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Summary and Recommendations: Incremental Improvements to Tennessee’s Childhood Obesity Problem are Possible

Tennessee’s childhood obesity rate has been trending higher for more than two decades, and every major report on childhood obesity shows that Tennessee is worse than the national average. High childhood obesity rates are associated with negative health outcomes for children as well as with higher obesity rates and negative health outcomes for adults. The rates of childhood and adult obesity in Tennessee are consistently higher than in most other states, with roughly a fifth of Tennessee’s children and a third of Tennessee’s adults obese. Childhood obesity is estimated to cost both Tennessee and the United States a substantial amount in related health care and other costs, although exact dollar figures cannot be determined.

The causes of childhood obesity are many and complex—the Mayo Clinic lists six major overlapping factors that increase a child’s risk of becoming overweight: diet, lack of exercise, family factors, psychological factors, socioeconomic factors, and certain medications. In the United States, the recognition of the upward trend and its many root causes has led to a wide array of responses from federal, state, and local governments. But as this report documents, these efforts to both understand and confront the problem have not been enough to halt and reverse the overall increasing trend of childhood obesity. Because of the Tennessee General Assembly’s concerns about childhood obesity, Public Chapter 503, Acts of 2021, requires the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) “to perform a comprehensive evaluation on the socioeconomic impact childhood obesity has in Tennessee and its short and long-term effects.”

Childhood obesity has been an ongoing epidemic in Tennessee, the US, and the world for over two decades.

In 1997, the World Health Organization (WHO) formally recognized obesity as a global epidemic and in 2021 estimated that the worldwide prevalence of obesity had nearly tripled since 1975. Among children and adolescents aged five through 19, the WHO found the share who were obese or overweight increased from just 4% in 1975 to more than 18% in 2016. Both WHO and the US Center for Disease Control and Prevention (CDC) determine whether someone is obese or overweight based on a person’s body mass index (BMI), which is calculated by dividing a person’s weight in kilograms by the square of height in meters. A high BMI may indicate an unhealthy amount of body fat. For children, the CDC defines obesity “as a BMI at or above the 95th percentile of the CDC

sex-specific BMI-for-age growth charts.” Overweight is defined as at or above the 85th percentile.

See table 1 for data by ages and grade levels for the percentage of Tennessee children overweight and obese compared to US percentages.

Table 1. Percentage of Tennessee Children Overweight and Obese Compared to US Percentages

Source of Data		Tennessee	US
US Bureau of the Census National Survey of Children’s Health (NSCH) Ages 10 through 17 (2019 to 2020)	Overweight	16.1%	15.9%
	Obese	20.8%	16.2%
CDC Youth Risk Behavior Surveillance System High School Students (YRBSS) (2019)	Overweight	18.3%	16.1%
	Obese	20.9%	15.5%
Body Weight Status* Assessed Students, Tennessee Public Schools Grades 2, 4, 6, 8 and any one year of high school (2019 to 20)	Overweight	17.0%	NA
	Obese	22.7%	NA

* Tennessee Department of Health, Division of Population Health Assessment 2019-20.

Childhood obesity affects specific demographics differently in both the US and Tennessee

Both Tennessee and national statistics show that childhood obesity rates vary across races, ethnicities, and family incomes. The National Survey of Children’s Health (NSCH) data from 2019 and 2020 shows the obesity rate for Tennessee children 10 through 17 was 30.4% for Hispanics, 25.2% for African Americans, and 17.3% for whites. For the same years, the NSCH data shows similar disparities nationally—the obesity rate for children 10 through 17 was 21.4% for Hispanics, 23.8% for African Americans, 12.1% for whites, 8.1% for Asians, and 16.9% for all other races. Regarding income levels in Tennessee, the same NSCH data reports the obesity percentage for children 10 through 17 whose family income was

- below the federal poverty line—29.9%;

- 100 to 199% of the federal poverty line—25.8%;
- 200 to 399% of the federal poverty line—19.6%; and
- 400% or greater of the federal poverty line—9.7%.

But class alone is not determinative of childhood obesity rates in the state. For instance, overall poverty rates for children under 18 in Tennessee fell from 25.7% in 2010 to 19.7% in 2019. Inflation-adjusted household incomes increased across all racial groups from 2010 to 2019 as well. But childhood obesity rates have gotten worse over the same period.

Childhood obesity is associated with negative health outcomes for children and adults.

Numerous adverse health outcomes of childhood obesity, whether in Tennessee or elsewhere, include the development of high blood pressure, high cholesterol, insulin resistance, type 2 diabetes, and fatty liver disease. Other medical consequences include sleep apnea, asthma, gallstones, skin conditions, menstrual abnormalities, impaired balance, and orthopedic problems. Negative psychological consequences of childhood obesity are also well-established. Weight stigma and bullying can contribute to behaviors such as binge eating, social isolation, avoidance of health care services, decreased physical activity, and increased weight gain over time. One study concluded that overweight and obese children were four times more likely to report having various problems at school than their healthy weight peers.

Overall, obese children and adolescents are around five times more likely to be obese in adulthood than children and adolescents who were not obese, and an individual is three times more likely to be obese as an adult if they enter kindergarten as an obese child. However, childhood obesity developing into adult obesity is still not the primary cause of adult obesity at the national level—80% of obese adults at least age 30 were not obese in adolescence. Obesity in adulthood has many of the same health and emotional consequences as childhood obesity.

Tennessee state government has made efforts to halt the increase in childhood obesity, but more could be done.

From better nutrition and more strenuous physical activity and physical education requirements in Tennessee schools to Gold Sneaker certifications for Tennessee daycares to better access to green spaces and parks, state initiatives have attempted to make Tennessee children healthier and halt the increase in obesity. Some state initiatives are Tennessee's implementation of federal nutrition programs such as school meals and the

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Many state efforts to make children and youth healthier have focused on public schools or daycares, the common locations where many children spend approximately a third of their day.

Coordinated School Health

Since the early 1900s, most school health programs across the country had been structured with three components: school health services, school health education, and school health environments. In the late 1980s, the CDC broadened this approach, retaining these components but adding food and nutrition services; health promotion for staff; physical education; counseling, psychological, and social services; and family and community involvement. The initial eight-component model became known as the Coordinated School Health approach—intended to build on the growing and increasingly complex understanding of the intertwined relationship between children’s education and health, as well as to encourage systemic coordination to eliminate gaps and overlaps and the best use of available personnel, time, and resources.

With the passage of the Coordinated School Health Improvement Act in 2000, Tennessee became the first state in the US to pass legislation mandating the CDC’s CSH model. From the beginning, Tennessee’s CSH initiative emphasized addressing the increasing rate of childhood obesity in the state. Tennessee’s CSH says that “Tennessee leads the nation by providing a state-funded CSH Coordinator in every school district.” As envisioned by the CDC, a full-time CSH Coordinator ensures a systematic approach is implemented to create and sustain healthy school environments so students can receive the support needed to make healthy choices. In addition to collecting and sharing BMI data with the Tennessee Department of Health (TDOH), the CSH is also statutorily required to submit the Coordinated School Health Annual Report and the Health Services Annual Report to the governor and General Assembly, and a Physical Education and Activity Report to the General Assembly. Funding for CSH, which has not been increased since 2007, was not calculated as part of the K-12 funding formula used through the 2022-23 school year—the Basic Education Program (BEP). However, recognizing the importance of the CSH program and its funding, the CSH is included in the base funding amount of the new Tennessee Investment in Student Achievement (TISA), which the state will begin to use to calculate K-12 funding in school year 2023-24. However, currently available information about TISA does not show the amount of state funds each district will receive for CSH. **Given that research supports the importance of coordinated collaborative efforts in addressing childhood obesity, the General Assembly should**

ensure each district receives at least the same amount of state funds for CSH under TISA than before it.

Physical Activity in Schools

Regular physical activity promotes health and fitness—physically active children and youth have lower body fat, stronger bones and muscles, improved cognition (e.g., academic performance and memory), and reduced symptoms of depression. Accordingly, the US Department of Health and Human Services currently recommends that children and adolescents ages six through 17 engage daily (not just school days) in sixty minutes or more of moderate-to-vigorous physical activity (MVPA). On average, 42% of Tennessee’s children’s daily physical activity occurs in school settings, and the state of Tennessee has taken numerous actions to increase physical activity in public schools over the years, including by strengthening laws to require more time spent on physical activity.

In Tennessee, the levels of children’s physical activity are roughly in line with US levels. According to the 2019 to 2020 NSCH data, 22.0% of children six through 17 years old in Tennessee achieved the recommended daily MVPA, slightly higher than the national average of 20.6%. According to the CDC’s Youth Risk Behavior Surveillance System (YRBSS), the percentage of high school students in Tennessee meeting the guidelines for MVPA has ranged between a high of 30.2% in 2011 to a low of 21.6% in 2019, when the national average was 23.2%. State statistics will likely show an increase in childhood obesity because of the COVID-19 pandemic—some early studies across the nation with data collected during the pandemic show declines in physical activity among children and adolescents because of disruptions in normal activities.

School Nutrition

School nutrition is another factor influencing childhood obesity. Children can consume up to two meals and a snack at school in a given day, which can amount to as much as 58% of their total daily caloric intake. In Tennessee, all public schools participate in the federal National School Lunch Program (NSLP), which determines the nutritional standards for foods served and available in all participating schools.

Together, the NSLP, School Breakfast Program, and Summer Food Service Program constitute the United States Department of Agriculture’s (USDA) child meal programs and are united by the goal of improving the diet of US children and addressing the issues of malnutrition, food insecurity, and obesity. To this end, child meal programs are mandated, overseen, and funded by the USDA, but policies, including those for

participation and implementation, may be refined by community-level agencies such as school districts and food service operations.

Since the 1990s, the USDA has taken numerous steps to strengthen the nutritional standards of food served in public schools, most notably with the Healthy, Hunger-Free Kids Act of 2010. This act established calorie limits for different age groups, decreased sodium levels and fat content, and increased the required offerings of whole grains, fruits, and vegetables. The lunch standards began to take effect across the country, including in Tennessee, in the 2012-13 school year; the new breakfast standards began to take effect in the 2013-2014 school year. The USDA has also established standards for food and beverage products sold in schools outside of breakfast and lunch programs (Smart Snacks), often referred to as competitive foods because they offer foods to students outside of and potentially in place of the food offered by the federally reimbursable school meal programs.

Breastfeeding Support

The American Academy of Pediatrics strongly recommends breastfeeding for all infants, and studies have shown that breastfeeding is associated with a reduced risk of children becoming overweight or obese. Research also shows that the longer an infant breastfeeds, the less likely he or she is to become overweight. Recognizing the importance of breastfeeding in getting children started with a healthy life, the state has taken many steps to support mothers, families, and employers. This includes passing several laws over the past decades to protect breastfeeding mothers. Additionally, TDOH maintains a comprehensive website with many resources about breastfeeding—[Breastfeeding in Tennessee \(tn.gov\)](http://Breastfeeding in Tennessee (tn.gov)).

Gold Sneaker Initiative

In 2008, TDOH developed the “Gold Sneaker Initiative” to enhance policy related to health and wellness within licensed childcare facilities across Tennessee. The Initiative is free and voluntary to any licensed childcare provider in Tennessee that has met training and application requirements. Through the Gold Sneaker Program, licensed Tennessee childcare providers may improve the health of the children in their care by adopting policies related to physical activity, healthy eating, and a tobacco-free environment. In 2018, Gold Sneaker policies were revised and updated, and the program also strengthened its partnership with the Tennessee Department of Human Services (TDHS) by integrating Gold Sneaker policies into the TDHS Star-Quality Program, a voluntary program that recognizes child care agencies who exceed minimum licensing standards.

The Initiative is currently being restructured and is not accepting applications as of September 2022.

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

Federal and state efforts to improve the nutritional quality of federal food programs that affect childhood obesity in Tennessee extend beyond school meal programs. Studies have found evidence of declining rates of obesity for children participating in WIC—which provides eligible families with nutritious foods, nutrition education, breastfeeding support, and referrals to health care—going against national trends (the nationwide rate for preschoolers rose over the same period) and putting preschool children participating in WIC on par with the overall national rate, which includes higher-income children. The WIC program is extremely supportive of breastfeeding, saying that “WIC mothers are strongly encouraged to breastfeed their infants unless there is a medical reason not to.” In 2019 in Tennessee, of the 251,100 individuals eligible for the WIC program, there were 109,400 participants in the state (a coverage rate of 43.6%). Tennessee’s coverage rate was below the national average (57.4%) and below that of some of its neighboring states—in 2019, coverage rates in Kentucky (56.7%), Georgia (49.2%), Alabama (61.8%), and Mississippi (59.6%) were each higher than in Tennessee. **If Tennessee raised its coverage rate to the 2019 national average of 57.4%, this would add almost 35,000 more participants to the program. Although no data are available showing how effective its current efforts to increase participation are, the Tennessee Department of Health should continue trying to increase participation in Tennessee’s Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).**

Chronic Weight Management Task Force

In 2021, Public Chapter 373 created the Chronic Weight Management Task Force to study the health implications of chronic weight management and Type 2 diabetes. The task force has held four public hearings with public health experts and will report its findings and recommendations to the General Assembly by January 15, 2023. **Even though the focus was not limited to childhood obesity, the state should review and consider the recommendations of the Chronic Weight Management Task Force, given their medical expertise and focus on improving treatment options for obesity.**

Incremental improvements to the problem of childhood obesity can be made.

Both the CDC and the Health and Medicine Division (HMD) of the National Academies recommend “multi-level strategies to develop environments and policies that support healthy eating and physical activity across a range of settings, including schools,

worksites, communities, and health care.” Given the consensus on the importance of multi-level strategies, the Commission recommends a data-driven and community-level three-step approach to further address childhood obesity in the state:

- The first step would be to collect the appropriate community-level data, most of which is not yet available. The Tennessee Livability Collaborative, a working group of approximately 20 state agencies with a mission of improving the prosperity, quality of life, and health of Tennesseans, is already working on collecting a set of 120 community indicators, many of which—such as access to parks and recreation and food insecurity—are relevant to childhood obesity. The Collaborative can add more indicators relevant to childhood obesity. Agencies participating in the Collaborative already work together to coordinate state efforts to solve difficult problems. The Collaborative is supported by Tennessee Department of Health staff, and the Department of Health is willing to further coordinate state efforts to target childhood obesity through the Collaborative.
- The second step would be to analyze and evaluate the data, including examining how different demographics are affected by childhood obesity. The Office of Evidence and Impact (OEI) in the Tennessee Department of Finance and Administration, which promotes and facilitates data sharing among departments to gather deeper insights about program outcomes, identify gaps in state services, and inform intelligent policy design, would be particularly helpful with this kind of analysis. OEI is willing to support TDOH and the Livability Collaborative.
- The third step is for the state to use insights from the data to create pilot programs in communities with high rates of childhood obesity to test the effectiveness of these programs. If a local community does then slow or even halt the growth in its rate of childhood obesity, that local data would allow the state to evaluate more precisely which efforts are leading to the positive change, and state officials could then consider taking the initiatives statewide.

This data-driven community approach would be a new direction for the state on this issue, and the Livability Collaborative and OEI are willing to work closely with other Tennessee state departments to find out what is working to improve childhood obesity at the community level. However, even if successful, it is likely that halting and reversing the trend at the state level will take time and require efforts across multiple administrations.

Analysis: Incremental Improvements to Tennessee’s Childhood Obesity Problem are Possible

In the United States, the recognition of the upward trend in childhood obesity rates and its many root causes has led to a wide array of responses from federal, state, and local governments. But as this report documents, these efforts to both understand and confront the problem have not been enough to halt and reverse the overall increasing trend of childhood obesity. Because of the Tennessee General Assembly’s concerns about childhood obesity, Public Chapter 503, Acts of 2021, requires TACIR “to perform a comprehensive evaluation on the socioeconomic impact childhood obesity has in Tennessee and its short and long-term effects.” The report is due on or before January 31, 2023.

Childhood obesity has been an ongoing epidemic in Tennessee, the US, and the world for over two decades.

In 1997, the World Health Organization (WHO) formally recognized obesity as a global epidemic¹ and in 2021 estimated that the worldwide prevalence of obesity had nearly tripled since 1975. In 2016, WHO found that more than 1.9 billion adults aged 18 years and older were overweight, and of these over 650 million were obese.² WHO reports that “today more people are obese than underweight in every region except sub-Saharan Africa and Asia”³ and that the prevalence of children and adolescents aged five through 19 who are overweight or obese “has risen dramatically from just 4% in 1975 to just over 18% in 2016.”⁴

Both WHO and the US Center for Disease Control and Prevention (CDC) define body mass index (BMI) as a person’s weight in kilograms divided by the square of height in meters. A high BMI may indicate an unhealthy amount of body fat.⁵ For children, the CDC defines obesity “as a body mass index (BMI) at or above the 95th percentile of the CDC sex-specific BMI-for-age growth charts.”⁶ Overweight is defined as at or above the

¹ World Health Organization 1997.

² World Health Organization 2021.

³ World Health Organization “Obesity.”

⁴ World Health Organization 2021.

⁵ Centers for Disease Control and Prevention “Body Mass Index (BMI).”

⁶ Centers for Disease Control and Prevention “Childhood Obesity Facts.”

85th percentile. The CDC says that “BMI is interpreted differently for children and teens, even though it is calculated using the same formula as adult BMI. Children and teen’s BMI need to be age and sex-specific because the amount of body fat changes with age and differs between girls and boys. The CDC BMI-for-age growth charts consider these differences and visually show BMI as a percentile ranking.”⁷

The CDC says that “[f]or adults 20 years old and older, BMI is interpreted using standard weight status categories.” These categories are the same for men and women of all body types and ages. CDC definitions for adult BMI ranges are:

- Underweight—BMI less than 18.5,
- Healthy Weight—BMI 18.5 to <25,
- Overweight—BMI 25.0 to <30 [85th percentile, same as WHO definition],
- Obese—BMI 30.0 or higher [95th percentile, same as WHO definition],
 - Obesity Class 1—BMI of 30 to < 35,
 - Obesity Class 2—BMI of 35 to < 40,
 - Obesity class 3—BMI of 40 or higher (sometimes called “severe” obesity)

The US Census Bureau’s National Survey of Children’s Health (NSCH) is designed to produce national and state-level data on the physical and emotional health of children zero through 17 years old in the United States, although the childhood obesity measurement only includes children 10 through 17 years old.⁸ Tennessee’s childhood obesity rate has been trending higher for more than two decades.⁹ The rates of childhood and adult obesity in Tennessee are consistently higher than in most other states, with roughly a fifth of Tennessee’s children and a third of Tennessee’s adults obese.¹⁰ The 2019 and 2020 NSCH (2 years combined) reported that the percentage of Tennessee children who were overweight was 16.1% as compared to 15.9% both nationally and for the

⁷ Centers for Disease Control and Prevention “About Adult BMI.”

⁸ United States Census Bureau. “About the National Survey of Children’s Health.”

⁹ Data Resource Center for Child and Adolescent Health. National Survey of Children’s Health “Weight Status of Children Based on Body Mass Index for Age: Children Age 10-17 Years: Nationwide vs. Tennessee;” and Centers for Disease Control and Prevention “High School Youth Risk Behavior Survey: Tennessee 2019 and United States 2019 Results;” and Tennessee Department of Health 2021.

¹⁰ State of Childhood Obesity “Tennessee.”

Southeast,¹¹ and the percentage of Tennessee children with obesity was sixth worst nationally,¹² at 20.8% as compared to the national average of 16.2% and regional average of 19.0%.¹³

The CDC's Youth Risk Behavior Surveillance System (YRBSS) is another important source of childhood obesity data. The YRBSS was developed by the CDC in 1990 to monitor health behaviors established during childhood and early adolescence "that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States."¹⁴ For obesity, the YRBSS collects data on high school students. The most recent YRBSS data is from 2019—20.9% of high school youth in Tennessee were obese, as compared to the national percentage of 15.5%, and 18.3% were overweight, compared to the national percentage of 16.1%.¹⁵ Tennessee's percentage of high school students with obesity was fourth worst nationally.¹⁶ Three of the four states with a high school obesity percentage greater than 20% were in the Southeast (Tennessee, Mississippi, and Arkansas).¹⁷ The percentage of Tennessee high

¹¹ Data Resource Center for Child and Adolescent Health. National Survey of Children's Health. The HRSA divides the country into ten regions; the Southeast is HRSA Region IV and includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee.

¹² Data Resource Center for Child and Adolescent Health. National Survey of Children's Health 2019-20. Alabama (21.8%), West Virginia (21.9%), Louisiana (22.2%), Mississippi (22.3%), and Kentucky (23.8%) are the five states with higher childhood obesity rates than Tennessee in the population surveyed by the NSCH survey. Overall, 6 of the 9 states with a childhood obesity rate above 20% were in the Southeast. Kentucky (23.8%), West Virginia (21.9%), and Texas (20.3%) were the three states above 20% outside of the Southeast.

¹³ Data Resource Center for Child and Adolescent Health. National Survey of Children's Health 2019-2020. "Weight Status of the Child Based on Body Mass Index for Age: Children Age 10-17 Years: Nationwide vs. Tennessee"; and National Survey of Children's Health "Weight Status of the Child Based on Body Mass Index for Age: Children Age 10-17 Years: Nationwide vs. HRSA Region IV."

¹⁴ Centers for Disease Control and Prevention "Youth Risk Behavior Surveillance System (YRBSS) Overview."

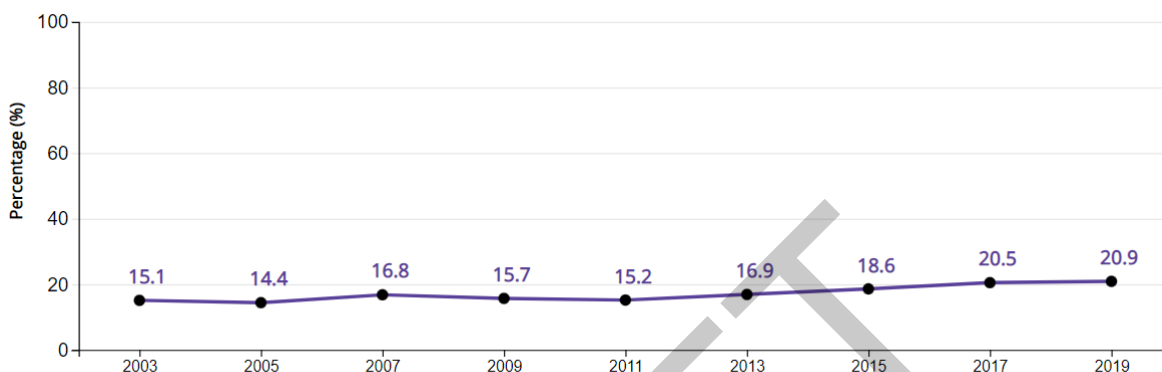
¹⁵ Centers for Disease Control "High School Youth Risk Behavior Survey: Tennessee 2019 and United States 2019 Results."

¹⁶ Ibid. Arkansas (22.1%), West Virginia (22.9%), and Mississippi (23.4%) were the three states with worse obesity rates for high school students.

¹⁷ Centers for Disease Control "High School Youth Risk Behavior Survey: Tennessee 2019 and United States 2019 Results." West Virginia (22.9%) was the only state above 20% outside of the Southeast.

school students with obesity increased from 15.1% in 2003 to 20.9% in 2019.¹⁸ And over the same period, the percentage of African-American high school students with obesity in Tennessee climbed from 18.0% to 23.6%.¹⁹ See figure 1 for the percentage of Tennessee high school students with obesity over time.

Figure 1. Percentage of Tennessee High School Students with Obesity Over Time



* Students who were \geq 95th percentile for body mass index, based on sex- and age-specific reference data from the 2000 CDC growth charts.

Source: Centers for Disease Control Youth Risk Behavior Surveillance System 2019.

As part of the Tennessee Department of Education’s Coordinated School Health (CSH) program, schools are encouraged to screen students’ BMIs (with parental permission required by some districts). CSH then passes that data to the Tennessee Department of Health (TDOH), which is statutorily required to report BMI. Data is collected from kindergarten, grades 2, 4, 6, 8, and any one year of high school. The most recent Tennessee Public Schools Summary of Weight Status Report is for school year 2019-20—22.7% of students were obese and 17.0% were overweight. See appendix A for a copy of this report, which includes county-level obesity and overweight data for three years. Of the Tennessee counties for which at least half of the student population was assessed in the 2019-20 school year, Sequatchie County had the highest prevalence of overweight or obese students (54.1%) while Montgomery County had the lowest (29.8%).²⁰

See table 1 for data by ages and grade levels for the percentage of Tennessee children overweight and obese compared to US percentages.

¹⁸ Centers for Disease Control “High School Youth Risk Behavior Survey: Tennessee 2019 and United States 2019 Results.”

¹⁹ Ibid.

²⁰ Tennessee Department of Health 2021.

Table 1 (reposted). Percentage of Tennessee Children Overweight and Obese Compared to US Percentages

Source of Data		Tennessee	US
US Bureau of the Census National Survey of Children’s Health (NSCH) Ages 10-17 (2019-2020)	Overweight	16.1%	15.9%
	Obese	20.8%	16.2%
CDC Youth Risk Behavior Surveillance System (YRBSS) High School Students (2019)	Overweight	18.3%	16.1%
	Obese	20.9%	15.5%
Body Weight Status* Assessed Students, Tennessee Public Schools Grades 2, 4, 6, 8 and any one year of high school (2019-20)	Overweight	17.0%	NA
	Obese	22.7%	NA

* Tennessee Department of Health, Division of Population Health Assessment 2019-20.

Another important source of information for childhood obesity rates is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)—“a federal food program that provides low-income nutritionally at-risk pregnant women, postpartum mothers, infants, and children up to 5 years old with nutritious foods, nutrition education, breastfeeding support, and referrals to health care.”²¹ In biennial censuses, the United States Department of Agriculture (USDA) collects the data of families that WIC serves, including obesity rates for children in the program, ages two through four. In 2018 (the most recent data), 15.2% of Tennessee children in this age group were obese. The national WIC average for this age group was 14.4%—Tennessee’s average was tied for 16th worst. The regional pattern for obesity among WIC-served children is less dramatic than in the NSCH and YRBSS reports—only four of the 18 states with obesity rates 15% or higher are in the southeast.²²

²¹ United States Department of Agriculture, Food and Nutrition Service, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) “WIC at a Glance.”

²² State of Childhood Obesity “Obesity Ranks Among WIC Participants Ages 2-4.”

Childhood obesity affects specific demographics differently in both the US and Tennessee

Tennessee and national statistics show that childhood obesity rates vary across races, ethnicities, and family incomes. In Tennessee, the NSCH data from 2019 to 2020 shows the obesity rate for children 10 through 17 was 30.4% for Hispanics, 25.2% for African Americans, and 17.3% for whites. For the same years, the NSCH data shows similar disparities nationally—the obesity rate for children 10 to 17 was 21.4% for Hispanics, 23.8% for African Americans, 12.1% for whites, 8.1% for Asians, and 16.9% for all other races.²³

Regarding income levels in Tennessee, the same NSCH data reports the obesity percentage for youth whose family income was

- below the federal poverty line (FPL)—29.9%,
- 100 to 199% of the FPL—25.8%,
- 200 to 399% of the FPL—19.6%, and
- 400% or greater of the FPL—9.7%.²⁴

But class alone is not determinative of childhood obesity rates in the state. For instance, overall poverty rates for children under 18 in Tennessee have fallen over the last decade from 25.7% in 2010 to 19.7% in 2019. Tennessee’s 2019 percentage was higher than the national average of 16.8%.²⁵ Inflation-adjusted household incomes have increased across all racial groups in Tennessee over the last decade—median household income for white households increased by about \$8,000 from 2010 to 2019 (roughly \$52,000 to \$60,000 or a 15.4% increase), median income for African-American households has increased by about \$4,000 over the same period (roughly \$37,000 to \$41,000 or a 10.8% increase), and median income for Hispanic households has increased by about \$8,000 (roughly \$38,000 to

²³ Data Resource Center for Child and Adolescent Health. National Survey of Children’s Health “Weight Status of Children Based on Body Mass Index for Age: Children Age 10-17 Years: Nationwide vs. Tennessee: Obese (95th percentile or above) x Race/ethnicity of child – with Asian.”

²⁴ Data Resource Center for Child and Adolescent Health. National Survey of Children’s Health “Weight Status of Children Based on Body Mass Index for Age: Children Age 10-17 Years: Nationwide vs. Tennessee: Obese (95th percentile or above) x Household income level.”

²⁵ Sycamore Institute 2020.

\$46,000 or a 21.0% increase).²⁶ But as noted above, childhood obesity rates have gotten worse over the same period.²⁷

Many studies have also linked disparities in public health—including obesity—to food access and consumption. Researchers have found that people living in food deserts, which are low-income areas lacking large grocery stores, supermarkets, or supercenters, tend to have a less nutritious diet and poorer health outcomes than those living in other communities. By one measure, in Tennessee 21% of the state’s population lives in areas considered to be food deserts—15% in urban food deserts and 6% in rural food deserts.²⁸ Food desert interventions are complex, however. As TACIR found in 2019, “Although the use of government incentives can help encourage the development of food retailers in food deserts, it is unclear whether simply opening or expanding stores in these communities leads to measurable changes in diet or health.”²⁹ Improving access to healthy food in food deserts requires significant community outreach and education. Another report found that “engaging community residents and understanding neighborhood context is critical to developing strategies that increase access to healthful foods in corner stores.”³⁰

Childhood obesity is associated with negative health outcomes for children and adults.

Numerous adverse health outcomes, including the development of high blood pressure, high cholesterol, insulin resistance, type 2 diabetes, and fatty liver disease, are associated with obesity in children.³¹ Type 2 diabetes, for instance, is a disease that was not common in children prior to the childhood obesity epidemic and has severe health consequences.³²

²⁶ Sycamore Institute 2020.

²⁷ Centers for Disease Control “High School Youth Risk Behavior Survey: Tennessee 2019 and United States 2019 Results.”

²⁸ Tennessee Advisory Commission on Intergovernmental Relations 2019.

²⁹ Ibid.

³⁰ Larson et al 2013.

³¹ National Collaborative on Childhood Obesity Research 2020.

³² Deese 2016. Prediabetes, which means that the level of sugar (glucose) in the blood is higher than normal, but not high enough to be diagnosed as having full-fledged diabetes, is also on the rise nationally for children. According to recent research, the percentage of youths aged 12-19 with prediabetes has

As one childhood obesity expert noted, “We never used to see children with type 2 diabetes, but it’s happening more often these days. Kids ages 14 to 18 now have type 2 diabetes and an increased chance of things like blindness or the need for dialysis in their career years, which is a scary future.”³³ The risk of death in patients diagnosed with type 2 diabetes in their late teens and 20s is 36% higher than it is among adults diagnosed in their 30s.³⁴ Other medical consequences include sleep apnea, asthma, gallstones, skin conditions, menstrual abnormalities, impaired balance, and orthopedic problems.³⁵

Negative psychological consequences of childhood obesity are also well-established. Weight stigma and bullying can contribute to behaviors such as binge eating, social isolation, avoidance of health care services, decreased physical activity, and increased weight gain over time.³⁶ One study concluded that “overweight and obese children were four times more likely to report having problems at school than their healthy weight peers.”³⁷ In a 2003 article in the *Journal of the American Medical Association*, the authors said that

obesity is one of the most common chronic disorders in childhood and its prevalence continues to increase rapidly. There is a growing awareness of the long-term health complications of obesity in children and adolescents, yet many pediatricians do not offer treatment to obese children and adolescents in the absence of comorbid conditions. However, the most widespread consequences of childhood obesity may be psychosocial. Obese children and adolescents are at risk for psychological and social adjustment problems, including lower perceived competencies than

more than doubled in recent years, going from just under 12% in 1999 to 28% by 2018. (Searing 2022; Liu et al. 2022).

³³ Interview with Dr. Sarah Colby, associate professor, Department of Nutrition, University of Tennessee, Knoxville January 24, 2022. From Coordinated school data, there were 2,786 students with diabetes in the 2020-21 school year. Given a student population of 935,376 (2020 -Kedebe), this percentage is about .29%. According to CSH, the national average is .25% (which would mean around 2,338 students in TN). Email correspondence from Lori Paisley, senior director, CSH, December 8, 2021.

³⁴ Jackson 2017.

³⁵ Sahoo et al. 2015.

³⁶ Pont et al. 2017.

³⁷ Sahoo et al. 2015.

normative samples on social, athletic, and appearance domains, as well as overall self-worth.³⁸

Although there is consensus that being obese causes problems in school, researchers disagree on whether obesity causes decreased school performance.³⁹

Childhood obesity has negative health effects that can continue into adulthood. According to the authors of a 2015 article in the *Journal of Family Medicine and Primary Care*, “Although most of the physical health conditions associated with childhood obesity are preventable and can disappear when a child or adolescent reaches a healthy weight, some continue to have negative consequences throughout adulthood.”⁴⁰ Overall, obese children and adolescents are around five times more likely to be obese in adulthood than children and adolescents who were not obese, and an individual is three times as likely to be obese as an adult if they enter kindergarten as an obese child.⁴¹ And the probability of being obese as a young adult increases with the age of the obese child. The authors of a 1997 *New England Journal of Medicine* article said that “after six years of age, the probability of obesity in adulthood exceeded 50 percent for obese children, as compared with about 10 percent for nonobese children.”⁴² Around 80% of obese adolescents will be obese into young adulthood, but only around 70% will be obese after age 30.⁴³

However, childhood obesity developing into adult obesity is still not the primary cause of adult obesity at the national level—80% of obese adults at least age 30 were not obese in adolescence.⁴⁴ But the positive correlation of childhood obesity with adult obesity could be increasing. One childhood obesity expert in Tennessee said the current statistic speaks more to recent changes in the environment and lifestyle of adults, like decreasing

³⁸ Schwimmer et al. 2003.

³⁹ Pont et al. 2017; and Presentation at December 1, 2021 TACIR meeting by Dr. Jacqueline Yenerall, assistant professor, Department of Agricultural and Resource Economics (ARE), University of Tennessee.

⁴⁰ Sahoo et al. 2015.

⁴¹ Presentation at September 15, 2021 TACIR Meeting by Dr. Shari Barkin, director, Pediatric Obesity Research, Vanderbilt University School of Medicine (now physician-in-chief of Children’s Hospital of Richmond at VCU and chair of the Department of Pediatrics at VCU School of Medicine).

⁴² Whitaker et al. 1997.

⁴³ Simmonds et al. 2016.

⁴⁴ Presentation at December 1, 2021 TACIR meeting by Dr. Jacqueline Yenerall, assistant professor, Department of Agricultural and Resource Economics (ARE), University of Tennessee.

adult physical activity and worsening dietary patterns, including the rise of fast food over the past 30 years. As the number of children with obesity increases over time, she expects that the percentage of obese adults who were not obese in adolescence will decrease.⁴⁵

Obesity in adulthood has many of the same health consequences as childhood obesity. And like childhood obesity, obesity in adulthood is also linked to depression and other mental health problems.⁴⁶ According to the National Institutes of Health,

People who deal with overweight and obesity may also be the subject of weight bias and stigma from others, including health care providers. This can lead to feelings of rejection, shame, or guilt—further worsening mental health problems.”⁴⁷

Childhood and adult obesity are estimated to cost Tennessee and the United States a substantial amount in related health care and other costs, although exact dollar figures cannot be determined.⁴⁸ Current adult obesity rates are also affecting current US military readiness with just over one in three young adults between the ages of 17 and 24 having a BMI too high to qualify for military service.⁴⁹

The causes of childhood obesity are many and complex.⁵⁰

In recent years, there has been a move in government—especially in public health and education—toward taking a systems approach to attempt to halt the increase in childhood obesity. Instead of simply telling children to eat less and engage in more physical activity, the focus is on figuring out why some children seem predisposed to obesity, and why children across demographics vary in consumption of calories and

⁴⁵ Interview with Dr. Sarah Colby, associate professor, Department of Nutrition, University of Tennessee, Knoxville, January 24, 2022.

⁴⁶ National Institutes of Health “Health Risks of Overweight & Obesity.”

⁴⁷ Ibid.

⁴⁸ Presentation at September 15, 2021 TACIR Meeting by Dr. Shari Barkin, director, Pediatric Obesity Research, Vanderbilt University School of Medicine (now physician-in-chief of Children’s Hospital of Richmond at VCU and chair of the Department of Pediatrics at VCU School of Medicine); and Presentation at December 1, 2021 TACIR meeting by Dr. Jacqueline Yenerall, assistant professor, Department of Agricultural and Resource Economics (ARE), University of Tennessee.

⁴⁹ Centers for Disease Control and Prevention “Consequences of Obesity.”

⁵⁰ Mayo Clinic “Childhood Obesity.”

engagement in physical activity. In a presentation to the Commission, Tennessee Department of Health staff said that “when it comes to childhood obesity, we are evolving from where we were even just five to 10 years ago where we thought mostly about what the child is eating (like what type of calories are they consuming) and how much activity the child is getting. We now know obesity is influenced by a lot more than just those two things and is not an issue that has one simple solution.”⁵¹

The Mayo Clinic lists six major overlapping factors that increase a child’s risk of becoming overweight: diet, lack of exercise, family factors, psychological factors, socioeconomic factors, and certain medications.⁵² The Institute of Medicine’s Committee on Accelerating Progress in Obesity Prevention similarly said in 2012 that “an impressive body of evidence confirms that the drivers of the epidemic involve interactions among several complex, ever-changing systems, including the food system, transportation systems, community infrastructure, school systems, health care systems, and the intricate behavioral and physiological systems that influence individual physical activity and eating behaviors and body weight.”⁵³

In the public health realm, a systems perspective has become increasingly influential in recent years as a key strategy for promoting population-level health and disease prevention.⁵⁴ The systems approach currently provides the framework for the obesity prevention activities and recommendations of the CDC and the Health and Medicine Division (HMD) of the National Academies (formerly the Institute of Medicine). Both organizations recommend “multi-level strategies to develop environments and policies that support healthy eating and physical activity across a range of settings, including schools, worksites, communities, and health care.”⁵⁵

Tennessee state government has made efforts to halt the increase in childhood obesity, but more could be done.

From better nutrition and more strenuous physical activity and physical education requirements in Tennessee schools to Gold Sneaker certifications for Tennessee daycares

⁵¹ Presentation at December 1, 2021 TACIR Meeting by Leslie Meehan, director, Office of Primary Prevention, Tennessee Department of Health.

⁵² Mayo Clinic “Childhood Obesity.”

⁵³ Glickman et al. 2012.

⁵⁴ Fagen et al. 2014.

⁵⁵ Pelletier 2016.

to better access to green spaces and parks, state initiatives have attempted to make Tennessee children healthier and halt the increase in obesity. Some state initiatives are Tennessee's implementation of federal nutrition programs such as school meals and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Many state efforts to make children and youth healthier have focused on public schools or daycares, the common locations where many children spend approximately a third of their day.

Schools

The Tennessee General Assembly, the Tennessee State Board of Education, and the Tennessee Department of Education have taken many steps to improve the health of Tennessee's children and youth, including attempts to prevent childhood obesity. While most school districts have implemented nutrition education and physical activity programs for decades, their understanding and use of a systems approach to obesity prevention have also been increasing.⁵⁶ This includes implementing Coordinated School Health, increasing physical activity and physical education in schools, and improving school nutrition.

Coordinated School Health

Since the early 1900s, most school health programs across the country had been structured with three components: school health services, school health education, and school health environments. In the late 1980s, the CDC broadened this approach, retaining these components but adding food and nutrition services; health promotion for staff; physical education; counseling, psychological and social services; and family and community involvement.⁵⁷ The initial eight-component model became known as the Coordinated School Health (CSH) approach and was intended to build on the growing and increasingly complex understanding of the intertwined relationship between children's education and health,⁵⁸ as well as to encourage "systemic coordination in order to eliminate gaps and overlaps and the best use of available personnel, time, and resources."⁵⁹ States began to implement this systems approach over the next decade.

⁵⁶ Fagen et al. 2014.

⁵⁷ Allensworth and Kolbe 1987; and Lohrmann 2008.

⁵⁸ Allensworth and Kolbe 1987; and Lohrmann 2008.

⁵⁹ Rasberry et al. 2015.

With the passage of the Coordinated School Health Improvement Act in 2000,⁶⁰ Tennessee became the first state in the US to pass legislation mandating the CSH model.⁶¹ The act provided for \$1,000,000 in funding to start 10 pilot sites at schools across the state. The Office of Coordinated School Health was created in the 2000-2001 school year, and subsequently the State of Tennessee has continued to adopt new policies that prioritize the importance of good health in school settings.⁶² CSH was expanded statewide in 2006 with \$15 million in state funding through the Coordinated School Health Expansion and Physical Activity Act.⁶³ The act created a Physical Education Specialist and a Coordinator of School Health position within the Tennessee Department of Education (TDOE) and mandated 90 minutes of physical activity per week in grades K-12. By July 1, 2007, all Tennessee public school systems had implemented CSH.⁶⁴ Funding for CSH at the state level has not been increased since 2007. Funding for CSH, which has not been increased since 2007, was not calculated as part of the K-12 funding formula used through the 2022-23 school year—the Basic Education Program (BEP). However, recognizing the importance of the CSH program and its funding, the CSH is included in the baseline funding amount of the new Tennessee Investment in Student Achievement (TISA), which the state will begin to use to calculate K-12 funding in school year 2023-24. Currently available information about TISA does not show the amount of state funds each district will receive for CSH.

From the beginning, Tennessee’s CSH initiative emphasized addressing the increasing rate of childhood obesity in the state.⁶⁵ Tennessee’s CSH says that “Tennessee leads the nation by providing a state-funded CSH Coordinator in every school district.”⁶⁶ As envisioned by the CDC, “a full time CSH Coordinator⁶⁷ ensures a systematic approach is

⁶⁰ Public Chapter 554, Acts of 2000.

⁶¹ Tennessee Department of Education 2021.

⁶² Tennessee Department of Education “Coordinated School Health.”

⁶³ Public Chapter 1001, Acts of 2006; and Tennessee Department of Education “Coordinated School Health.”

⁶⁴ In 2010, the act was renamed the Connie Hall Givens Coordinated School Health Improvement Act. Public Chapter 764, Acts of 2010.

⁶⁵ Interview with Lori Paisley, senior director, Coordinated School Health, Tennessee Department of Education, November 2, 2021.

⁶⁶ Ibid.

⁶⁷ Tennessee Department of Education 2019; School systems with less than 3,000 students are only required to establish a CSH coordinator at 50% time or more.

implemented to create and sustain healthy school environments so students can receive the support needed to make healthy choices.”⁶⁸ Tennessee’s CSH lists several main goals:

- “improve the health and academic status of all Tennessee students,
- build and maintain state and local partnerships to address school health priorities,
- create an understanding about the relationship between health and academics,
- maximize resources and avoid duplication of services through effective coordination and communication, and
- utilize data to develop and maintain school health priorities.”⁶⁹

In addition to sharing BMI data with the Tennessee Department of Health (TDOH), the CSH is also statutorily required to submit the Coordinated School Health Annual Report and the Health Services Annual Report to the governor and General Assembly, and a Physical Education and Activity Report to the General Assembly.⁷⁰

Fitness and Nutrition Education in Schools

In addition to CSH, Tennessee’s “Lifetime Wellness Grades 9-12” standards (see appendix B) require high school students to master many fitness and nutritional concepts, including being able to

- “list the health problems associated with inadequate levels of health-related fitness;
- distinguish between facts and fallacies as related to fitness products, services, and marketing;
- discuss the social, emotional, physical, and mental benefits associated with participation in physical fitness activities;
- identify resources and facilities in the community that promote physical fitness and wellness;
- identify the six classes of nutrients and describe their functions;

⁶⁸ Tennessee Department of Health “Tennessee Coordinated School Health.”

⁶⁹ Tennessee Department of Education “Tennessee Coordinated School Health.”

⁷⁰ Tennessee Department of Education “CSH Reports & Data.”

- evaluate personal nutritional and energy needs;
- compare and contrast dietary guidelines (e.g., USDA, Mayo, Harvard);
- identify the relationship between healthy eating and total wellness;
- discuss eating disorders and their effects on the total wellness of the individual;
- assess personal daily dietary practices to each of the categories to the current USDA Food Guide Pyramid;
- interpret information provided on food labels;
- identify “fad diets” and their impact on total wellness;
- describe food safety including food storage, cooking and sanitation;
- identify factors that influence food choices (e.g., culture, family/friends, advertising, time and money, emotions, taste, spiritual beliefs); and
- examine the relationship between diet and disease (e.g., obesity, hypertension, diabetes, elevated cholesterol levels).⁷¹

Physical Activity in Schools

Physical activity is another key factor related to childhood obesity. Regular physical activity promotes health and fitness—physically active children and youth have lower body fat, stronger bones and muscles, improved cognition (e.g., academic performance and memory), and reduced symptoms of depression.⁷² Accordingly, the US Department of Health and Human Services currently recommends that children and adolescents ages six through 17 engage daily (not just school days) in 60 minutes or more of moderate-to-vigorous physical activity (MVPA).⁷³ However, the NSCH reported that only 20.6% of US youth ages six through 17 met the recommended level in 2019 and 2020.⁷⁴ Similarly,

⁷¹ Tennessee Department of Education “Lifetime Wellness Grades 9-12.”

⁷² Centers for Disease Control and Prevention “Physical Activity Guidelines for School-Aged Youth and Adolescents.”

⁷³ Ibid.

⁷⁴ Data Resource Center for Child and Adolescent Health. National Survey of Children’s Health 2019-2020 “Number of Days During Past Week Children Engaged in Vigorous Physical Activity For At Least 60 Minutes: Children Aged 6-17 Nationwide.”

the YRBSS reported 23.2% of US high school students reached the recommended levels of MVPA in 2019.⁷⁵

In Tennessee, the levels of children’s physical activity are roughly in line with US levels. According to the 2019 and 2020 NSCH, 22.0% of children six through 17 years old in Tennessee achieved the recommended daily MVPA, slightly higher than the national average of 20.6%.⁷⁶ The percentage of high school students in Tennessee meeting the guidelines for MVPA has ranged between a high of 30.2% in 2011 and a low of 21.6% in 2019, according to the YRBSS, with the most recent data falling below the national average of 23.2% for that survey.⁷⁷ State statistics will likely show an increase in childhood obesity because of the COVID-19 pandemic—some early studies across the nation with data collected during the pandemic show declines in physical activity among children and adolescents due to disruptions in normal activities.⁷⁸

The US and Tennessee are not completely out of step with the rest of the world with the level of physical activity of children and youth. A global study in 2012 found only 19.7% of 13 through 15-year-olds reached at least 60 minutes of MVPA per day.⁷⁹ Worldwide studies on physical activity levels for children find that physical activity declines as children age and that there is a gender disparity between male and female children. A 2016 study from Australia, for instance, found that girls were 19% less active than boys.⁸⁰

School policies and practices play a vital role in the levels of physical activity among Tennessee’s children—on average 42% of their daily physical activity occurs in school settings.⁸¹ The state of Tennessee has taken numerous actions to increase physical activity in public schools over the years. In 2006, the General Assembly passed Public Chapter

⁷⁵ Centers for Disease Control and Prevention “Youth Risk Behavior Survey: High School Students Who Were Physically Active At Least 60 Minutes Per Day on All 7 Days 2011-2019.”

⁷⁶ Data Resource Center for Child and Adolescent Health. National Survey of Children’s Health 2019-2020 “Number of Days During Past Week Children Engaged in Vigorous Physical Activity For At Least 60 Minutes: Children Aged 6-17 Nationwide vs. Tennessee.”

⁷⁷ Centers for Disease Control and Prevention “Youth Risk Behavior Survey: Tennessee High School Students Who Were Physically Active At Least 60 Minutes Per Day on All 7 Days 2007-2019.”

⁷⁸ Nagata et al. 2022.

⁷⁹ Hallal et al. 2012.

⁸⁰ Telford et al. 2016.

⁸¹ Carlson et al. 2016.

1001, the “Physical Activity Law,” which required all local education agencies (LEAs) to integrate a minimum of 90 minutes of physical activity per week for students of all ages in all public and charter schools. Physical activity qualifying under the law could include “walking, jumping rope, playing volleyball, or other forms of physical activity that promote fitness and well-being.”⁸² The law passed with widespread support in 2006 and its implementation began a year later in 2007.⁸³ In 2011, Public Chapter 245 added a new component to the law, requiring that by 2012, CSH report to the General Assembly on the implementation of the physical activity requirement, and in 2014, Public Chapter 986 revised the law to prevent “walking to and from class” from being considered physical activity.

In 2016, Public Chapter 669 substantially revised the law to include more specific physical activity requirements. For K to 1 students, a minimum of three fifteen-minute periods of non-structured physical activity per day was required, and for students in grades 2 to 6, a minimum of two twenty-minute periods of non-structured physical activity at least four days a week was now required. Guidelines for grades 7 to 12 remained largely unchanged. After many school leaders raised concerns that the specificity of the requirements was too restrictive,⁸⁴ Public Chapter 99, Acts of 2017 revised Tennessee Code Annotated, Section 49-6-1021, making the guidelines simpler to administer by basing the law on weekly instead of daily totals, except for elementary students, for which the law still required at least one fifteen-minute period of physical activity per day. Beyond that, however, the weekly requirement for elementary students was 130 minutes of physical activity. For middle and high school students, the weekly time required by law for physical activity was 90 minutes.

The Tom Cronan Physical Education Act of 2018 (Public Chapter 976) added new language to Tennessee Code Annotated, Section 49-6-1021. In addition to physical activity requirements, the Cronan Act required that elementary schools have a “physical education class that meets at least two times per full school week” and that “the total physical education class time each full school week shall be no less than sixty minutes.” The classes also need to be taught by a licensed PE teacher.⁸⁵ The requirements went into

⁸² Tennessee Code Annotated, Section 49-6-1021.

⁸³ Pate and Buchner 2012.

⁸⁴ Brobeck 2017.

⁸⁵ Tennessee Code Annotated, Section 49-6-1021.

effect for the 2020-21 school year.⁸⁶ Nearly 60 local school districts requested a waiver of the physical education requirements of the Cronan Act for that school year, often citing COVID-19 as the reason, but the Tennessee State Board of Education rejected any requests to lessen the time requirements of the Cronan Act, stressing the need for physical activity for students—especially during the pandemic.⁸⁷ Students are also required by the Tennessee Board of Education to take physical education in grade nine and to earn physical education credit (0.5 credit) for high school graduation.⁸⁸ Even with these policies, the State of Tennessee still falls short of the recommendations from the Society of Health and Physical Educators (SHAPE America), which recommends at least 30 minutes of daily PE for elementary grade levels and 45 minutes of daily PE for secondary school and high school grade levels.⁸⁹

School Nutrition

School nutrition is another influence on childhood obesity.⁹⁰ A 2020 article in *Preventive Medicine Reports* says that in a given day “Children consume up to two meals and a snack at school, which can amount to as much as 58% of their total daily caloric intake.”⁹¹ In Tennessee, all public schools participate in the federal National School Lunch Program (NSLP),⁹² which determines the nutritional standards for foods served and available in all participating schools⁹³

In 1946, Congress passed the National School Lunch Act (NSLA), which first established the NSLP and its nutritional standards. In the decades that followed, similar programs

⁸⁶ Tennessee Department of Education “Physical Education Standards.”

⁸⁷ Tennessee Association for Health, Physical Education, Recreation, and Dance “Tom Cronan Bill;” and Jones 2020.

⁸⁸ SHAPE America 2016.

⁸⁹ SHAPE America “Tennessee Fact Sheet.”

⁹⁰ State of Childhood Obesity 2021.

⁹¹ Dighe et al. 2020.

⁹² Tennessee Department of Education “School Nutrition.”

⁹³ In 2019, 451,452 students (46% of the 973,659 students in public schools in TN in 2019 [[TDOE data - State of Tennessee | Profile | Tennessee Department of Education \(tnedu.gov\)](#)]) “actually participated every day in the free or reduced price school meals program during [the] school year.” Since 2010, the lowest participation was 412,318 in 2014 and the highest number over that period was 485,279 in 2017. Kids Count Data Center “Free/Reduced-Price School Lunch Participation in Tennessee.”

were formalized by the federal government, including the School Breakfast Program (SBP) and Summer Food Service Program (SFSP). Most changes have reflected rising concerns for children's health, as the original guidelines for these programs were developed long before childhood obesity and diet-related chronic disease had become a major concern, and as a result did not address limits on food and beverages that advances in nutritional science had begun to connect to excess weight gain.⁹⁴

The authors of a 2015 review article wrote that

the NSLP, SBP, and SFSP are intended to address issues of malnutrition and food insecurity from a social ecological theory approach. To this end, these child meal programs (CMPs) are mandated, overseen, and funded at the institutional level by the USDA. The policies, including policies of participation, implementation, and nutritional quality of meals of these national programs depend on community-level agencies such as school districts and food service operations. Interpersonally, provisions of meals to children at school and during the summertime inherently affect the food security status of households as a whole. Finally, the health and nutritional status of low-income children are dependent upon receipt of meals from these programs.⁹⁵

Some stakeholders have expressed concern about the nutritional quality of child-meal programs and their potential contribution to childhood obesity.⁹⁶ However, since the 1990s, the USDA has taken numerous steps to strengthen the nutritional standards of food served in public schools, most notably with the Healthy, Hunger-Free Kids Act (HHKA) of 2010.⁹⁷ This act established calorie limits for different age groups, decreased sodium levels and fat content, and increased the required offerings of whole grains, fruits, and vegetables. The lunch standards began to take effect across the country, including in Tennessee, in the 2012-13 school year; the new breakfast standards began to take effect in

⁹⁴ United States Department of Agriculture 2008.

⁹⁵ Hopkins and Gunther 2015.

⁹⁶ Ibid.

⁹⁷ Healthy, Hunger-Free Kids Act of 2010.

the 2013-14 school year.⁹⁸ In Tennessee, 99% of schools and 66% of children in the School Lunch Program are also in the School Breakfast Program.⁹⁹

The USDA also established standards for food and beverage products sold in schools outside of breakfast and lunch programs (Smart Snacks), often referred to as competitive foods because they offer foods to students outside of and potentially in place of the food offered by the federal reimbursable school meal programs. Tennessee is one of 18 states where state laws meet Smart Snacks standards for all grade levels.¹⁰⁰ Competitive foods include snacks from vending machines and school stores. The Smart Snacks guidelines eliminated most sugary beverages and reduced the sugar and caloric content of food products for sale in public schools participating in the NSLP. The standards took effect in the 2014-15 school year and replaced the Tennessee state nutritional regulations that had existed before¹⁰¹ but that had only applied to pre-kindergarten through eighth grade in Tennessee.¹⁰² As a result of the expanded age-range in the Smart Snacks program, this was the first time vending machines in Tennessee high schools were regulated by nutritional value of their products.¹⁰³ States and local education agencies do have the ability to implement stronger nutrition standards for competitive foods in schools, although Tennessee has not done so.¹⁰⁴ Tennessee allows 30 Smart Snacks-exempt events per building per year. Compared to other states, 30 Smart Snacks exemptions is on the high end, as many states have zero exemptions. South Carolina and Georgia, though, for example, also allow 30 exemptions.¹⁰⁵

Also, as it relates to the lunch and breakfast programs, the federal micro-purchase threshold has been increased several times recently: from \$2,500 to \$3,000 in 2006, to

⁹⁸ Food Research and Action Center 2019a.

⁹⁹ State of Childhood Obesity 2021.

¹⁰⁰ Ibid.

¹⁰¹ School Nutrition "Tennessee Child Nutrition Policies and Programs."

¹⁰² In 2004, T.C.A. 49-6-2307 set nutritional requirements for foods sold in schools that are not part of the school breakfast and lunch programs, establishing "minimum nutritional standards and nutritionally sound portion sizes for individual food items sold or offered for sale to pupils in pre-kindergarten through grade eight (pre-K-8) and standards governing the time, place and circumstances of any such sale or offer to sell."

¹⁰³ Hardy 2014.

¹⁰⁴ School Nutrition "Tennessee Child Nutrition Policies and Programs."

¹⁰⁵ School Nutrition Association 2022.

\$3,500 in 2015, to \$10,000 in 2019, and finally, to \$50,000 in 2021.¹⁰⁶ Stakeholders in Tennessee have said the ability to employ micro-purchases (purchases that can be made without using the more formal competitive bidding processes) can help program directors purchase local and potentially healthier food options for their schools and a higher threshold for these purchases could ultimately help school districts improve their nutritional offerings to students.¹⁰⁷ With the higher threshold, the main challenge turns to making sure schools know about and can take advantage of the micro-purchase processes.¹⁰⁸ TDOE currently has a federally funded school nutrition staff position dedicated to farm-to-school purchases and facilitating partnerships with the community's local food producers to serve locally grown foods in school cafeterias.¹⁰⁹

There is no clear association between the increased nutritional standards of the USDA and childhood obesity trends overall, according to recent research.¹¹⁰ There are numerous studies, however, that do show that school lunches since 2010 provide superior nutrient quality when compared to student lunches obtained from other sources.¹¹¹ One 2017 study found that “consumption of a school-provided lunch was associated with greater nutritional quality compared to lunches obtained elsewhere across both age and income categories.” Children who did not participate in the school lunch program but were eligible for no-cost school lunches, in particular, consumed approximately 60% more energy, 58% more total fat, 60% more saturated fat, 50% more solid fat, 61% more sodium, double the amount of added sugars, and less than half the amount of fruit.¹¹²

¹⁰⁶ Federal Transit Administration “Micropurchases;” and Federal Register “Federal Acquisition Regulation; Inflation Adjustment of Acquisition-Related Thresholds;” and United States Department of Agriculture “Federal Micro-Purchase and Simplified Acquisition Thresholds;” and United States Department of Agriculture “Updates to the Federal Micro-Purchase Threshold in 2 CFR 200.320(a)(1).”

¹⁰⁷ United States Department of Agriculture “Federal Micro-Purchase and Simplified Acquisition Thresholds;” and Interview with Samantha Goyet, Executive Director, and Caroline Ideus, Outreach Coordinator, Northwest Tennessee Local Food Network, February 11, 2022.

¹⁰⁸ Interview with Randa Meade, Training Coordinator and Program Specialist, School Nutrition Program, Tennessee Department of Education, March 29, 2022.

¹⁰⁹ Interview with Randa Meade, Training Coordinator and Program Specialist, School Nutrition Program, Tennessee Department of Education, March 29, 2022; and Tennessee Department of Education “School Nutrition.”

¹¹⁰ Kenney et al. 2020.

¹¹¹ Food Research and Action Center 2019a.

¹¹² Vernarelli and O’Brien 2017.

The Food Research and Action Center says that “for school breakfasts, similar dietary benefits are observed among students attending schools that provide breakfast at no cost to all students, when compared to students who eat away from school.”¹¹³ Alongside this association with a higher intake of healthy foods, however, the same study found no association between participation in the lunch program and the intake of unhealthy foods and beverages, such as energy-dense and nutrient poor foods (like chips, cookies, etc.), sugar sweetened beverages, or added sugar.¹¹⁴

Several studies highlight that the nutritional benefits of the lunch and breakfast programs are most pronounced with lower income participants. One study found that low-income children who ate school breakfast and lunch had significantly higher total Healthy Eating index scores, including higher total grain and meat and beans component scores, but that these improvements moderated with higher family income.¹¹⁵ The increased nutritional impact of these programs on low-income students offers one potential reason why, when isolated to these students alone, a recent 2020 study found an effect for the HHKA’s stricter nutritional guidelines on childhood obesity: “For children in poverty, the risk of obesity declined substantially each year after the HHKA, such that obesity prevalence would have been 47 percent higher in 2018 if there had been no legislation. These results suggest that the HHKA science-based nutritional standards should be maintained to support healthy growth, especially among children living in poverty.”¹¹⁶

During the COVID pandemic, the USDA issued waivers across its 15 nutrition programs “to ease program operations and protect the health of participants,” including making school meals available at no charge to all students.¹¹⁷ Beginning in July 2022, universal free school meals were discontinued.¹¹⁸

¹¹³ Food Research and Action Center 2019a; and Polonsky 2017.

¹¹⁴ Au et al. 2018.

¹¹⁵ Hanson and Olson 2013.

¹¹⁶ Kenney et al. 2020.

¹¹⁷ United States Department of Agriculture “Tennessee: COVID-19 Waivers & Flexibilities.”

¹¹⁸ Whitmer 2022.

Early Childhood Programs in Tennessee

Experts agree that obesity prevention for children should start early in life, so that healthy practices can have widespread and long-term effects.¹¹⁹ The state of Tennessee has taken numerous steps over the past decades to address this important stage of childhood development. Recognizing the importance of breastfeeding in getting children started with a healthy life, the state has done a great deal to support mothers, families, and employers. WIC provides nutrition support for mothers and young children, including promoting breastfeeding. According to TDOH, “Licensed Tennessee childcare providers can adopt Gold Sneaker policies related to physical activity, healthy eating, and a tobacco-free environment.”¹²⁰

Breastfeeding Support

The American Academy of Pediatrics strongly recommends breastfeeding for all infants, and studies have shown that breastfeeding is associated with a reduced risk of children becoming overweight or obese. Breast milk contains fewer calories than formula and lower amounts of sugar, protein, and fat. It also contains a bioactive substance called leptin that helps control hunger. Higher protein and fat levels in formula in comparison have been associated with higher fat deposits in the bodies of infants.¹²¹ Research also shows that the longer an infant breastfeeds, the less likely he or she is to become overweight. Breastfeeding exclusively also plays a key role in the prevention of obesity in infants.¹²²

The state has passed several laws over the past decades to protect breastfeeding mothers. In 1999, the state passed Public Chapter 161, which requires employers to provide daily unpaid break time for a mother to express breast milk for her infant child. Employers are also required to make reasonable efforts to provide a private location, other than a toilet stall, near the workplace for this activity.¹²³ And in 2006, the state passed Public Chapter 617, which permits a mother to breastfeed in any location, public or private, that the

¹¹⁹ Eat Well Play More Tennessee 2010.

¹²⁰ Tennessee Department of Health “Gold Sneaker.”

¹²¹ Wang et al. 2017.

¹²² Eat Well Play More Tennessee 2010.

¹²³ Tennessee Code Annotated, Section 50-1-305.

mother and child are authorized to be in,¹²⁴ prohibits local governments from criminalizing or restricting breastfeeding,¹²⁵ and specifies that the act of breastfeeding shall not be considered public indecency or nudity, obscene, or sexual conduct.¹²⁶ Public Chapter 91, Acts of 2011, amended state law by removing the age limit, thus permitting mothers to publicly breastfeed children over the age of 12 months.¹²⁷

The Tennessee Department of Health maintains a comprehensive website with many resources about breastfeeding—[Breastfeeding in Tennessee \(tn.gov\)](http://Breastfeeding in Tennessee (tn.gov)). One page is directed to mothers (including contact information for breastfeeding support including the Tennessee Breastfeeding Hotline), one to providers, and one to businesses. Other website pages are for breastfeeding laws, breastfeeding data and statistics, breastfeeding support in WIC, the Tennessee Breastfeeding Hotline, the Breastfeeding Welcomed Here Initiative, and Tennessee Breastfeeding News and Events.

WIC

As discussed above, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is “a federal food program that provides low-income nutritionally at-risk pregnant women, postpartum mothers, infants, and children up to five years old with nutritious foods, nutrition education, breastfeeding support, and referrals to health care.”¹²⁸ The WIC program is also extremely supportive of breastfeeding. The USDA says that

WIC mothers are strongly encouraged to breastfeed their infants unless there is a medical reason not to. All WIC staff are trained to promote breastfeeding and provide the necessary support new breastfeeding mothers and infants need for success. WIC state and local agencies are required by WIC program regulations to create policies and procedures to ensure breastfeeding support and assistance is provided throughout the prenatal and postpartum period, particularly when the mother is most likely to need assistance.

¹²⁴ Tennessee Code Annotated, Section 68-58-101.

¹²⁵ Tennessee Code Annotated, Section 68-58-103.

¹²⁶ Tennessee Code Annotated, Section 68-58-102.

¹²⁷ Tennessee Code Annotated, Section 68-58-101.

¹²⁸ United States Department of Agriculture, Food and Nutrition Service, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) “WIC at a Glance.”

Breastfeeding Promotion and Support in WIC includes

- anticipatory guidance, counseling, and breastfeeding educational materials;
- a greater quantity and variety of foods;
- longer participation in the program;
- breastfeeding aids such as breast pumps, breast shells; and
- trained staff.¹²⁹

In 2009, the USDA implemented the guidelines for the WIC food packages to make them even more nutritious. Studies have shown that these changes improved the dietary intake of participants.¹³⁰ One study, for example, showed participating families “purchased 11% fewer total calories after the package change compared with before and also improved overall diet quality in ways that may protect against obesity and facilitate healthier growth.”¹³¹ Alongside these improvements in diet after these changes, studies have found complementary evidence of declining rates of obesity for children participating in WIC,¹³² going against national trends (the nationwide rate for preschoolers rose over the same period) and put preschool children participating in WIC on a par with the national rate, which includes higher-income children.¹³³

In 2019 in Tennessee, of the 251,100 individuals eligible for the WIC program, there were 109,400 participants in the state (a coverage rate of 43.6%).¹³⁴ Tennessee’s coverage rate was below the national average (57.4%¹³⁵) and below that of some of its neighboring

¹²⁹ United States Department of Agriculture, Food and Nutrition Service, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) “Breastfeeding Is a Priority in the WIC Program.”

¹³⁰ Carlson and Neuberger 2021.

¹³¹ Daep et al. 2019.

¹³² Chiasson et al. 2013; and Daep et al. 2019.

¹³³ Center on Budget and Policy Priorities “States Can Boost WIC, Improve Outcomes for Low-Income Women, Young Children.”

¹³⁴ The coverage rate for WIC in Tennessee was 42.9% in 2017 and 46.1% in 2018. United States Department of Agriculture “WIC 2019 Eligibility and Coverage Rates.”

¹³⁵ The national average for participation in the program has seen declines over the last decade – 57.4% is down from 64 percent in 2011. United States Department of Agriculture “WIC 2019 Eligibility and Coverage Rates.”

states: in 2019, coverage rates in Kentucky (56.7%), Georgia (49.2%), Alabama (61.8%), and Mississippi (59.6%) were each higher than in Tennessee.¹³⁶ If Tennessee were to raise its coverage rate to the 2019 national average of 57.4%, this would amount to roughly 35,000 more participants in the program.

To increase participation in the program, there have been efforts in Tennessee over the last several years, as well as in many other states to make WIC both easier to enroll in and benefits easier to use. In Tennessee, the WIC program moved from paper vouchers to Electronic Benefit Transfer (EBT) cards in 2019.¹³⁷ Beyond the added convenience, the EBT card can help alleviate the stigma that could sometimes be associated with the use of paper vouchers. Currently WIC participants can buy groceries at participating stores and pay for the groceries that are and aren't WIC eligible at the same time, paying for the groceries that are WIC eligible with their EBT card and then paying for the rest with another form of payment. And stakeholders in Tennessee say that WIC is accepted in stores across the state and that there are no large areas in the state without stores that accept WIC.¹³⁸ For enrollment, WIC typically requires an initial in-person appointment to establish eligibility in the program.¹³⁹ There are currently 124 WIC clinics across the state and that number has held steady over recent years. WIC also has adjunctive eligibility with SNAP and TennCare, meaning if someone is eligible for one of those two programs then they automatically meet the economic eligibility requirements for WIC. Together, these changes have helped make it easier to enroll and use WIC benefits in Tennessee.¹⁴⁰ Tennessee WIC staff are taking further steps to try to improve the

¹³⁶ United States Department of Agriculture, Food and Nutrition Service, Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) "WIC 2019 Eligibility and Coverage Rates."

¹³⁷ WIC participants receive checks or vouchers to purchase specific foods each month that are designed to supplement their diets with specific nutrients that benefit WIC's target population. Together these separate foods form a "WIC food package" of allotted food for everyone in the program and vary depending on the different categories of participants. In addition to checks or vouchers, all WIC state agencies were required to implement WIC electronic benefit transfer (EBT) statewide by October 1, 2020 and Tennessee did so on April 3, 2019.

¹³⁸ Interview with Alesha Reeves, section chief, Supplemental Nutrition Programs, Division of Family Health & Wellness, Tennessee Department of Health, June 6, 2022.

¹³⁹ Through the Families First Coronavirus Response Act, Tennessee officials were able to administer WIC services remotely throughout the COVID-19 pandemic through a waiver removing the requirement for an initial in-person appointment, which was extended through July 2022.

¹⁴⁰ Interview with Alesha Reeves, Section Chief, Supplemental Nutrition Programs, Division of Family Health & Wellness, Tennessee Department of Health, June 6, 2022.

percentage of eligible families participating, although there is no data available to evaluate the success of these efforts.¹⁴¹

Some Tennessee efforts toward making the program better have received national attention. For example, the 2019 report *Making WIC Work Better: Strategies to Reach More Women and Children and Strengthen Benefits Use* spotlights this Tennessee effort:

In Knoxville, Tennessee, the popular “Call the WIC Lady SOS” campaign invites WIC participants to call or text the local WIC agency if they have a question or complaint while shopping. WIC customers regularly text questions with pictures of the food items attached.¹⁴²

Gold Sneaker Initiative

In 2008, TDOH developed the “Gold Sneaker Initiative” to enhance policy related to health and wellness within licensed childcare facilities across Tennessee. The initiative is free and voluntary to any licensed childcare provider in Tennessee that has met training and application requirements. Through Gold Sneaker, licensed Tennessee childcare providers can improve the health of the children in their care by adopting policies related to physical activity, healthy eating, and a tobacco-free environment. To become Gold Sneaker certified, the facility director and all educators must meet training and application requirements and the provider must agree to

- 1) provide a balance of teacher and child-led activities, both indoors and outdoors;
- 2) provide education to families addressing limits on screen time;
- 3) ensure children experience frequent, positive physical activity;
- 4) publicly display support for breastfeeding;
- 5) ensure adequate time for snacks and meals and educate families about nutrition; and
- 6) provide a tobacco-free environment.¹⁴³

¹⁴¹ Interview with Alesha Reeves, section chief, Supplemental Nutrition Programs, Division of Family Health & Wellness, Tennessee Department of Health, June 6, 2022.

¹⁴² Food Resource & Action Center 2019.

¹⁴³ Tennessee Department of Health “Gold Sneaker Initiative: For Parents and Families.”

In 2018, Gold Sneaker policies were revised and updated,¹⁴⁴ and the program also “strengthened its partnership with the Tennessee Department of Human Services (TDHS) by integrating Gold Sneaker policies into the TDHS Star-Quality Report Card Program. The Star-Quality Child Care Program is a voluntary program that recognizes childcare facilities who exceed minimum licensing standards. These facilities may receive a rating of one, two, or three stars. TDHS has developed a new Report Card Component—Child Health and Well-Being—which now includes Gold Sneaker status. Effective July 30, 2018, childcare providers seeking the 3-star level in the Child Health and Well-Being component are required to be Gold Sneaker certified and implement Gold Sneaker policies.”¹⁴⁵ The Initiative is currently being restructured and is not accepting applications as of September 2022.¹⁴⁶

Other Tennessee Efforts

There have been and continue to be many other Tennessee state government groups attempting to address childhood obesity. Groups currently working to improve Tennessee’s childhood obesity rate include the Chronic Weight Management Task Force, the Livability Collaborative, the TDOH Healthy Built Environment Program, and TDOH’s Project Diabetes. Groups previously working on childhood obesity include the Tennessee Obesity Task Force and the Governor’s Children’s Cabinet.

Chronic Weight Management Task Force

In 2021, Public Chapter 373 created the Chronic Weight Management Task Force to study the health implications of chronic weight management and Type 2 diabetes. There are many medical experts on the task force. The task force has held four public hearing with public health experts and will report its findings and recommendations to the General Assembly by January 15, 2023.

Livability Collaborative

In 2015, the TDOH helped to launch the Livability Collaborative—a working group of approximately 20 Tennessee state agencies, departments, and commissions with the mission of improving the prosperity, quality of life, and health of Tennesseans through collaboration in the areas of policy, funding, and programming. The collaborative says

¹⁴⁴ Tennessee Department of Health “Gold Sneaker Initiative Policies.”

¹⁴⁵ Tennessee Department of Health “Gold Sneaker Initiative Certification.”

¹⁴⁶ Tennessee Department of Health “Gold Sneaker.”

that the group has improved collaboration and perspective between governing agencies and improved policy development and data sharing across departments with a focus on the healthiness of Tennessee communities.¹⁴⁷ The Office of Evidence and Impact (OEI) in the Department of Finance and Administration is one of the agencies participating in the Collaborative. OEI promotes and facilitates data sharing among departments to gather deeper insights about program outcomes, identify gaps in state services, and inform intelligent policy design would be particularly helpful¹⁴⁸ OEI is willing to support TDOH and the Livability Collaborative in addressing childhood obesity.¹⁴⁹ As noted above, both the CDC and the Health and Medicine Division (HMD) of the National Academies recommend “multi-level strategies to develop environments and policies that support healthy eating and physical activity across a range of settings, including schools, worksites, communities, and health care.” It could be extremely helpful to have a state entity doing a community-level analysis of data to see whether the data can show what is and isn’t working in terms of childhood obesity prevention.

Healthy Built Environment Program

In 2017, the TDOH started the Healthy Built Environments (HBE) program. HBE grants are non-competitive grants that, beginning in 2019, have been awarded to every county in Tennessee. The HBE grants focus on supporting improvement to the built environment that will have a positive impact on public health, like access to healthy food and physical activity. Many of the grants are for initiatives targeted at children’s health specifically, such as a \$10,000 grant awarded to Blount County in 2017 for playground equipment and \$20,000 in 2019 to Lake County for new playground equipment at Margaret Newton Elementary School.¹⁵⁰ The TDOH has an interactive map listing all the projects funded by the HBE program since its inception at [Healthy Built Environments \(HBE\) Grants \(tn.gov\)](#).

Project Diabetes

In 2007, the state started Project Diabetes, a competitive grant program, that awards funding to community partners to support primary prevention projects that aim to prevent chronic disease from ever occurring. Project Diabetes has two main goals: 1) creating

¹⁴⁷ Tennessee Department of Health “Tennessee Livability Collaborative.”

¹⁴⁸ Tennessee Department of Finance and Administration, Office of Evidence and Impact. “About Us.”

¹⁴⁹ Email correspondence from Christin Lotz, director, Tennessee Department of Finance and Administration, Office of Evidence and Impact. June 27, 2022.

¹⁵⁰ Tennessee Department of Health “Healthy Built Environments (HBE) Grants.”

equitable food and beverage environments that ensure that healthy food and beverage options are the routine, easy choice and 2) making physical activity an integral and routine part of life for all Tennesseans. In the 2019-2022 grant cycle, Project Diabetes funded 10 projects that specifically targeted school settings. And the forthcoming 2022-2025 cycle includes several projects that focus on families and children as well, including funding to remodel the home economics classroom and introduce a farm to school program with cooking classes, a greenhouse, and gardens at Mt. Pleasant High School in Maury County. Another is for funding for school cooking classes and a family walking club program at the Chattanooga Food Center in Hamilton County.¹⁵¹

Tennessee Obesity Task Force

In 2007, concerned stakeholders from Tennessee attended the Southern Obesity Summit, and soon after, formed the Tennessee Obesity Taskforce (TOT).¹⁵² The TOT then applied for and received federal funding in 2008 through 2013.¹⁵³ With funding in place, the TOT expanded quickly, growing from 45 people from 31 organizations (state agencies, major universities, hospitals, obesity coalitions, and privately owned institutions) to a membership body of more than 200 organizations and more than 1,800 engaged members.¹⁵⁴ In 2010, the TOT developed and published a comprehensive, statewide nutrition and physical activity plan (“Eat Well, Play More Tennessee”)—a five-year plan (2010-2015) that provided a roadmap to reduce obesity and chronic disease in Tennessee by 2015, which focused on school as well as community initiatives.¹⁵⁵ TACIR staff interviewed several participants in the TOT and all praised the TOT for facilitating beneficial communication between state agencies and numerous other organizations, both private and public.¹⁵⁶

¹⁵¹ Tennessee Department of Health “Project Diabetes.”

¹⁵² Centers for Disease Control and Prevention “Stories from the Field: Tennessee.”

¹⁵³ In 2008, the CDC Division of Nutrition, Physical Activity and Obesity (DNPAO) awarded 5-year funding to many states through the State Nutrition, Physical Activity and Obesity Programs Cooperative Agreement (State Program 805) to promote healthy eating and physical activity to prevent and control obesity and other chronic diseases.”—[2013 - CDC - 805 Funding - A Review of Accomplishments by State Grantees - 2008-2013.pdf](#).

¹⁵⁴ Centers for Disease Control and Prevention “Stories from the Field: Tennessee;” and Interview with Tennessee Department of Health, July 20, 2021.

¹⁵⁵ Tennessee State Government “‘Eat Well, Play More’ Plan to Reduce Obesity in Tennessee.”

¹⁵⁶ Interview with Tennessee Department of Health, July 20, 2021; and Interview with Lori Paisley, senior director, Coordinated School Health, Tennessee Department of Education, November 1, 2021; and

Governor's Children's Cabinet

The Tennessee Governor's Children's Cabinet in 2003 was first created during Governor Bredesen's administration and then continued and reorganized under Governor Haslam.¹⁵⁷ The Children's Cabinet under Governor Haslam had three main goals: "1) Multiple Agency Collaboration with Individual Families 2) kidcentraltn.com (a "one-stop shop for families to connect with important state information and resources and 3) childhood obesity."¹⁵⁸ Kidcentraltn.com still operates and remains an important resource for educators, parents, and children across the state.¹⁵⁹ When the Governor's Children's Cabinet disbanded, the value of Kidcentraltn.com was recognized by administration officials—and the maintenance of the website was taken over by the Tennessee Commission on Children and Youth (TCCY).

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Interview with Laurie Stanton, CSH coordinator, Maury County Schools February 18, 2022; and Interview with Dr. David Schlundt, associate professor of psychology, Vanderbilt University, November 5, 2021; and Interview with Dr Shari Barkin, chief of pediatrics, Vanderbilt University, August 12, 2021.

¹⁵⁷ Governor Phil Bredesen Executive Order No. 7 and Governor Bill Haslam Executive Order No. 10.

¹⁵⁸ The Forum for Youth Investment "Tennessee Governor's Children's Cabinet."

¹⁵⁹ KidCentraltn.com 2022.

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[C2=XX2019&QP=G&DP=1&VA=CI&CS=Y&SYID=&EYID=&SC=DEFAULT&SO=ASC&PF=1.](https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html)

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Appendix A: Tennessee Public Schools: A Summary of Student Body Mass Index Data 2019-2020

Tennessee Public Schools: A Summary of Student Body Mass Index Data 2019-20



Tennessee Department of Health | November 2021



Tennessee Department of Health

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Created in partnership with the

Tennessee Department of Education

The Tennessee Public Schools Summary of Weight Status Report 2019-20
Prepared by the Tennessee Department of Health
Division of Population Health Assessment

Introduction

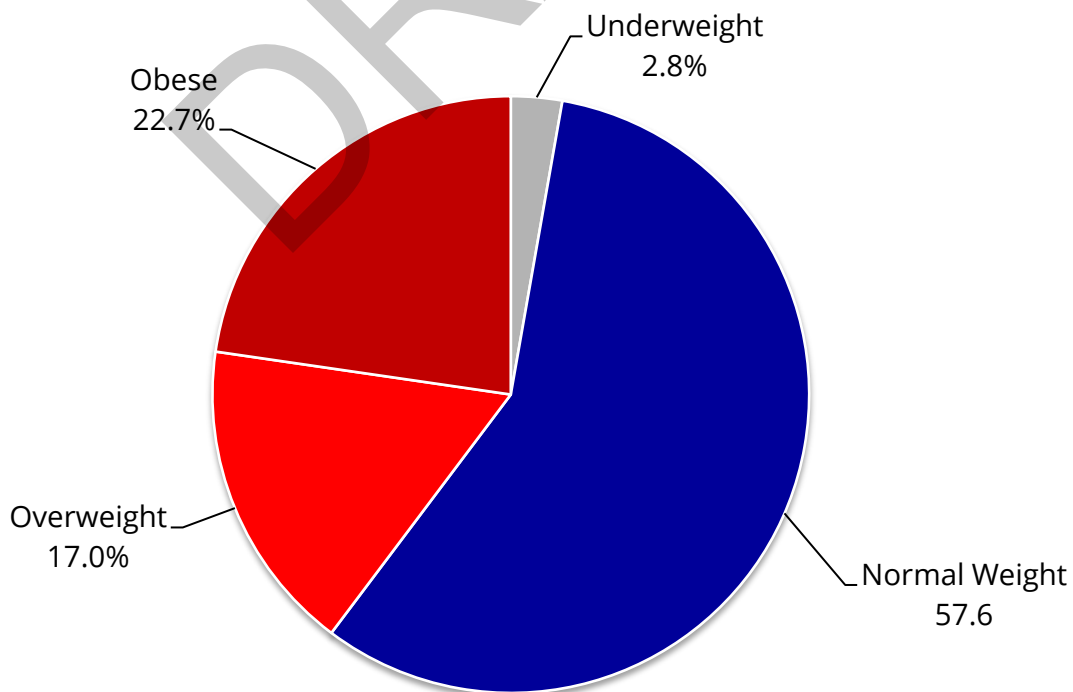
This summary presents weight status results from 283,532 assessed students enrolled in Tennessee public schools during the 2019-20 school year in grades kindergarten, 2, 4, 6, 8, and any one year of high school. This report includes measurements submitted by 137 public school districts in Tennessee ([see Appendix A](#)) and a total of 62.2 percent of the target population was assessed.

The data used in this report was collected by Coordinated School Health (CSH) coordinators, school nurses and Physical Education teachers. CSH was established by the Tennessee Department of Education in February 2001 and expanded to include all districts in Tennessee in 2006. As a result, the first year that all districts collected Body Mass Index (BMI) data was the 2007-08 school year. The primary mission of CSH is to improve student health outcomes as well as support the connection between good health practices, academic achievement, and lifetime wellness.

BMI is calculated based on the height and weight measurements collected during screening in the current school year and is age- and gender-specific for children and teens. Please note that some counties and school districts require an active opt-in informed consent for BMI data collection, which can significantly decrease the number of students screened.

The prevalence of overweight or obese students in this report refers to the proportion of public-school students found to be overweight or obese during the school year. **Overweight** is defined as having a BMI in the 85th to less than the 95th percentile for children of the same age and gender. **Obese** is defined as having a BMI in the 95th percentile or greater.

**Figure 1. Body Weight Status
Assessed Students, Tennessee Public Schools, 2019-20**

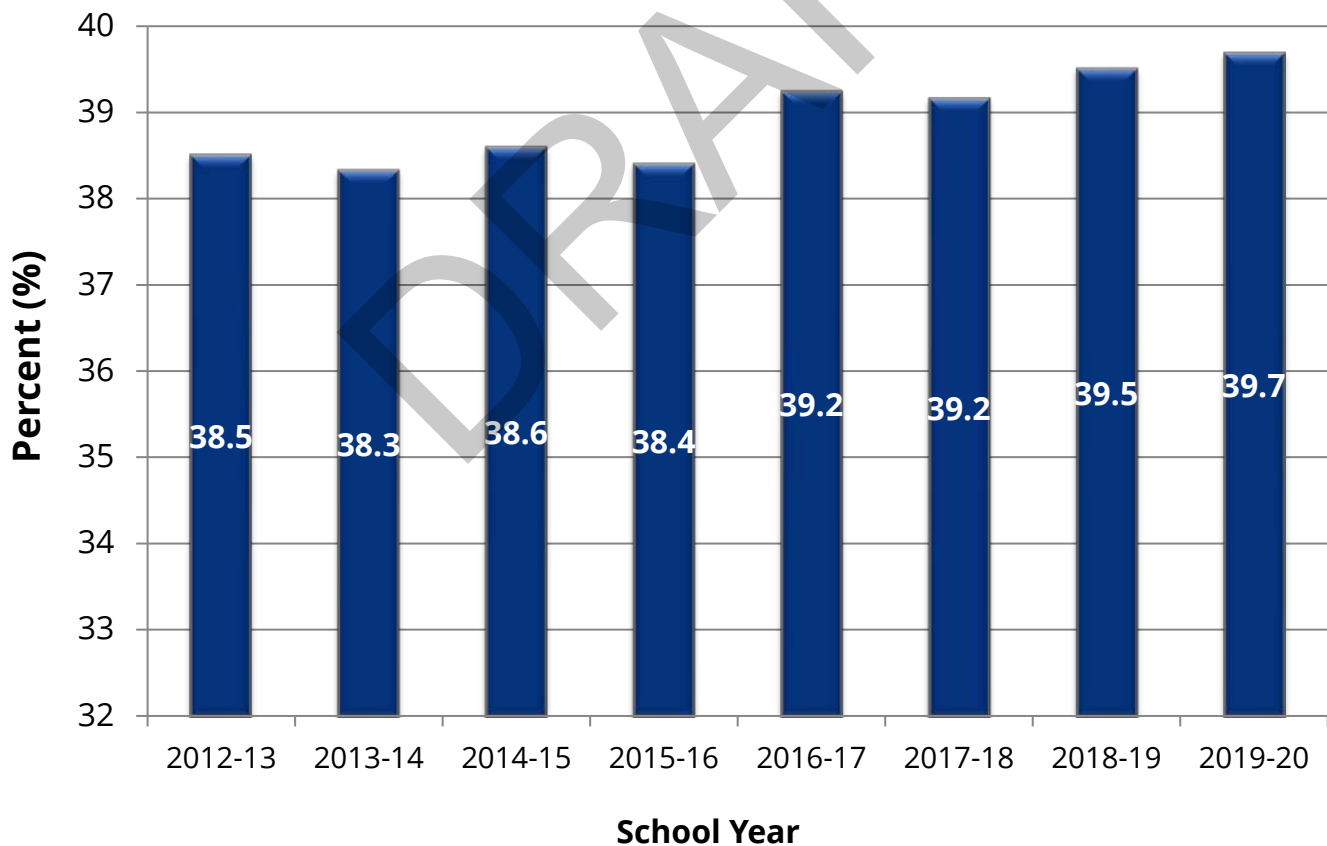


Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Key Findings

- Overall, 57.6 percent of assessed students had BMI measurements in the normal range, 17.0 percent were overweight, 22.7 percent of students were obese, and the remaining 2.8 percent were underweight ([see Figure 1](#)).
- Rural counties had a slightly higher prevalence of overweight or obese students (40.5 percent) among students who were assessed compared to those in metropolitan counties (38.0 percent) (statistically significant).
- The prevalence of assessed students who were classified as overweight or obese increased significantly with rising grade levels up through grade 6 (*kindergarten*: 30.7 percent; *grade 2*: 35.3 percent; *grade 4*: 41.6 percent; *grade 6*: 45.0 percent; *grade 8*: 44.7 percent; *high school*: 42.6 percent).
- The prevalence of assessed students who were classified as overweight or obese in Tennessee public schools has increased slightly between the 2012-13 and 2019-20 school years from 38.5 percent to 39.7 percent (statistically significant) ([see Figure 2](#)).

Figure 2. Prevalence Trend of Overweight or Obesity, Assessed Students, Tennessee Public Schools, 2012-13 to 2018-19 School Year

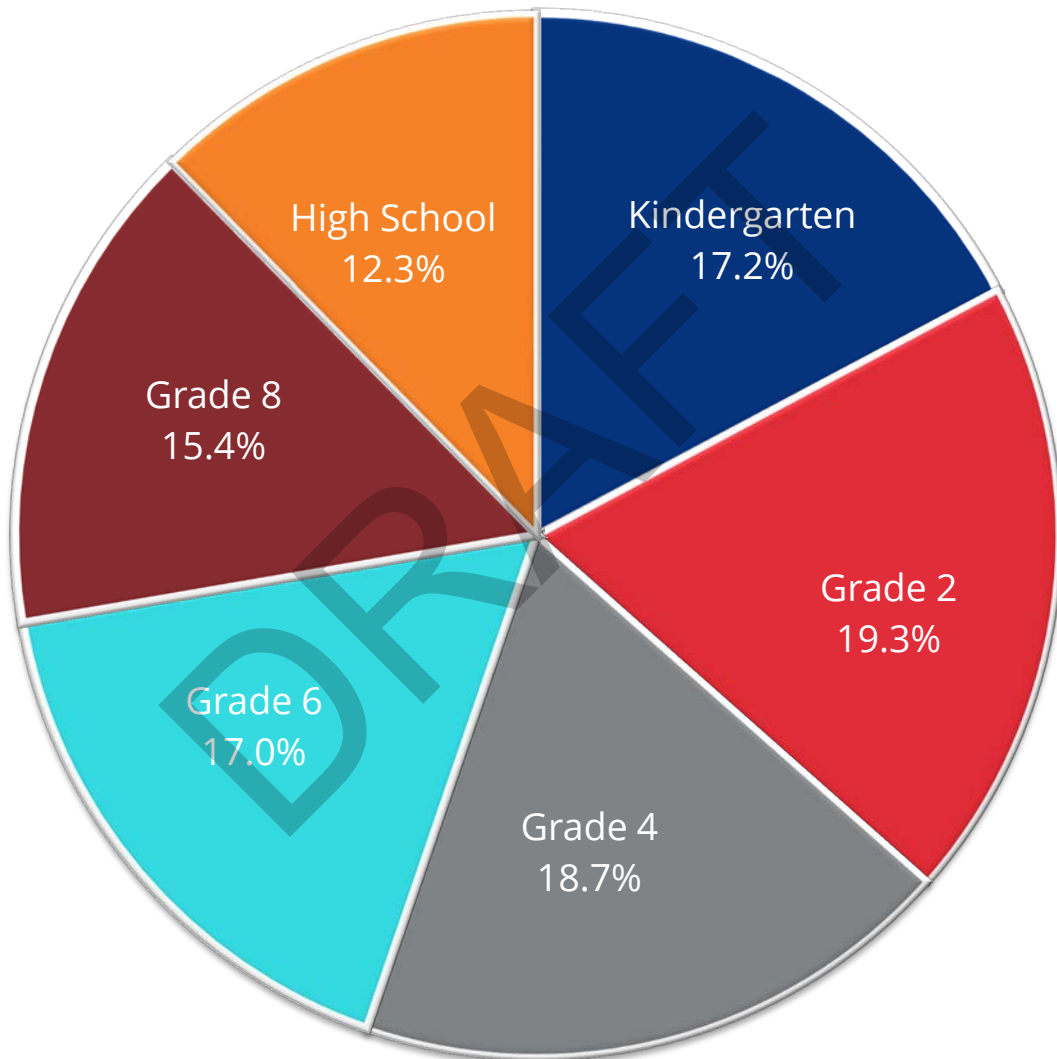


Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Student Characteristics

An approximately equal proportion of boys (51.5 percent), and girls (48.5 percent), were assessed for the 2019-20 school year. Of those assessed – 17.2 percent were kindergarteners, 19.3 percent were 2nd graders, 18.7 percent were 4th graders, 17.0 percent were 6th graders, 15.4 percent were 8th graders, and 12.3 were high schoolers (see [Figure 3](#)).

Figure 3. Percentage of Assessed Students by Grade Level, Tennessee Public School Students, 2019-20

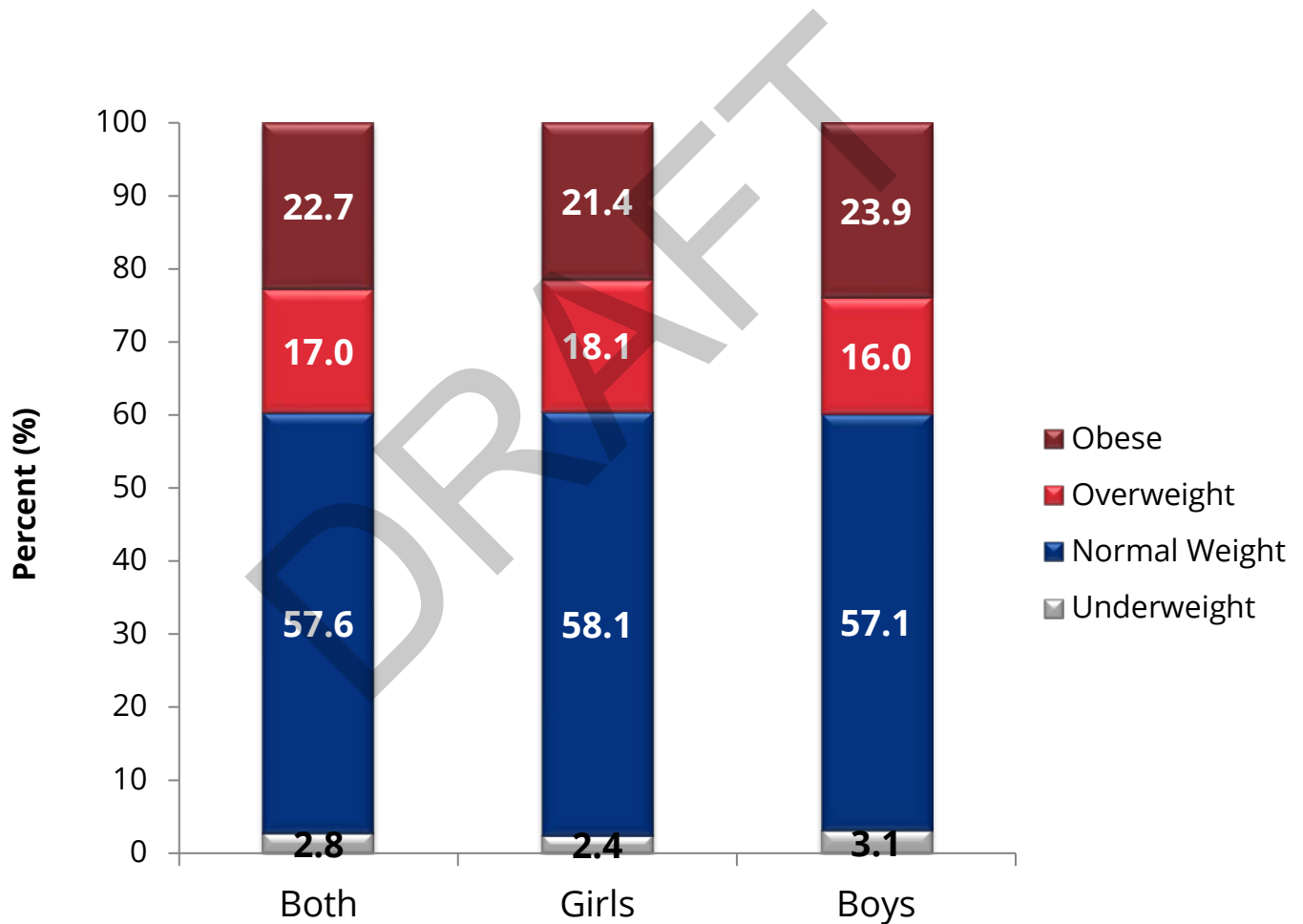


Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Weight Status Distribution by Gender

- Overall, the percentage of assessed girls with normal weight was similar to that of assessed boys; 58.1 percent vs. 57.1 percent, respectively ([see Figure 4](#)).
- Nearly 40 percent of all screened students were either overweight or obese.
- The overweight or obesity prevalence among assessed girls was similar to that of assessed boys; 39.5 percent vs. 39.8 percent, respectively ([see Table 2](#)).
- Boys who were assessed were more likely to be obese (23.9 percent) than girls who were assessed (21.4 percent) (statistically significant). However, girls who were assessed were more likely to be overweight (18.1 percent) than boys (16.0 percent) (statistically significant).

Figure 4. Weight Status Distribution by Gender, Assessed Students, Tennessee Public Schools, 2019-20



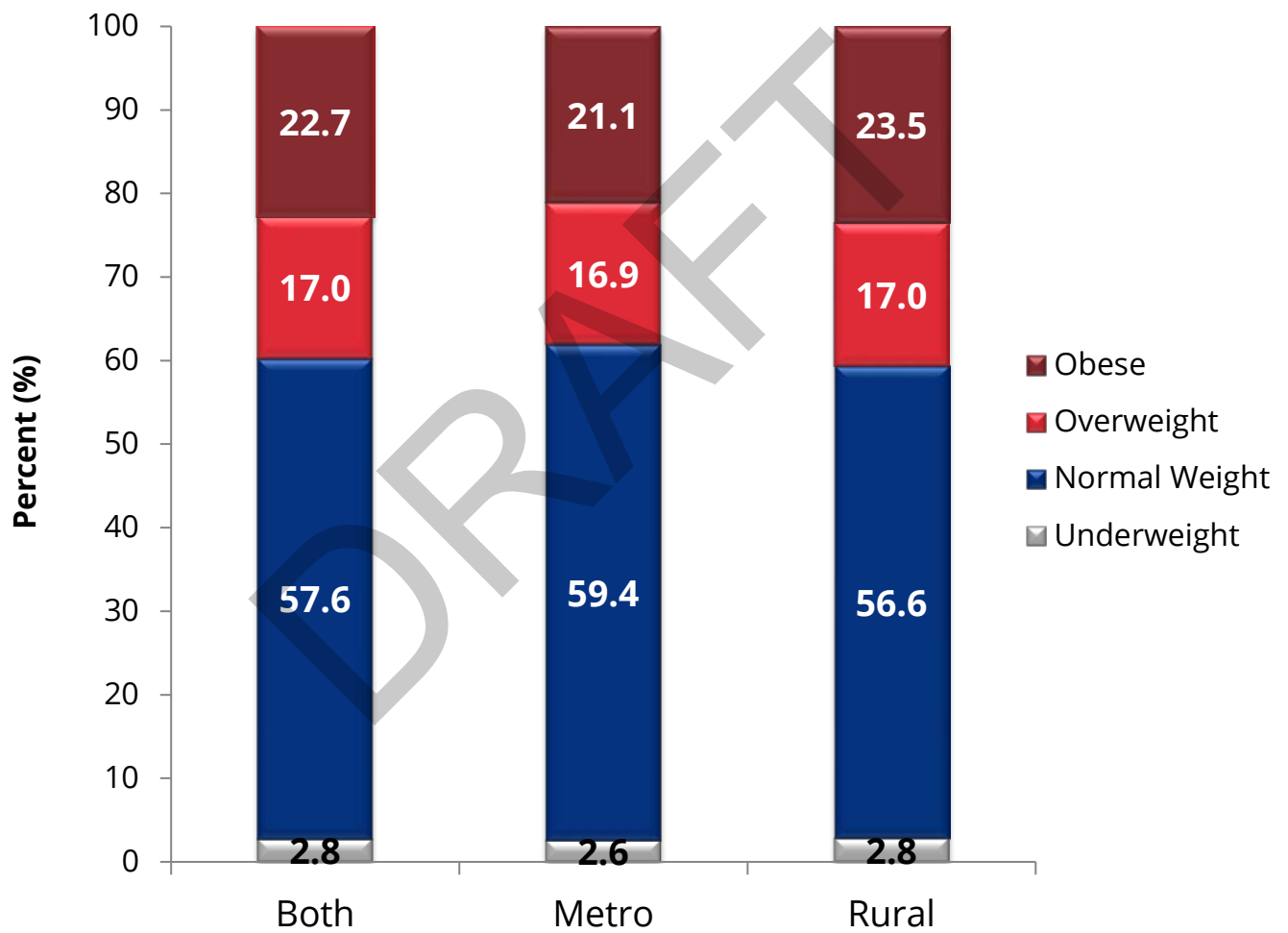
Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Weight Status Distribution by Metro and Rural Counties

Most students screened (66.1 percent) were outside metropolitan counties¹.

- Metropolitan county students screened were more likely to be normal weight (59.4 percent) compared to rural county students (56.6 percent) (statistically significant) ([see Figure 5](#)).
- Rural students screened were more likely to be obese (23.5 percent) than metro students screened (21.1 percent) (statistically significant).
- Rural students screened were just as likely to be overweight (17.0 percent) as metro students screened (16.9 percent).

Figure 5. Weight Status Distribution by Metro and Rural Counties, Assessed Students, Tennessee Public Schools, 2019-20



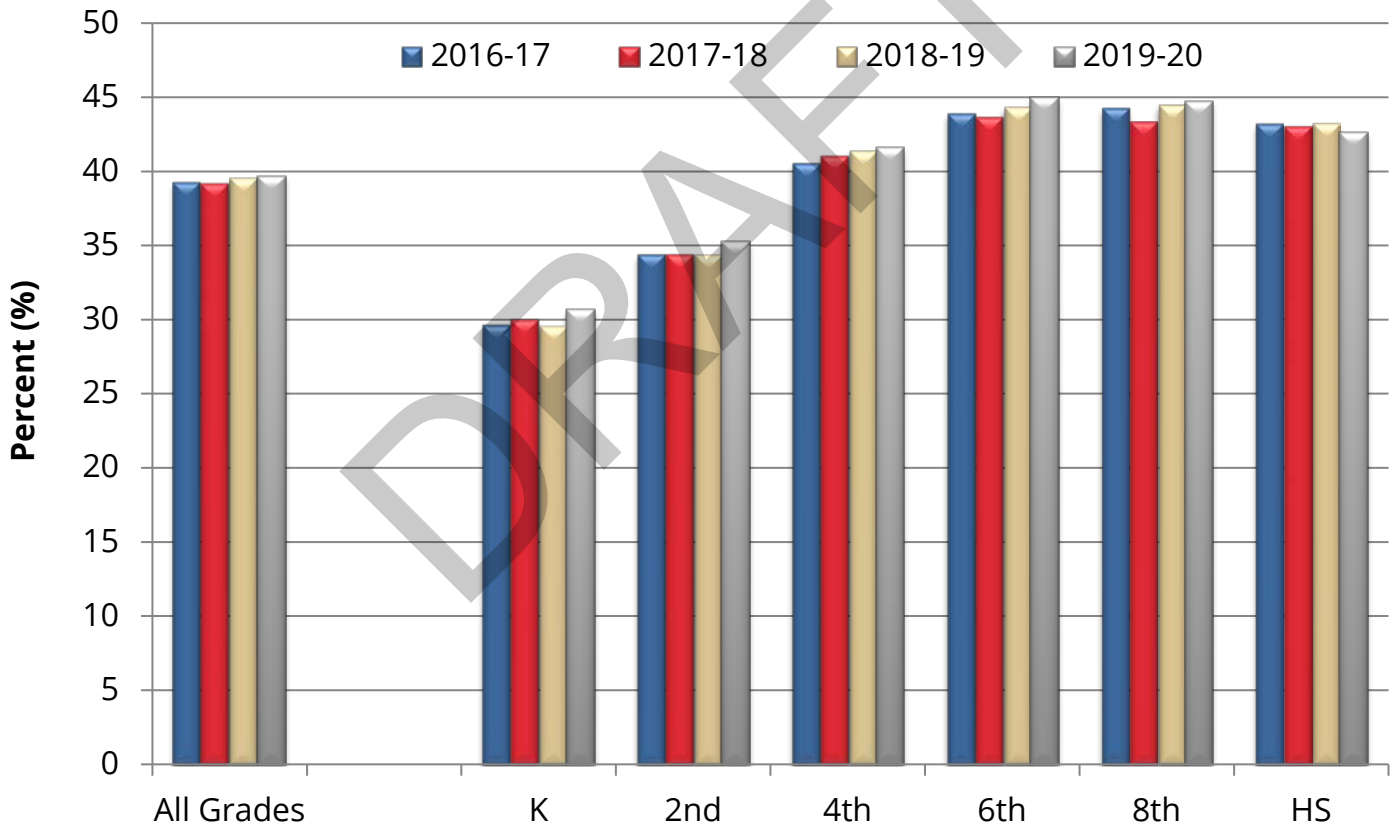
Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

¹ Davidson, Hamilton, Knox, Madison, Shelby, and Sullivan are considered metropolitan counties, and the remaining 89 Tennessee counties are considered rural ([see Appendix B](#)).

Prevalence of Overweight or Obese Students by Grade

- Since the 2016-17 school year, there has been a statistically significant increase in the overall overweight or obese prevalence in grades K, 2, 4 and 6. ([see Table 2](#))
- There were significant increases in overweight or obese prevalence among Kindergarteners from 2018-19 (29.6 percent) to 2019-20 (30.7 percent) as well as among second graders from 2018-19 (34.3 percent) to 2019-20 (35.3 percent) ([see Figure 6](#)).
- There was a slight decrease in overweight or obese prevalence among high school students from 2018-19 (43.2 percent) to 2019-20 (42.6 percent), though not statistically significant.

Figure 6. Prevalence of Overweight or Obese by Grade, Assessed Students, Tennessee Public Schools, 2016-17, 2017-18, 2018-19, and 2019-20



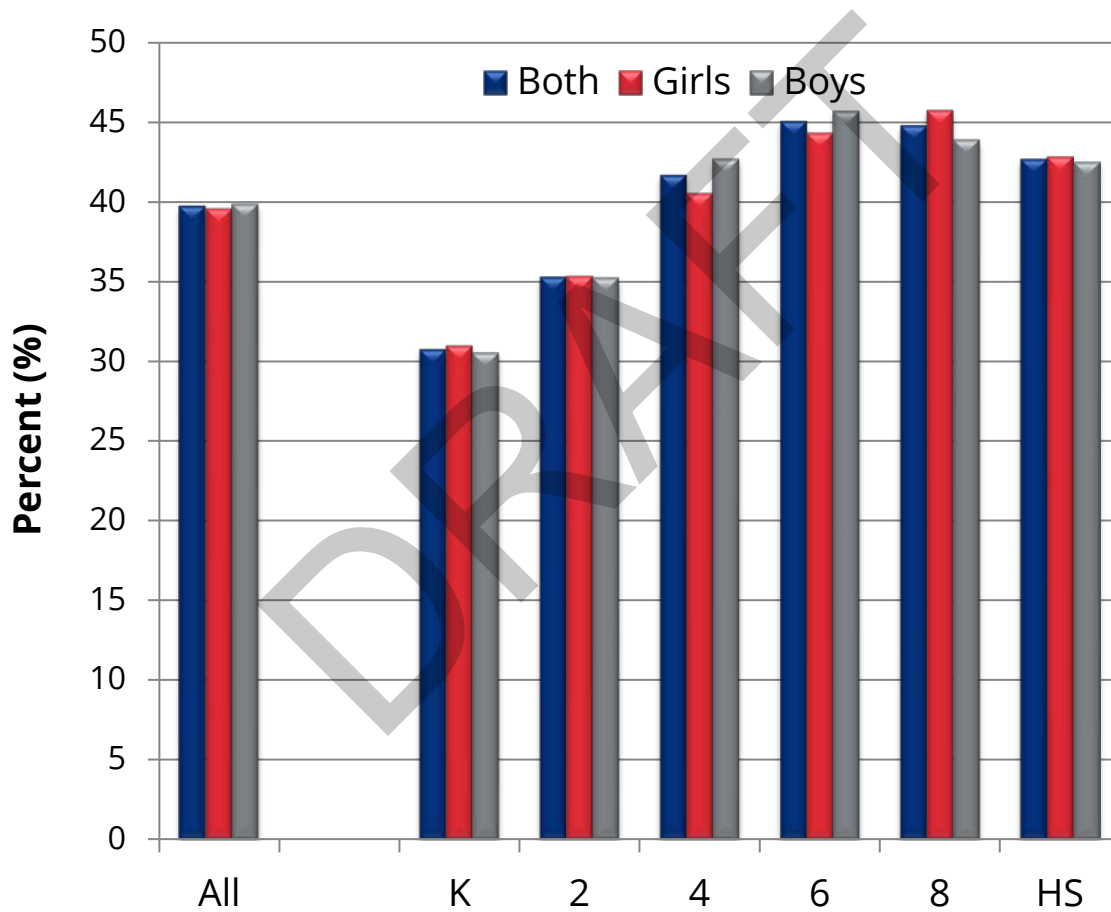
Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Prevalence of Overweight or Obese Students by Gender and Grade

The percent of overweight or obese students of those screened was 40 percent or higher in grade 4, grade 6, grade 8, and high school for both girls and boys ([see Figure 7](#)).

- Boys assessed had the highest percentage of overweight or obese students in grade 6 (45.7 percent).
- Girls assessed had the highest percentage of overweight or obese students in grade 8 (45.7 percent).
- In metro areas, there was no significant difference between boys and girls in the percentage of students who were overweight and obese. In rural areas, boys had a slightly significantly higher percentage than girls: 41.0 vs. 40.1, respectively.

Figure 7. Prevalence of Overweight or Obese by Gender and Grade, Assessed Students, Tennessee Public Schools, 2019-20



Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Prevalence of Overweight or Obese Students by County

Of the students screened, the prevalence of overweight or obese students varied by county, ranging from 29.8 percent (Montgomery County) to 54.1 percent (Sequatchie County) for the 2019-20 school year * (see Figure 8).

- The five counties with the highest percentage of overweight or obese students among those screened for BMI for the 2019-20 school year were Sequatchie (54.1 percent), Grainger (50.4 percent), Lake (49.5 percent), Campbell (48.6 percent) and Benton Counties (48.5 percent) * (see Table 1).
- The five counties with the lowest percentage of overweight or obese students among those screened for BMI for the 2019-20 school year were Montgomery (29.8 percent), Knox (34.3 percent), Houston (35.5 percent), Perry (35.5 percent) and Washington Counties (35.7 percent) *.

Figure 8a. Prevalence of Overweight or Obese by County, Assessed Students, Tennessee Public Schools, 2019-20

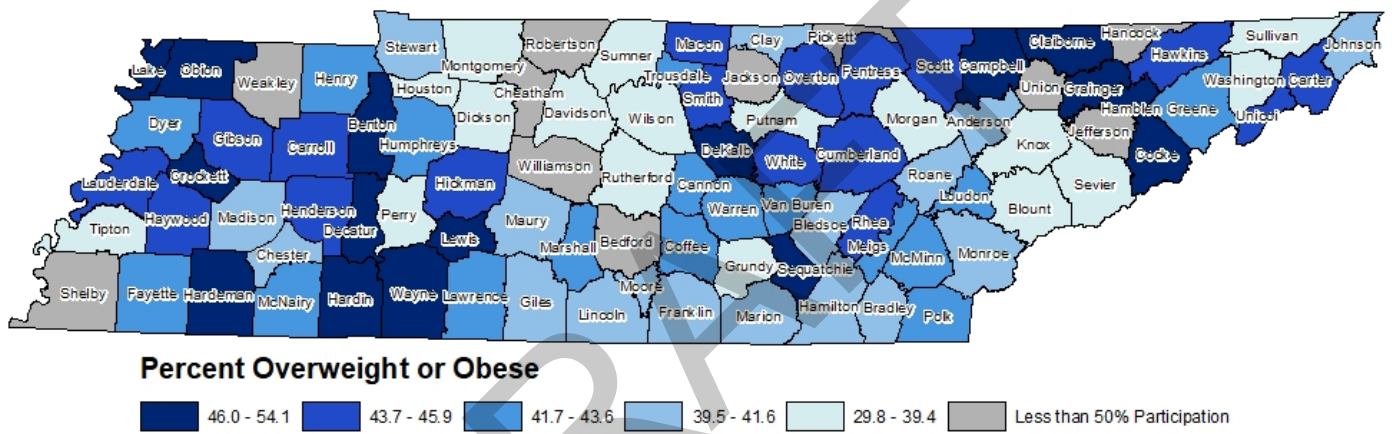
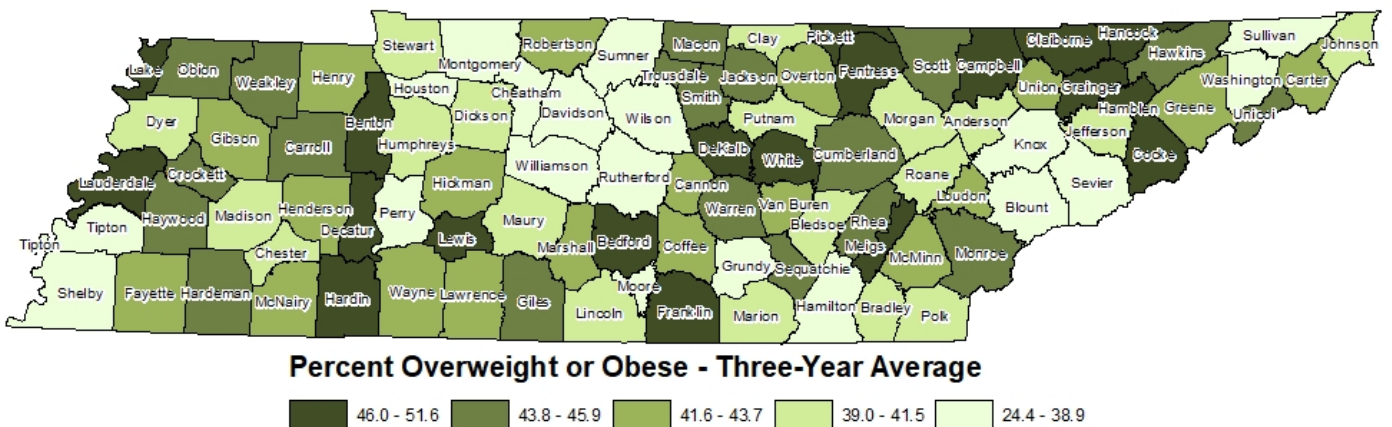


Figure 8b. Prevalence of Overweight or Obese by County, Assessed Students, Tennessee Public Schools, Three-Year Average for School Years 2017-18, 2018-19 and 2019-20



* Only counties with at least 50% participation are ranked

Data Source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Prevalence of Overweight or Obese Students by School District

The prevalence of overweight or obese students screened for BMI varied by school district, ranging from 21.8 percent (Germantown) to 54.1 percent (Sequatchie County) for the 2019-20 school year * ([see Table 3](#)).

- The school districts with the highest percentage of overweight or obese students among those screened for the 2019-20 school year were Sequatchie County (54.1 percent), Humboldt SSD (53.1 percent), South Carroll SSD (51.1 percent), West Carroll SSD (50.9 percent), and Grainger County (50.4 percent) *.
- The five school districts with the lowest percentage of overweight or obese students among those screened for the 2019-20 school year were Germantown (21.8 percent), Lakeland (29.5 percent), Montgomery County (29.8 percent), Arlington (30.6 percent) and Bristol City (33.0 percent) *.

* Only districts with at least 50% participation are ranked

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Table 1. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by County, 2016-17, 2017-18, 2018-19 and 2019-20 School Years

County	2016-17		2017-18		2018-19		2019-20		Percent of Population Assessed 2019-20
	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	
Tennessee	39.2	39.1 - 39.4	39.2	39.0 - 39.3	39.5	39.4 - 39.7	39.7	39.5 - 39.9	62.2
Anderson	39.7	38.2 - 41.3	39.3	37.8 - 40.8	39.5	37.8 - 41.1	40.0	38.5 - 41.5	77.1
Bedford	43.4	39.9 - 47.0	46.6	44.9 - 48.4	48.5	46.7 - 50.3	43.5	41.0 - 46.0	36.0**
Benton	43.3	39.5 - 47.1	50.2	46.6 - 53.8	46.6	43.1 - 50.1	48.5	44.7 - 52.2	73.6
Bledsoe	43.1	37.8 - 48.5	41.8	37.4 - 46.1	41.5	36.8 - 46.3	39.8	35.0 - 44.7	53.5
Blount	37.8	36.7 - 39.0	38.9	37.7 - 40.0	38.5	37.4 - 39.6	38.2	37.0 - 39.3	81.0
Bradley	38.8	37.5 - 40.0	40.4	39.1 - 41.6	40.2	39.0 - 41.4	40.8	39.5 - 42.0	78.8
Campbell	45.0	42.1 - 47.9	47.5	44.1 - 50.8	45.6	42.3 - 48.9	48.6	46.2 - 51.0	68.2
Cannon	43.5	39.9 - 47.0	44.9	41.2 - 48.6	40.3	36.7 - 43.8	43.6	40.0 - 47.2	82.2
Carroll	43.3	40.9 - 45.7	42.9	40.5 - 45.3	47.0	44.7 - 49.3	45.9	43.4 - 48.3	77.5
Carter	42.0	40.2 - 43.9	42.1	40.0 - 44.3	44.3	42.3 - 46.3	43.6	41.7 - 45.6	72.5
Cheatham	34.3	32.1 - 36.6	33.1	30.9 - 35.3	32.2	30.0 - 34.5	No Data	-	0.0
Chester	36.1	32.2 - 40.0	37.1	34.0 - 40.3	41.3	38.1 - 44.5	41.4	38.2 - 44.6	70.0
Claiborne	48.2	45.6 - 50.8	48.5	45.8 - 51.2	47.7	44.8 - 50.6	47.1	44.2 - 50.0	62.4
Clay	39.2	34.7 - 43.8	42.3	37.9 - 46.6	41.5	37.0 - 46.1	39.8	35.0 - 44.6	78.4
Cocke	48.2	46.1 - 50.2	46.2	44.0 - 48.4	48.3	46.4 - 50.2	46.2	44.0 - 48.3	87.2
Coffee	41.4	39.8 - 43.0	41.6	39.9 - 43.3	41.5	39.8 - 43.2	42.8	41.2 - 44.5	76.8
Crockett	47.9	45.1 - 50.6	44.3	41.6 - 47.1	45.6	42.6 - 48.6	46.1	43.3 - 48.9	86.4
Cumberland	44.7	42.7 - 46.6	44.6	43.0 - 46.3	46.9	45.2 - 48.6	43.9	42.0 - 45.7	82.1
Davidson	36.6	36.0 - 37.2	36.8	36.2 - 37.4	37.1	36.5 - 37.7	35.9	35.3 - 36.5	56.2
DeKalb	46.8	44.0 - 49.6	48.8	45.9 - 51.7	46.2	43.3 - 49.1	46.9	44.0 - 49.8	84.3
Decatur	47.5	43.9 - 51.2	44.9	41.2 - 48.6	45.1	41.2 - 48.9	47.8	44.0 - 51.6	94.9
Dickson	37.6	35.9 - 39.3	39.0	37.2 - 40.8	41.3	39.5 - 43.1	38.1	35.9 - 40.4	49.3
Dyer	40.5	38.7 - 42.4	41.6	39.7 - 43.6	39.0	37.1 - 40.8	42.1	39.8 - 44.4	60.5
Fayette	54.6	51.4 - 57.7	43.0	40.1 - 45.9	46.0	43.2 - 48.8	42.0	39.3 - 44.8	81.3
Fentress	49.3	46.3 - 52.2	46.8	43.7 - 49.9	49.4	46.3 - 52.6	45.5	42.2 - 48.7	75.2
Franklin	37.7	35.3 - 40.0	40.0	37.1 - 42.9	66.0	62.7 - 69.2	40.9	38.4 - 43.4	65.9
Gibson	44.1	42.5 - 45.7	43.3	41.6 - 45.0	42.9	41.2 - 44.6	44.0	42.3 - 45.6	81.8
Giles	34.5	32.1 - 36.9	44.4	41.8 - 47.0	45.7	43.2 - 48.2	40.8	38.1 - 43.5	72.7
Grainger	50.0	47.4 - 52.5	51.7	49.1 - 54.3	52.8	50.1 - 55.5	50.4	47.7 - 53.1	87.7
Greene	42.7	41.1 - 44.3	43.8	42.1 - 45.4	42.7	41.0 - 44.3	41.8	40.1 - 43.5	76.9
Grundy	42.0	37.8 - 46.2	37.7	33.5 - 42.0	39.6	35.4 - 43.8	39.2	35.3 - 43.2	68.9
Hamblen	45.6	44.1 - 47.1	46.9	45.4 - 48.5	47.0	45.5 - 48.5	47.6	46.0 - 49.1	80.8
Hamilton	33.1	32.3 - 33.8	34.4	33.7 - 35.1	36.0	35.3 - 36.7	41.2	40.4 - 41.9	78.0
Hancock	51.4	46.7 - 56.2	48.4	43.3 - 53.5	51.2	46.2 - 56.1	45.1	37.2 - 53.0	36.7**
Hardeman	46.0	43.3 - 48.7	44.2	41.3 - 47.2	42.2	38.9 - 45.5	47.9	44.6 - 51.2	58.0
Hardin	48.7	46.2 - 51.3	44.3	41.8 - 46.8	47.2	44.7 - 49.6	47.0	44.5 - 49.5	96.6
Hawkins	44.9	43.1 - 46.8	45.8	44.0 - 47.7	45.6	43.7 - 47.5	43.8	41.8 - 45.8	69.1
Haywood	44.8	42.0 - 47.7	45.1	42.2 - 48.0	42.8	39.9 - 45.7	43.8	40.8 - 46.8	90.8
Henderson	59.4	57.1 - 61.7	42.7	40.5 - 45.0	44.3	42.1 - 46.6	44.2	41.5 - 46.9	58.8
Henry	42.7	40.6 - 44.8	44.2	42.0 - 46.4	42.3	40.0 - 44.5	42.9	40.7 - 45.1	94.4
Hickman	42.8	40.2 - 45.4	42.3	39.8 - 44.9	43.0	40.2 - 45.8	45.6	42.7 - 48.4	77.0
Houston	37.4	32.1 - 42.7	37.6	33.3 - 42.0	32.8	29.0 - 36.7	35.5	31.2 - 39.7	81.9
Humphreys	42.9	39.9 - 46.0	41.9	39.0 - 44.8	39.5	36.7 - 42.3	42.0	38.9 - 45.2	70.5
Jackson	44.0	39.6 - 48.3	43.8	38.6 - 49.0	38.4	33.4 - 43.5	54.5	48.4 - 60.6	41.3**
Jefferson	38.1	34.6 - 41.6	41.5	37.8 - 45.3	41.8	39.2 - 44.3	39.0	36.5 - 41.6	42.7**
Johnson	43.7	40.0 - 47.3	37.6	33.7 - 41.5	41.4	37.7 - 45.1	39.9	36.4 - 43.4	84.0
Knox	30.3	29.6 - 31.0	35.7	35.0 - 36.4	37.6	36.8 - 38.3	34.3	33.5 - 35.1	50.0
Lake	48.4	43.1 - 53.7	48.9	43.6 - 54.3	50.3	42.9 - 57.6	49.5	43.8 - 55.2	94.9
Lauderdale	43.9	41.5 - 46.3	45.2	42.7 - 47.6	47.9	45.1 - 50.6	45.4	42.7 - 48.1	77.4
Lawrence	40.0	38.2 - 41.9	41.4	39.4 - 43.5	42.1	40.1 - 44.1	43.0	41.0 - 45.1	72.8
Lewis	45.2	41.4 - 49.1	46.6	42.7 - 50.4	51.0	47.2 - 54.7	48.4	44.2 - 52.6	69.1

Table 1. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by County, 2016-17, 2017-18, 2018-19 and 2019-20 School Years

County	2016-17		2017-18		2018-19		2019-20		Percent of Population Assessed 2019-20
	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	
Lincoln	39.3	37.1 - 41.5	39.4	37.2 - 41.7	38.7	36.5 - 40.9	41.6	39.3 - 43.9	72.6
Loudon	43.4	41.4 - 45.4	42.2	40.2 - 44.2	43.6	41.5 - 45.6	42.6	40.6 - 44.5	76.2
Macon	42.8	40.3 - 45.2	45.3	42.8 - 47.7	45.5	43.0 - 48.0	44.5	42.2 - 46.9	93.2
Madison	41.1	39.8 - 42.5	41.0	39.6 - 42.3	42.5	41.2 - 43.9	40.8	39.4 - 42.2	78.4
Marion	44.5	42.0 - 46.9	39.2	36.7 - 41.7	42.9	40.3 - 45.5	39.8	37.1 - 42.5	66.8
Marshall	41.7	39.1 - 44.3	40.8	38.2 - 43.5	41.2	39.2 - 43.3	43.1	41.0 - 45.3	84.2
Mauzy	41.7	40.3 - 43.1	41.6	40.3 - 42.9	38.0	36.8 - 39.2	39.6	38.2 - 41.0	80.5
McMinn	44.0	42.2 - 45.8	42.0	40.2 - 43.8	41.5	39.7 - 43.4	42.8	40.9 - 44.6	81.3
McNairy	44.8	42.4 - 47.2	43.0	40.7 - 45.3	43.6	41.3 - 45.9	43.3	40.9 - 45.7	92.3
Meigs	48.4	44.3 - 52.5	56.0	52.1 - 60.0	44.7	41.0 - 48.4	42.7	38.8 - 46.7	82.4
Monroe	47.5	45.7 - 49.3	46.8	45.0 - 48.7	44.7	42.7 - 46.6	40.2	38.2 - 42.2	76.8
Montgomery	37.5	36.6 - 38.5	35.0	34.1 - 35.9	34.0	33.2 - 34.9	29.8	28.9 - 30.7	53.4
Moore	41.6	36.4 - 46.8	32.8	27.8 - 37.7	39.4	34.3 - 44.5	40.1	33.5 - 46.7	54.5
Morgan	39.7	36.7 - 42.7	37.8	34.6 - 41.0	40.4	37.6 - 43.3	38.0	34.7 - 41.3	70.3
Obion	46.1	43.9 - 48.3	45.2	43.0 - 47.4	43.8	41.7 - 45.9	46.3	44.0 - 48.5	90.3
Overton	43.5	40.6 - 46.3	42.6	39.2 - 45.9	41.7	38.5 - 44.9	45.0	41.8 - 48.3	62.3
Perry	29.6	24.5 - 34.6	27.9	22.3 - 33.4	37.6	29.8 - 45.4	35.5	29.7 - 41.2	55.8
Pickett	49.3	43.7 - 55.0	49.2	43.2 - 55.3	44.2	38.5 - 49.9	No Data	-	0.0
Polk	39.8	36.7 - 42.8	42.4	39.0 - 45.8	37.6	34.3 - 41.0	41.9	38.3 - 45.5	71.7
Putnam	37.8	35.6 - 40.1	38.1	35.8 - 40.3	39.6	37.9 - 41.3	38.9	37.2 - 40.6	59.5
Rhea	40.8	38.7 - 43.0	44.3	42.1 - 46.5	44.5	42.3 - 46.7	45.4	43.2 - 47.6	83.6
Roane	38.7	36.7 - 40.7	39.3	37.3 - 41.3	41.0	38.5 - 43.4	41.3	39.4 - 43.3	85.7
Robertson	39.0	36.4 - 41.5	42.0	39.8 - 44.2	44.0	42.1 - 45.9	44.2	42.1 - 46.2	40.1**
Rutherford	40.3	39.6 - 41.0	38.1	37.4 - 38.8	35.9	35.1 - 36.6	38.0	37.3 - 38.8	65.4
Scott	45.1	42.7 - 47.5	46.8	44.4 - 49.2	46.0	43.5 - 48.5	44.8	42.4 - 47.2	83.3
Sequatchie	46.2	42.8 - 49.6	39.3	35.8 - 42.8	44.2	40.9 - 47.6	54.1	49.9 - 58.3	56.1
Sevier	34.3	33.0 - 35.7	37.3	35.9 - 38.6	36.6	35.2 - 37.9	38.2	36.9 - 39.5	76.6
Shelby	38.9	38.4 - 39.4	37.6	37.1 - 38.2	39.3	38.8 - 39.8	38.8	38.3 - 39.3	49.0**
Smith	42.0	39.2 - 44.8	44.1	41.3 - 46.9	42.4	39.5 - 45.3	45.0	42.3 - 47.8	86.3
Stewart	39.1	36.2 - 42.0	42.1	38.5 - 45.7	40.6	37.1 - 44.1	40.7	37.4 - 43.9	94.4
Sullivan	37.2	36.1 - 38.2	36.6	35.5 - 37.7	37.7	36.6 - 38.9	39.4	38.2 - 40.6	68.7
Sumner	37.7	36.8 - 38.6	35.8	34.9 - 36.6	35.8	35.0 - 36.7	36.7	35.8 - 37.6	76.7
Tipton	39.2	37.6 - 40.8	40.6	38.9 - 42.2	37.9	36.2 - 39.5	37.4	35.7 - 39.1	65.2
Trousdale	57.0	52.5 - 61.4	45.0	40.8 - 49.3	43.4	39.3 - 47.5	42.9	39.0 - 46.8	98.6
Unicoi	45.3	42.1 - 48.5	44.0	40.6 - 47.4	44.5	41.1 - 47.9	45.4	41.4 - 49.4	59.8
Union	39.7	36.6 - 42.8	42.3	39.3 - 45.4	40.9	37.4 - 44.3	42.9	39.2 - 46.6	30.6**
Van Buren	43.3	37.2 - 49.4	46.6	40.6 - 52.6	38.7	32.9 - 44.5	43.1	37.1 - 49.0	85.0
Warren	45.0	43.2 - 46.8	46.2	44.3 - 48.2	44.7	42.8 - 46.6	43.0	41.1 - 44.9	89.1
Washington	35.3	34.0 - 36.7	36.8	35.5 - 38.2	36.8	35.4 - 38.2	35.7	34.4 - 37.0	66.5
Wayne	44.8	41.4 - 48.1	43.3	39.9 - 46.8	37.5	33.8 - 41.1	46.4	43.0 - 49.8	85.3
Weakley	44.6	42.2 - 46.9	44.5	42.2 - 46.8	45.1	42.8 - 47.5	52.6	45.2 - 60.0	9.2**
White	47.0	44.4 - 49.5	45.3	42.7 - 47.9	46.7	44.1 - 49.4	45.7	42.9 - 48.6	68.4
Williamson	23.8	22.6 - 24.9	24.4	23.3 - 25.4	24.7	23.5 - 25.9	24.0	22.3 - 25.7	11.2**
Wilson	37.3	36.2 - 38.3	36.7	35.6 - 37.7	36.5	35.5 - 37.6	37.0	36.0 - 38.0	80.9

*Overweight/obese was defined as body mass index (BMI) greater than or equal to the 85th percentile for children of the same age and sex.

No data indicates data was not collected or submitted for the school year.

Data source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville Tennessee

** Results for counties with less than a 50% response rate should be interpreted with caution.

Two counties are missing data due to the COVID-19 pandemic.

Table 2. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by Grade, 2016-17, 2017-18, 2018-19 and 2019-20 School Years

Grade	Gender	2016-17		2017-18		2018-19		2019-20		Change from 2016-17 to 2019-20
		Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	Percent overweight or obese	95% confidence interval	
All Grades	Both	39.2	39.1 - 39.4	39.2	39.0 - 39.3	39.5	39.4 - 39.7	39.7	39.5 - 39.9	Increase
	Girls	39.4	39.1 - 39.6	39.2	38.9 - 39.4	39.5	39.2 - 39.7	39.5	39.3 - 39.8	
	Boys	39.1	38.8 - 39.3	39.2	38.9 - 39.4	39.6	39.3 - 39.8	39.8	39.6 - 40.1	Increase
K	Both	29.7	29.3 - 30.1	30.0	29.6 - 30.4	29.6	29.2 - 29.9	30.7	30.3 - 31.1	Increase
	Girls	30.2	29.6 - 30.8	30.5	29.9 - 31.1	30.0	29.4 - 30.5	30.9	30.3 - 31.5	
	Boys	29.2	28.6 - 29.7	29.6	29.0 - 30.1	29.2	28.6 - 29.7	30.4	29.9 - 31.0	Increase
2nd	Both	34.4	34.0 - 34.8	34.4	34.0 - 34.8	34.3	33.9 - 34.7	35.3	34.9 - 35.7	Increase
	Girls	34.3	33.7 - 34.9	34.5	33.9 - 35.1	34.1	33.5 - 34.7	35.3	34.7 - 35.9	
	Boys	34.5	33.9 - 35.0	34.3	33.7 - 34.9	34.6	34.0 - 35.1	35.2	34.7 - 35.8	
4th	Both	40.5	40.1 - 40.9	41.0	40.6 - 41.4	41.3	41.0 - 41.7	41.6	41.2 - 42.0	Increase
	Girls	40.1	39.5 - 40.6	40.4	39.8 - 40.9	40.7	40.1 - 41.2	40.5	39.9 - 41.1	
	Boys	40.9	40.4 - 41.5	41.7	41.1 - 42.3	42.0	41.4 - 42.5	42.7	42.1 - 43.2	Increase
6th	Both	43.9	43.4 - 44.3	43.6	43.2 - 44.1	44.3	43.9 - 44.7	45.0	44.6 - 45.4	Increase
	Girls	43.6	43.0 - 44.2	42.6	42.0 - 43.2	43.6	43.0 - 44.2	44.2	43.6 - 44.9	
	Boys	44.1	43.5 - 44.7	44.6	44.0 - 45.2	44.9	44.4 - 45.5	45.7	45.1 - 46.3	Increase
8th	Both	44.2	43.8 - 44.7	43.3	42.9 - 43.8	44.4	44.0 - 44.9	44.7	44.3 - 45.2	
	Girls	45.6	44.9 - 46.2	44.3	43.7 - 45.0	45.6	45.0 - 46.2	45.7	45.0 - 46.4	
	Boys	42.9	42.3 - 43.6	42.5	41.8 - 43.1	43.4	42.8 - 44.0	43.9	43.2 - 44.5	
High School	Both	43.2	42.7 - 43.6	43.0	42.5 - 43.4	43.2	42.7 - 43.7	42.6	42.1 - 43.1	
	Girls	43.4	42.7 - 44.0	43.6	42.9 - 44.2	43.5	42.8 - 44.1	42.8	42.0 - 43.5	
	Boys	42.9	42.3 - 43.6	42.4	41.8 - 43.0	42.9	42.3 - 43.0	42.5	41.7 - 43.2	

*Overweight/obese was defined as body mass index (BMI) greater than or equal to the 85th percentile for children of the same age and sex.

**"Decrease" or "Increase" indicates a statistically significant change from 2016-17 to 2019-20.

Data source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville Tennessee

Table 3. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by School District 2016-17, 2017-18, 2018-19 and 2019-20 School Years

District	2016-17			2017-18			2018-19			2019-20			Percent of Population Assessed 2019-20
	Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		
Tennessee	39.2	39.1	- 39.4	39.2	39.0	- 39.3	39.5	39.3	- 39.7	39.7	39.5	- 39.9	62.2
Alamo	44.1	38.4	- 49.9	48.5	42.6	- 54.5	42.8	37.3	- 48.3	45.2	39.6	- 50.7	92.5
Alcoa City	34.3	31.2	- 37.3	36.7	32.9	- 40.5	38.3	34.1	- 42.4	37.0	32.3	- 41.7	43.4**
Alvin York	53.9	46.0	- 61.9	49.6	41.1	- 58.2	44.3	35.3	- 53.4	38.8	29.1	- 48.4	67.1
Anderson County	42.9	40.9	- 45.0	43.2	41.1	- 45.2	43.1	41.0	- 45.2	44.2	42.0	- 46.4	69.9
Arlington Community	32.4	30.2	- 34.7	30.7	28.5	- 32.9	33.1	31.0	- 35.3	30.6	28.6	- 32.7	91.2
Athens City	37.5	33.9	- 41.1	33.9	30.6	- 37.2	39.6	36.0	- 43.1	37.2	33.8	- 40.6	85.2
Bartlett City Schools	32.5	30.9	- 34.0	34.2	32.7	- 35.8	33.8	32.2	- 35.4	33.4	31.8	- 35.0	76.5
Bedford County	43.4	39.9	- 47.0	46.6	44.9	- 48.4	48.5	46.7	- 50.3	43.5	41.0	- 46.0	36.0**
Bells City	34.1	26.1	- 42.1	33.1	25.4	- 40.8	36.1	28.3	- 44.0	38.7	31.3	- 46.1	93.9
Benton County	43.3	39.5	- 47.1	50.2	46.6	- 53.8	46.6	43.1	- 50.1	48.5	44.7	- 52.2	73.6
Bledsoe County	43.1	37.8	- 48.5	41.8	37.4	- 46.1	41.5	36.8	- 46.3	39.8	35.0	- 44.7	53.5
Blount County	40.2	38.8	- 41.7	42.0	40.5	- 43.5	41.1	39.6	- 42.6	41.4	39.9	- 43.0	81.3
Bradford SSD	46.6	40.2	- 53.0	38.6	32.1	- 45.1	43.8	37.4	- 50.1	41.0	34.7	- 47.4	83.6
Bradley County	38.2	36.7	- 39.8	41.0	39.4	- 42.6	40.5	38.9	- 42.1	41.2	39.6	- 42.9	75.2
Bristol City	34.3	31.8	- 36.9	32.6	30.2	- 35.1	35.3	32.9	- 37.6	33.0	30.6	- 35.4	82.0
Campbell County	45.0	42.1	- 47.9	47.5	44.1	- 50.8	45.6	42.3	- 48.9	48.6	46.2	- 51.0	68.2
Cannon County	43.5	39.9	- 47.0	44.9	41.2	- 48.6	40.3	36.7	- 43.8	43.6	40.0	- 47.2	82.2
Carter County	43.9	41.4	- 46.3	43.8	41.2	- 46.4	46.1	43.6	- 48.6	43.9	41.4	- 46.3	71.0
Cheatham County	34.3	32.1	- 36.6	33.1	30.9	- 35.3	32.2	30.0	- 34.5	No Data	-	-	0.0
Chester County	36.1	32.2	- 40.0	37.1	34.0	- 40.3	41.3	38.1	- 44.5	41.4	38.2	- 44.6	70.0
Claiborne County	48.2	45.6	- 50.8	48.5	45.8	- 51.2	47.7	44.8	- 50.6	47.1	44.2	- 50.0	62.4
Clay County	39.2	34.7	- 43.8	42.3	37.9	- 46.6	41.5	37.0	- 46.1	39.8	35.0	- 44.6	78.4
Cleveland	39.7	37.7	- 41.8	39.4	37.4	- 41.4	39.8	37.8	- 41.7	40.0	38.0	- 42.0	84.9
Clinton City	40.2	35.2	- 45.1	30.6	26.2	- 35.0	36.9	32.4	- 41.4	35.1	30.6	- 39.6	86.2
Cocke County	48.2	46.0	- 50.4	46.9	44.5	- 49.3	48.2	46.1	- 50.3	46.2	43.8	- 48.5	85.4
Coffee County	45.1	42.7	- 47.5	43.0	40.5	- 45.5	44.1	41.5	- 46.6	43.9	41.4	- 46.4	78.7
Collierville	25.3	23.7	- 26.9	22.5	20.9	- 24.0	22.9	21.5	- 24.2	25.8	23.5	- 28.1	32.8**
Crockett County	51.4	48.0	- 54.7	45.0	41.5	- 48.4	49.3	45.3	- 53.2	48.3	44.6	- 51.9	82.5
Cumberland County	44.7	42.7	- 46.6	44.6	43.0	- 46.3	46.9	45.2	- 48.6	43.9	42.0	- 45.7	82.1
Davidson County	36.6	36.0	- 37.2	36.8	36.2	- 37.4	37.1	36.5	- 37.7	35.9	35.3	- 36.5	56.2
Dayton City	36.5	31.6	- 41.3	37.0	31.8	- 42.1	39.9	35.0	- 44.8	41.5	36.6	- 46.4	82.4
Decatur County	47.5	43.9	- 51.2	48.8	45.9	- 51.7	46.2	43.3	- 49.1	47.8	44.0	- 51.6	94.9
DeKalb County	46.8	44.0	- 49.6	44.9	41.2	- 48.6	45.1	41.2	- 48.9	46.9	44.0	- 49.8	84.3
Dickson County	37.6	35.9	- 39.3	39.0	37.2	- 40.8	41.3	39.5	- 43.1	38.1	35.9	- 40.4	49.3**
Dyer County	38.9	36.5	- 41.3	42.6	40.2	- 45.0	38.4	36.0	- 40.7	40.3	37.8	- 42.9	82.2
Dyersburg City	43.0	40.0	- 45.9	39.8	36.5	- 43.0	40.0	37.0	- 43.0	49.7	44.3	- 55.1	28.4**
Elizabethton	42.9	35.2	- 50.7	38.3	34.5	- 42.1	41.2	37.9	- 44.6	43.1	39.8	- 46.5	75.4
Etowah City	39.3	36.4	- 42.2	32.2	25.2	- 39.1	32.3	25.0	- 39.6	42.9	35.2	- 50.7	72.9
Fayette County	54.6	51.4	- 57.7	43.0	40.1	- 45.9	46.0	43.2	- 48.8	42.0	39.3	- 44.8	81.3
Fayetteville City	36.7	32.7	- 40.8	33.1	29.2	- 37.0	34.3	30.2	- 38.4	44.8	40.5	- 49.1	80.9
Fentress County	48.5	45.4	- 51.7	46.3	43.0	- 49.6	50.1	46.8	- 53.4	46.3	42.8	- 49.7	76.4
Franklin County	37.7	35.3	- 40.0	40.0	37.1	- 42.9	66.0	62.7	- 69.2	40.9	38.4	- 43.4	65.9
Franklin SSD	33.2	30.7	- 35.8	35.4	33.0	- 37.8	30.8	28.5	- 33.0	No Data	-	-	0.0
Germantown	25.4	23.5	- 27.4	22.5	20.8	- 24.3	21.7	20.0	- 23.5	21.8	20.0	- 23.5	78.6
Gibson County SSD	41.4	39.0	- 43.7	40.1	37.4	- 42.7	38.8	36.2	- 41.4	42.0	39.3	- 44.7	72.0
Giles County	34.5	32.1	- 36.9	44.4	41.8	- 47.0	45.7	43.2	- 48.2	40.8	38.1	- 43.5	72.7
Grainger County	50.0	47.4	- 52.5	51.7	49.1	- 54.3	52.8	50.1	- 55.5	50.4	47.7	- 53.1	87.7
Greene County	43.5	41.5	- 45.5	44.9	43.0	- 46.9	43.3	41.3	- 45.3	42.3	40.1	- 44.4	71.5
Greeneville City	41.0	38.1	- 43.9	41.2	38.4	- 44.1	41.4	38.5	- 44.2	41.0	38.2	- 43.8	88.2
Grundy County	42.0	37.8	- 46.2	37.7	33.5	- 42.0	39.6	35.4	- 43.8	39.2	35.3	- 43.2	68.9
Hamblen County	45.6	44.1	- 47.1	46.9	45.4	- 48.5	47.0	45.5	- 48.5	47.6	46.0	- 49.1	80.8
Hamilton County	33.1	32.3	- 33.8	34.4	33.7	- 35.1	36.0	35.3	- 36.7	41.2	40.4	- 41.9	78.0
Hancock County	51.4	46.7	- 56.2	48.4	43.3	- 53.5	51.2	46.2	- 56.1	45.1	37.2	- 53.0	36.7**

Table 3. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by School District 2016-17, 2017-18, 2018-19 and 2019-20 School Years

District	2016-17			2017-18			2018-19			2019-20			Percent of Population Assessed 2019-20
	Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		
Hardeman County	46.0	43.3	- 48.7	44.2	41.3	- 47.2	42.2	38.9	- 45.5	47.9	44.6	- 51.2	58.0
Hardin County	48.7	46.2	- 51.3	44.3	41.8	- 46.8	47.2	44.7	- 49.6	47.0	44.5	- 49.5	96.6
Hawkins County	44.6	42.6	- 46.6	45.6	43.6	- 47.6	46.0	44.0	- 48.1	44.4	42.2	- 46.5	69.8
Haywood County	44.8	42.0	- 47.7	45.1	42.2	- 48.0	42.8	39.9	- 45.7	43.8	40.8	- 46.8	90.8
Henderson County	64.3	61.8	- 66.9	43.8	41.2	- 46.4	44.8	42.2	- 47.4	43.9	40.6	- 47.2	48.7**
Henry County	41.5	38.8	- 44.2	44.4	41.6	- 47.3	42.6	39.8	- 45.4	44.7	42.0	- 47.5	98.6
Hickman County	42.8	40.2	- 45.4	42.3	39.8	- 44.9	43.0	40.2	- 45.8	45.6	42.7	- 48.4	77.0
Hollow Rock-Bruceston	43.4	36.1	- 50.8	38.7	32.5	- 45.0	45.9	39.2	- 52.7	33.3	22.0	- 44.7	23.2**
Houston County	37.4	32.1	- 42.7	37.6	33.3	- 42.0	32.8	29.0	- 36.7	35.5	31.2	- 39.7	81.9
Humboldt City	51.1	46.7	- 55.5	49.0	44.4	- 53.6	50.9	46.3	- 55.5	53.1	48.3	- 57.9	78.5
Humphreys County	42.9	39.9	- 46.0	41.9	39.0	- 44.8	39.5	36.7	- 42.3	42.0	38.9	- 45.2	70.5
Huntingdon SSD	43.1	38.7	- 47.4	44.9	40.7	- 49.1	41.5	37.4	- 45.7	50.3	46.1	- 54.5	87.6
Jackson County	44.0	39.6	- 48.3	43.8	38.6	- 49.0	38.4	33.4	- 43.5	54.5	48.4	- 60.6	41.3**
Jefferson County	38.1	34.6	- 41.6	41.5	37.8	- 45.3	41.8	39.2	- 44.3	39.0	36.5	- 41.6	42.7**
Johnson City	43.7	40.0	- 47.3	36.2	34.4	- 37.9	36.3	34.5	- 38.1	36.5	34.8	- 38.3	79.9
Johnson County	34.5	32.6	- 36.4	37.6	33.7	- 41.5	41.4	37.7	- 45.1	39.9	36.4	- 43.4	84.0
Kingsport City	35.3	33.6	- 37.0	34.0	32.3	- 35.7	33.7	31.8	- 35.6	34.4	32.0	- 36.7	46.1**
Knox County	30.3	29.6	- 31.0	35.7	35.0	- 36.4	37.6	36.8	- 38.3	34.3	33.5	- 35.1	50.0
Lake County	48.4	43.1	- 53.7	48.9	43.6	- 54.3	50.3	42.9	- 57.6	49.5	43.8	- 55.2	94.9
Lakeland	20.1	16.3	- 23.9	25.0	21.7	- 28.3	22.4	19.3	- 25.4	29.5	25.6	- 33.4	52.4
Lauderdale County	43.9	41.5	- 46.3	45.2	42.7	- 47.6	47.9	45.1	- 50.6	45.4	42.7	- 48.1	77.4
Lawrence County	40.0	38.2	- 41.9	41.4	39.4	- 43.5	42.1	40.1	- 44.1	43.0	41.0	- 45.1	72.8
Lebanon SSD	48.0	45.2	- 50.9	43.0	40.3	- 45.7	43.9	41.3	- 46.6	43.3	40.8	- 45.8	70.5
Lenoir City	46.5	42.4	- 50.6	46.3	41.7	- 50.9	48.2	43.2	- 53.2	49.0	44.9	- 53.0	59.4
Lewis County	45.2	41.4	- 49.1	46.6	42.7	- 50.4	51.0	47.2	- 54.7	48.4	44.2	- 52.6	69.1
Lexington City	44.6	40.0	- 49.3	39.5	35.0	- 44.0	42.9	38.2	- 47.6	44.8	40.2	- 49.4	97.6
Lincoln County	40.4	37.7	- 43.0	42.3	39.5	- 45.0	40.4	37.8	- 43.1	40.2	37.5	- 43.0	69.6
Loudon County	42.4	40.1	- 44.7	41.2	39.0	- 43.4	42.6	40.4	- 44.8	40.7	38.5	- 42.9	83.0
Macon County	42.8	40.3	- 45.2	45.3	42.8	- 47.7	45.5	43.0	- 48.0	44.5	42.2	- 46.9	93.2
Madison County	41.1	39.8	- 42.5	41.0	39.6	- 42.3	42.5	41.2	- 43.9	40.8	39.4	- 42.2	78.4
Manchester City	37.4	33.4	- 41.3	42.8	38.2	- 47.5	37.5	32.6	- 42.4	39.5	34.8	- 44.2	54.3
Marion County	44.3	41.8	- 46.8	38.8	36.2	- 41.4	42.3	39.7	- 45.0	39.8	37.1	- 42.5	70.9
Marshall County	41.7	39.1	- 44.3	40.8	38.2	- 43.5	41.2	39.2	- 43.3	43.1	41.0	- 45.3	84.2
Maryville City	32.7	30.3	- 35.1	33.7	31.8	- 35.7	33.7	31.7	- 35.6	33.0	31.1	- 34.9	94.4
Maurycy County	41.7	40.3	- 43.1	41.6	40.3	- 42.9	38.0	36.8	- 39.2	39.6	38.2	- 41.0	80.5
McKenzie SSD	40.1	35.8	- 44.4	38.9	34.4	- 43.5	50.8	46.4	- 55.2	37.1	32.7	- 41.4	81.0
McMinn County	46.4	44.2	- 48.5	46.1	43.9	- 48.3	43.1	40.8	- 45.3	45.1	42.9	- 47.4	80.5
McNairy County	44.8	42.4	- 47.2	43.0	40.7	- 45.3	43.6	41.3	- 45.9	43.3	40.9	- 45.7	92.3
Meigs County	48.4	44.3	- 52.5	56.0	52.1	- 60.0	44.7	41.0	- 48.4	42.7	38.8	- 46.7	82.4
Milan SSD	41.3	38.0	- 44.7	43.7	40.3	- 47.0	43.2	39.9	- 46.6	42.8	39.5	- 46.2	94.5
Millington	35.8	32.5	- 39.1	45.7	41.2	- 50.1	44.0	40.7	- 47.3	42.7	37.3	- 48.2	28.0**
Monroe County	48.2	46.1	- 50.2	48.0	45.9	- 50.2	45.2	43.0	- 47.4	39.4	37.2	- 41.6	85.4
Montgomery County	37.5	36.6	- 38.5	35.0	34.1	- 35.9	34.0	33.2	- 34.9	29.8	28.9	- 30.7	53.4
Moore County	41.6	36.4	- 46.8	32.8	27.8	- 37.7	39.4	34.3	- 44.5	40.1	33.5	- 46.7	54.5
Morgan County	39.7	36.7	- 42.7	37.8	34.6	- 41.0	40.4	37.6	- 43.3	38.0	34.7	- 41.3	70.3
Murfreesboro City	35.7	34.1	- 37.3	36.4	34.7	- 38.1	35.8	34.2	- 37.3	37.1	35.5	- 38.6	82.1
Newport City	47.9	42.9	- 52.9	42.9	37.6	- 48.1	48.8	43.7	- 53.9	46.2	40.9	- 51.6	97.9
Oak Ridge City	33.9	31.3	- 36.5	35.5	32.9	- 38.1	30.9	27.7	- 34.2	36.5	34.2	- 38.7	84.6
Obion County	47.6	45.0	- 50.3	46.6	43.9	- 49.3	45.3	42.7	- 47.9	46.2	43.4	- 48.9	91.0
Oneida SSD	42.0	37.8	- 46.1	42.7	38.6	- 46.7	43.5	39.2	- 47.8	42.1	37.9	- 46.2	100.2
Overton County	43.5	40.6	- 46.3	42.6	39.2	- 45.9	41.7	38.5	- 44.9	45.0	41.8	- 48.3	62.3
Paris SSD	44.7	41.2	- 48.2	43.8	40.2	- 47.3	41.6	37.8	- 45.4	39.9	36.3	- 43.4	88.1
Perry County	29.6	24.5	- 34.6	27.9	22.3	- 33.4	37.6	29.8	- 45.4	35.5	29.7	- 41.2	55.8
Pickett County	49.3	43.7	- 55.0	49.2	43.2	- 54.6	44.2	38.5	- 49.9	No Data	-	-	0.0

Table 3. Prevalence of Overweight or Obese* Assessed Students in Tennessee Public Schools, by School District 2016-17, 2017-18, 2018-19 and 2019-20 School Years

District	2016-17			2017-18			2018-19			2019-20			Percent of Population Assessed 2019-20
	Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		Percent overweight or obese	95% confidence interval		
Polk County	39.8	36.7	- 42.8	42.4	39.0	- 45.8	37.6	34.3	- 41.0	41.9	38.3	- 45.5	71.7
Putnam County	37.8	35.6	- 40.1	38.1	35.8	- 40.3	39.6	37.9	- 41.3	38.9	37.2	- 40.6	59.5
Rhea County	41.8	39.4	- 44.2	45.8	43.4	- 48.3	45.6	43.1	- 48.1	46.4	43.9	- 48.8	83.9
Richard City	47.2	36.8	- 57.6	44.6	34.4	- 54.7	50.5	40.5	- 60.6	<i>No Data</i>	-	-	0.0
Roane County	38.7	36.7	- 40.7	39.3	37.3	- 41.3	41.0	38.5	- 43.4	41.3	39.4	- 43.3	85.7
Robertson County	39.0	36.4	- 41.5	42.0	39.8	- 44.2	44.0	42.1	- 45.9	44.2	42.1	- 46.2	40.1**
Rogersville City	47.8	42.2	- 53.5	47.5	42.1	- 52.8	41.5	35.6	- 47.4	38.7	32.3	- 45.1	63.1
Rutherford County	41.3	40.6	- 42.1	38.5	37.7	- 39.2	35.9	35.1	- 36.7	38.3	37.5	- 39.2	61.7
Scott County	46.7	43.7	- 49.7	48.9	46.0	- 51.9	47.2	44.2	- 50.3	46.2	43.2	- 49.2	76.6
Sequatchie County	46.2	42.8	- 49.6	39.3	35.8	- 42.8	44.2	40.9	- 47.6	54.1	49.9	- 58.3	56.1
Sevier County	34.3	33.0	- 35.7	37.3	35.9	- 38.6	36.6	35.2	- 37.9	38.2	36.9	- 39.5	76.6
Shelby County	43.5	42.9	- 44.1	43.4	42.6	- 44.1	45.1	44.4	- 45.7	42.7	42.1	- 43.4	45.2**
Smith County	42.0	39.2	- 44.8	44.1	41.3	- 46.9	42.4	39.5	- 45.3	45.0	42.3	- 47.8	86.3
South Carroll Co SSD	44.9	35.1	- 54.7	51.1	42.6	- 59.6	48.1	40.2	- 55.9	51.1	42.8	- 59.4	94.6
Stewart County	39.1	36.2	- 42.0	42.1	38.5	- 45.7	40.6	37.1	- 44.1	40.7	37.4	- 43.9	94.4
Sullivan County	39.9	38.3	- 41.6	40.4	38.8	- 42.0	41.8	40.1	- 43.5	44.6	42.9	- 46.3	82.3
Sumner County	37.7	36.8	- 38.6	35.8	34.9	- 36.6	35.8	35.0	- 36.7	36.7	35.8	- 37.6	76.7
Sweetwater City	45.2	41.5	- 48.9	43.4	39.7	- 47.0	42.8	38.8	- 46.7	44.3	39.2	- 49.4	50.2
Tipton County	39.2	37.6	- 40.8	40.6	38.9	- 42.2	37.9	36.2	- 39.5	37.4	35.7	- 39.1	65.2
Trenton SSD	48.8	44.8	- 52.8	47.5	43.4	- 51.7	45.5	41.3	- 49.7	44.5	40.4	- 48.7	95.5
Trousdale County	57.0	52.5	- 61.4	45.0	40.8	- 49.3	43.4	39.3	- 47.5	42.9	39.0	- 46.8	98.6
Tullahoma City	38.3	35.7	- 41.0	39.6	36.9	- 42.2	39.8	37.2	- 42.4	42.7	40.2	- 45.3	84.9
Unicoi County	45.3	42.1	- 48.5	44.0	40.6	- 47.4	44.5	41.1	- 47.9	45.4	41.4	- 49.4	59.8
Union City	43.0	39.2	- 46.8	42.5	38.7	- 46.3	40.8	37.2	- 44.5	46.5	42.6	- 50.5	88.7
Union County	39.7	36.6	- 42.8	42.3	39.3	- 45.4	40.9	37.4	- 44.3	42.9	39.2	- 46.6	30.6**
Van Buren County	43.3	37.2	- 49.4	46.6	40.6	- 52.6	38.7	32.9	- 44.5	43.1	37.1	- 49.0	85.0
Warren County	45.0	43.2	- 46.8	46.2	44.3	- 48.2	44.7	42.8	- 46.6	43.0	41.1	- 44.9	89.1
Washington County	36.3	34.3	- 38.2	37.9	35.7	- 40.1	37.6	35.4	- 39.7	34.5	32.4	- 36.5	53.6
Wayne County	44.8	41.4	- 48.1	43.3	39.9	- 46.8	37.5	33.8	- 41.1	46.4	43.0	- 49.8	85.3
Weakley County	44.6	42.2	- 46.9	44.5	42.2	- 46.8	45.1	42.8	- 47.5	52.6	45.2	- 60.0	9.2**
West Carroll Co SSD	47.5	42.4	- 52.7	44.7	38.9	- 50.5	50.0	44.9	- 55.1	50.9	45.9	- 56.0	88.6
White County	47.0	44.4	- 49.5	45.3	42.7	- 47.9	46.7	44.1	- 49.4	45.7	42.9	- 48.6	68.4
Williamson County	20.6	19.4	- 21.9	20.9	19.8	- 22.1	22.0	20.6	- 23.3	24.0	22.3	- 25.7	12.3**
Wilson County	35.4	34.3	- 36.5	35.5	34.4	- 36.6	35.1	34.0	- 36.2	35.7	34.6	- 36.8	83.5

*Overweight/obese was defined as body mass index (BMI) greater than or equal to the 85th percentile for children of the same age and sex.

No data indicates data was not collected or submitted for the school year.

Data source: Body Mass Index Data, 2007-08 to 2019-20, Tennessee Department of Education, Nashville Tennessee

** Results for districts with less than a 50% response rate should be interpreted with caution.

Four districts are missing data due to the COVID-19 pandemic.

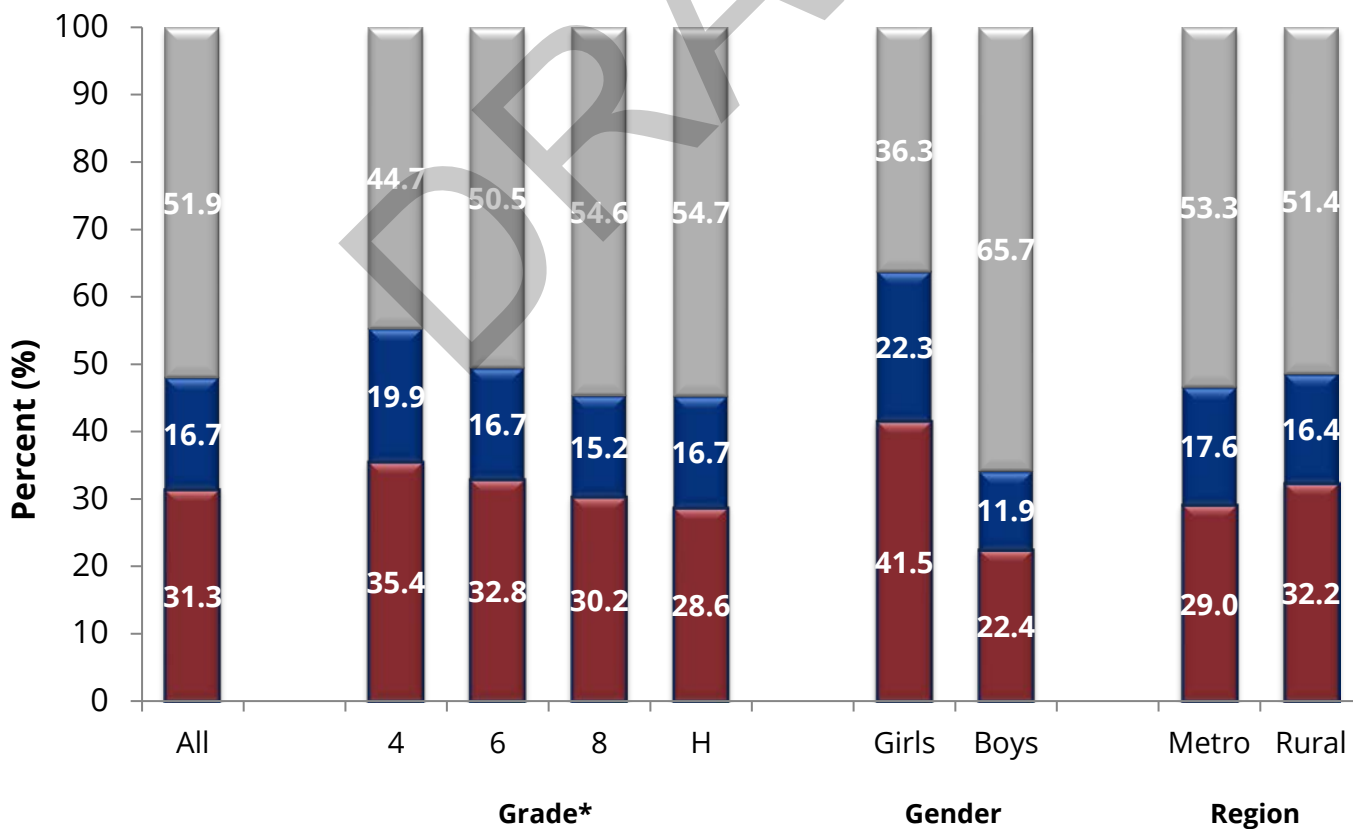
Supplement – PACER Data Analysis

The Progressive Aerobic Cardiovascular Endurance Run (or PACER) is a fitness test designed to estimate a child’s aerobic capacity or VO₂ max. The test involves running continuously between points that are either 20 or 15 meters apart, with less time to get from point to point as each minute passes. The number of laps a student completes, combined with their age, gender, height, and weight determines which of three fitness zones they fall into – Healthy Fitness Zone, Needs Improvement, or Needs Improvement–Health Risk (see Figure 9).

Approximately 21.0% of the target population, children in grades 4, 6, 8, and any one year of high school, were assessed.

- For the 2019-20 school year, the percentage of students falling into the Healthy Fitness Zone increased by grade level from 44.7 percent in grade 4* up to 54.7 percent in high school, though the increase from grade 8 to high school was not statistically significant.
- Boys were much more likely than girls to be in the Healthy Fitness Zone – 65.7 vs. 36.3 percent, respectively (statistically significant).
- Children in metro areas were slightly more likely to be in the Healthy Fitness Zone than children in rural areas – 53.3 vs. 51.4 percent, respectively (statistically significant).

Figure 9. Fitness Zone by Grade Level, Gender and Region, Assessed Students, Tennessee Public Schools, 2019-20

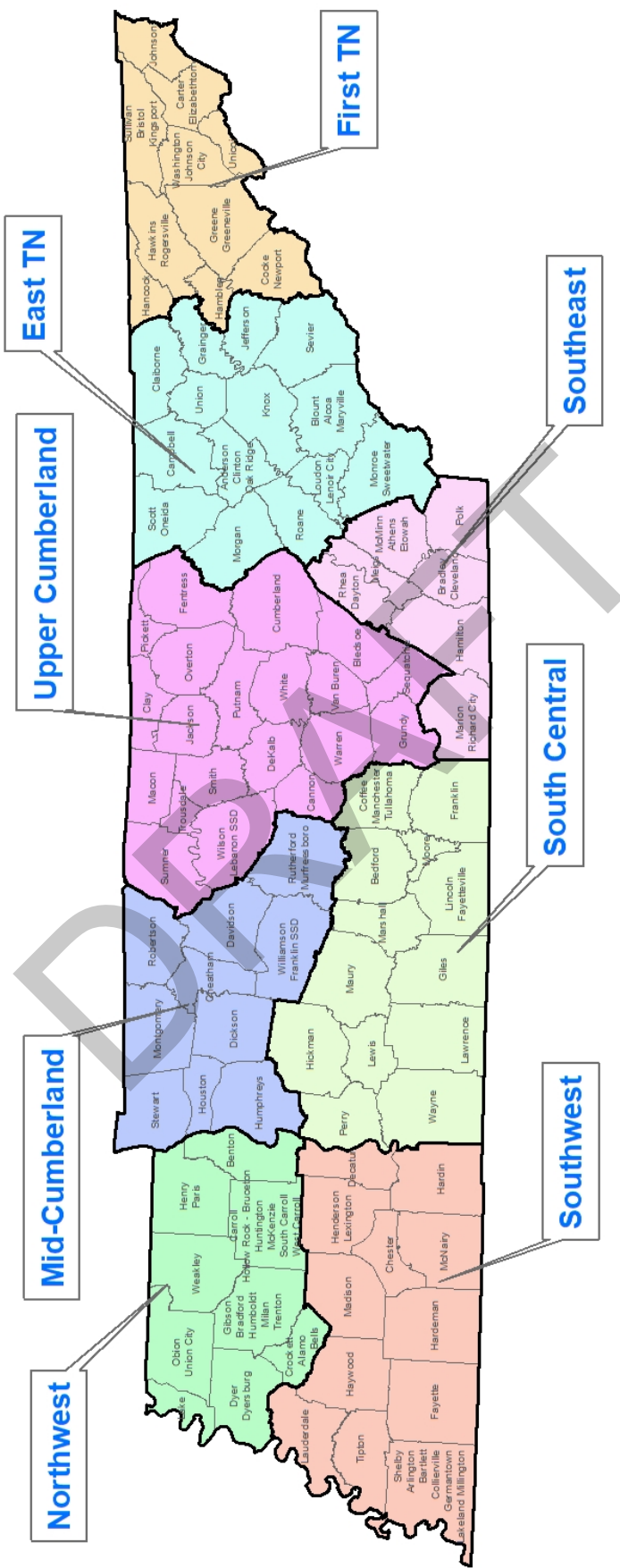


■ Needs Improvement - Health Risk ■ Needs Improvement ■ Healthy Fitness Zone

*Kindergarteners and Grade 2 were not included in the analysis
Data Source: Body Mass Index Data, 2019-20, Tennessee Department of Education, Nashville, Tennessee.

Appendix A

Tennessee's CORE Regions



Acknowledgements and Citations

The following agencies collaborated to compile this summary:

- [Tennessee Department of Education, Coordinated School Health](#)
- [Tennessee Department of Health, Division of Population Health Assessment](#)

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Appendix B: Lifetime Wellness Grades 9-12

Lifetime Wellness Grades 9-12

Preface

As required by the Tennessee State Board of Education's *Rules, Regulations, and Minimum Standards*, Lifetime Wellness teachers across Tennessee developed the *Tennessee Lifetime Wellness Curriculum Standards* for grades nine through twelve. The *Lifetime Wellness Curriculum Standards* includes Course Level Expectations (CLE), Checks for Understanding and Student Performance Indicators (SPI).

Philosophy

Lifetime Wellness is a holistic approach to health and lifetime physical activities in Tennessee high schools. This approach to total wellness encompasses the physical, mental, social, and emotional well-being of the individual.

Course Description

The content of the course includes seven standards: Disease Prevention and Control, Nutrition, Substance Use and Abuse, Mental/Emotional/Social Health, Sexuality and Family Life, Safety and First Aid and Personal Fitness. Each content area is addressed in a classroom and/or physical activity setting. Personal fitness and nutrition should be emphasized and integrated throughout the course. Students are provided opportunities to explore how content areas are interrelated. Students acquire knowledge and skills necessary to make informed decisions regarding their health and well-being throughout their lifetime.

Organization

1. Course Level Expectations (CLE) – Course Level Expectations do not indicate sequence, define the teaching strategies by which topics must be taught or preclude additional topics from being included in courses. Standards contain clear learning expectations.
2. Checks for Understanding – Checks for Understanding are objectives within each standard that the student is required to learn. They are stated in broad terms to accommodate a range of abilities, learning styles and resources.
3. Student Performance Indicators (SPI) – Student Performance Indicators detail the level of achievement for each CLE. There are three levels of student performance indicators.
 - a. Level 1: Prior knowledge
 - b. Level 2: Proficient
 - c. Level 3: Advanced

4. Sample Task – Sample tasks are examples of teaching activities pertinent to the specific standard.
5. (e.g.) – The abbreviation *e.g.* signifies that information listed within parentheses could be addressed. Examples used in learning expectations and performance indicators are not limited to those listed.
6. (i.e.) – The abbreviation *i.e.* signifies that all information listed within parentheses must be addressed.
7. Linkage – Linkage is defined as the correlation with other Lifetime Wellness Learning Expectations. Linkage to other learning expectations in different standards will be in parenthesis. Instructors are encouraged to integrate learning expectations across the Lifetime Wellness Curriculum to emphasize total wellness.

Example: 1.2 determine heredity, environmental and lifestyle factors which place students at risk for disease.
(Linkage 3.4, 3.5, 3.10, 3.11, 6.10, 6.11, 7.2, 7.3)

8. Integration – Integration is defined as the correlation with other curricular areas.

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Standard: Disease Prevention and Control

Course Level Expectation:

The student will identify the causes, signs and symptoms, treatments and prevention of communicable and non-communicable diseases related to total wellness and health maintenance.

Checks for Understanding:

The student will:

- 1.1 differentiate communicable and non-communicable diseases.
(Linkage: 6.8)
- 1.2 determine heredity, environmental and lifestyle factors which place the student at risk for disease.
(Linkage: 3.4, 3.5, 3.10, 3.11, 6.10, 6.11, 7.2, 7.3)
- 1.3 describe different types of pathogens and how they affect health.
(Linkage: 6.8, 6.12, 7.2, 7.3)
- 1.4 explain causes, modes of transmission, signs and symptoms, treatments and prevention of Communicable diseases (e.g., STIs, HIV/AIDS, mononucleosis).
(Linkage: 6.8, 6.10, 6.12, 7.2, 7.3)
- 1.5 explain causes, signs and symptoms, treatments and prevention of non-communicable diseases (e.g., obesity, Type I and Type II diabetes, asthma, heart disease).
(Linkage: 3.4, 3.11)
- 1.6 identify appropriate community agencies providing resources for disease treatment, information and support (e.g., local health department, American Red Cross, American Lung Association, American Heart Association, American Cancer Society, local Crisis Pregnancy Center).
(Linkage: 7.4)
- 1.7 recognize the need for annual physical exams.
(Linkage 3.4, 3.5, 3.11, 4.6, 6.5)
- 1.8 identify the physician as a community resource and discuss ways to locate a physician. (e.g., local health departments, insurance provider lists, hospitals, clinics)

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., disease, communicable disease, non-communicable disease, obesity, pathogens, diabetes, asthma, hypertension, hepatitis, immunity, vaccine, STI, HIV/AIDS).
- list common communicable and non-communicable diseases.
- describe behaviors and preventative measures to control the spread of communicable disease.

At Level 2, the student will:

- list and define the types of pathogens that cause communicable disease (e.g., virus, bacteria, fungi).
- describe how a person can protect himself/herself against the spread of pathogens.
- differentiate the symptoms of the common cold, allergies and the flu.
- identify modes of transmission, signs and symptoms and treatment of STIs.
- discuss healthy behaviors for avoiding STIs.
- differentiate HIV and AIDS.
- describe risk factors and warning signs of cancer, heart disease, hypertension, diabetes and obesity.
- determine when to seek medical care.
- research available community health resources.
- describe the role of immunizations in the prevention of various diseases (e.g., flu, hepatitis, meningitis, measles, mumps, rubella).

At Level 3, the student will:

- define immune system, T-cells, B-cells and antibodies.
- outline the immune system's response to a pathogen.
- categorize STIs as bacterial, parasitic or viral pathogens.
- discuss risk factors associated with an unhealthy lifestyle.
- discuss the effects of STIs on total wellness.

Sample Task #1:

Diabetes

The purpose of this activity is to identify responsibilities that each individual has toward diabetes control and prevention.

1. Compare and contrast Type I and Type II diabetes. (include causes, body's usage of insulin, treatment)

2. Research the long-term effects of diabetes on an individual. (medical treatment, socio-economic impact)
3. Have each student assess his/her likelihood of developing Type I or Type II diabetes.

Sample Task #2:

HIV or Other STI Transmission Activity

The purpose of this activity is to demonstrate how one person infected with an STI, HIV or AIDS can put a large number of people at risk for contracting disease.

1. Give each student a 3" x 5" card.
2. Students are given three minutes to obtain the signature of several classmates.
3. One card has a small "x" on the back identifying that person as being infected with an HIV or another STI.
4. The owner of the "x" card is identified and asked to list the names found on the "x" card as those individuals stand.
5. Each student identified on the "x" card writes the students' names found on his/her card until all who have directly or indirectly made contact with the "x" person are listed.

Integration

Biology, Sociology, Psychology, Technology

Standard: **Mental, Emotional and Social Health**

Course Level Expectation:

The student will acquire the knowledge and skills necessary to make informed decisions regarding their mental, emotional and social well-being.

Checks for Understanding:

The student will:

- 2.1 identify and describe Maslow's Hierarchy of Needs.
(Linkage: 3.4, 6.2)
- 2.2 describe characteristics of mental, emotional and social health.
(Linkage: 6.1)
- 2.3 identify various emotions and their effects on the mind and body.
(Linkage: 1.5, 6.12, 7.6)

- 2.4 explain how to develop and maintain a positive self-concept and high self-esteem.
(Linkage: 4.8, 6.2, 6.12, 7.2, 7.6, 7.7)
- 2.5 list the factors that affect personality development.
(Linkage: 6.2, 6.3, 7.2)
- 2.6 recognize stressors and formulate personal stress management techniques.
(Linkage: 1.5, 4.8, 6.12, 7.2, 7.7)
- 2.7 identify and practice coping, negotiation, delaying and refusal skills.
(Linkage: 5.2b, 6.7, 6.10, 6.12, 7.5)
- 2.8 describe stages of the grief process.
(Linkage: 1.5)
- 2.9 identify positive ways of resolving interpersonal conflict.
(Linkage: 5.2b, 6.1, 6.7, 6.10)
- 2.10 recognize the signs of potential suicide.
- 2.11 examine characteristics of mental disorders.
(Linkage: 3.5, 6.2, 7.2, 7.3, 7.6)
- a. anxiety disorders (e.g., phobias, obsessive-compulsive, panic, post-traumatic stress disorders).
 - b. affective disorders (e.g., clinical depression, bipolar disorder).
 - c. personality disorders (e.g., anti-social personality disorder, passive-aggressive personality disorder, schizophrenia).
 - d. eating disorders (e.g., anorexia nervosa, bulimia nervosa)
- 2.12 identify community resources providing information for mental health and suicide prevention.
(Linkage: 1.6, 7.4)

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., self-esteem, self-concept, personality, defense mechanism, stressor, stress).
- define mental, emotional and social health.

- list characteristics of good mental, emotional and social health.
- identify various emotions.
- list personal stressors.
- list warning signs for suicide.
- distinguish positive and negative ways to resolve interpersonal conflicts.

At Level 2, the student will:

- explain Maslow’s Hierarchy of Needs.
- identify characteristics of positive support groups.
- examine the effects of various emotions on the mind and body.
- list factors that shape personality.
- examine ways to develop a positive self-concept and self-esteem.
- explain the contributions of heredity, environment and personal behavior to the development of an individual’s personality.
- discuss signs, symptoms and treatment for depression.
- describe the fight or flight response.
- describe personal stress management techniques.
- identify the stages of grief.
- practice strategies to follow during conflict resolution.
- identify and demonstrate suicide prevention communication skills.
- list resources for mental health assistance.

At Level 3, the student will:

- design a plan to improve self-concept.
- discuss the physiological changes which occur during the fight or flight response.
- explain how defense mechanisms are used to deal with stressful situations.
- participate in peer mediation.

Sample Task #1:

Practice Non-abusive Behavior with Others

The purpose of this activity is to have students work cooperatively to find acceptable ways for their peers to “let off steam”.

1. Role-play conflict situations. Have students react in an abusive manner and then change the ending to a more productive solution.
2. Working in small groups, have each student identify a conflict they continually have with another person (parent, sibling, friend, teacher, etc.) that they would like to change. Give each other ideas on how to resolve personal conflicts.

Sample Task #2:

Looking For The Good

The purpose of this activity is to assist students in building self-esteem by demonstrating how to look for good qualities in others as well as themselves.

1. Provide one zip lock bag per student.
2. Inside each bag is a colored card that reads "I am special" and a stack of blank white cards equal to the number of students in the class.
3. Students write one anonymous, positive comment about each person in the class.
4. The students' comments may relate to physical characteristics, friendship, extra-curricular activities, class work, special abilities, etc.
5. Students travel around the room placing the comment card for each fellow student in the bag lying on that student's desk.
6. Once completed, each student reads the cards in their bag silently and volunteers comments publicly.

Integration

Biology, Psychology, Sociology, Literature

Standard: Nutrition

Course Level Expectation:

The student will assess the effects of nutritional choices and incorporate strategies that contribute to an improved quality of life.

Checks for Understanding:

The student will:

- 3.1 identify the six classes of nutrients and describe their functions.
- 3.2 evaluate personal nutritional and energy needs.
(Linkage: 4.5a)
- 3.3 compare and contrast dietary guidelines (e.g., USDA, Mayo, Harvard).
- 3.4 identify the relationship between healthy eating and total wellness.
(Linkage: 1.2, 1.5, 2.1, 4.6, 6.5, 6.12, 7.7)
- 3.5 discuss eating disorders and their effects on the total wellness of the individual.
(Linkage: 1.2, 2.11)

- 3.6 assess personal daily dietary practices to each of the categories to the current USDA Food Guide Pyramid.
- 3.7 interpret information provided on food labels.
- 3.8 identify “fad diets” and their impact on total wellness.
- 3.9 describe food safety including food storage, cooking and sanitation.
(Linkage: 5.1)
- 3.10 identify factors that influence food choices (e.g., culture, family/friends, advertising, time and money, emotions, taste, spiritual beliefs).
(Linkage: 1.2, 6.2)
- 3.11 examine the relationship between diet and disease (e.g., obesity, hypertension, diabetes, elevated cholesterol levels).
(Linkage: 1.2, 1.5)

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., nutrition, diet, nutrients, calorie, carbohydrates, fats, proteins, vitamins, minerals, atherosclerosis, cholesterol, fiber, high density lipoproteins (HDL), low density lipoproteins (LDL), hypertension, cardiovascular disease, obesity, diabetes, osteoporosis, cancer, plaque, overweight, underweight).
- label the categories in the current USDA Food Guide Pyramid.
- identify eating disorders (e.g., anorexia nervosa, bulimia nervosa, binge eating).
- compare healthy and unhealthy foods.

At Level 2, the student will:

- list and describe the six nutrient classifications.
- identify the three nutrients that provide the body with energy (i.e., fats, carbohydrates, proteins).
- examine factors influencing diet.
- identify food sources for each of the classifications of nutrients.
- define each eating disorder and the resulting effects on the body .
- calculate food and energy needs (e.g., caloric need, actual caloric intake and use).
- design a daily menu that meets the goals of the current USDA Food Guide Pyramid.
- describe problems associated with popular fad diets.
- interpret information provided on food labels.
- recognize and assess the effects of advertisements on food choices.
- analyze the relationship between food choices and diseases (e.g., obesity, diabetes, elevated cholesterol levels, colon cancer, hypertension, osteoporosis).
- analyze fast foods and snacks (e.g., fat grams, sugar content, caloric content)

At Level 3, the student will:

- analyze the current recommended daily allowance (RDA) guidelines.
- establish the connection between saturated fats and cholesterol with heart disease.
- discuss psychological implications associated with eating disorders.
- assess food safety and handling procedures.

Sample Task #1:

Nutritious Food Party

The purpose of this activity is to allow students the opportunity to socialize while eating healthy foods.

1. Several days before the Nutritious Food Party, ask students to sign-up to bring one type of nutritious food for their class party. Provide a list of nutritious foods from which students can select.
2. It is not necessary for students to bring enough of their nutritious food for everyone in the class (e.g., if a student selects to bring small bottles of water, he/she should bring six or less, rather than 30).
3. Keep the foods for each class separate to ensure you have enough food for each class (e.g., keep all 1st period food together, all 5th period food together).
4. Ensure you have refrigerators available for cold items (e.g., low-fat milk, low sugar juice).
5. On the day of the party, ask students to bring all foods to your room before they report to their 1st period class. This will give you time to set up the food for the party prior to the arrival of each class.

Sample Task #2

Fat Content

The purpose of this activity is to show the fat content of different foods.

1. Provide various kinds of food for students to identify (e.g., apple, peanut butter, catsup, potato chips, candy, luncheon meat, cookies, green beans).
2. Rub small amounts of each food on a brown paper bag.
3. Allow paper to dry and see what happens.
4. Help them conclude that food with fat leaves a spot, the more fat in the food the denser the spot and foods without fat will dry without leaving a spot.

Integration

Science, Consumer Science, Math, Art, Social Studies, History

Standard: Personal Fitness

Course Level Expectation:

The student will acquire the knowledge and skills necessary to achieve and maintain a health-enhancing level of personal fitness.

Checks for Understanding:

The student will:

- 4.1 identify and define concepts of physical fitness
 - a. identify and describe the health-related components of physical fitness (i.e., cardiovascular endurance, muscular strength, muscular endurance, flexibility, body composition).
 - b. identify and describe the skill-related components of physical fitness (i.e., balance, reaction time, speed, power, agility, coordination).
- 4.2 identify the anatomy and the functions of the muscular, skeletal and cardiovascular systems.
(Linkage: 7.2)
- 4.3 describe and apply principles related to physical activity.
 - a. describe and demonstrate proper warm-up and cool-down procedures when participating in physical activity.
 - b. define the training principles of overload, progression, and specificity.
 - c. describe the F.I.T.T. (frequency, intensity, time and type) principle.
 - d. calculate resting, target and maximum heart rate as it relates to personal fitness planning.
- 4.4 apply proper safety practices when participating in physical activity.
(Linkage: 5.1, 5.2c, 5.2d, 7.2)
- 4.5 analyze and engage in physical activities that are developmentally appropriate and support achievement of personal fitness and activity goals.
 - a. assess individual health-related fitness levels by measuring flexibility, cardiovascular endurance, muscular strength, muscular endurance and body composition using appropriate methods.
(Linkage: 3.2)

- b. design a personal fitness plan and set goals based on the health-related fitness assessment results that will lead to, or maintain, a satisfactory fitness level.
 - c. select aerobic and anaerobic activities needed for successful participation in lifetime activities (e.g., aerobic walking, circuit training, cycling, dance aerobics, racquet activities, rhythmic movement, rock climbing, rope jumping, rowing, running, skating, snow skiing, step aerobics, strength training, swimming, water aerobics).
 - d. demonstrate improvement in the health-related fitness components.
(Linkage: 2.4, 6.2, 7.6)
- 4.6 list the health problems associated with inadequate levels of health-related fitness.
(Linkage: 1.2, 1.5, 3.4, 6.12, 7.6)
- 4.7 distinguish between facts and fallacies as related to fitness products, services and marketing.
- 4.8 discuss the social, emotional, physical and mental benefits associated with participation in physical fitness activities.
(Linkage: 2.4, 2.6, 6.12, 7.3, 7.7)
- 4.9 identify resources and facilities in the community that promote physical fitness and wellness.

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., aerobic, anaerobic, metabolism, target heart rate, warm-up, cool down, F.I.T.T., physical fitness, health-related fitness components, skills-related fitness components).
- list and define the health-related components of fitness (i.e., cardiovascular endurance, muscular endurance, muscular strength, flexibility, body composition).
- list and define the skill-related components of fitness (i.e., power, agility, balance, speed, coordination, reaction time).
- differentiate health-related and skill-related fitness.

At Level 2, the student will:

- describe the social, mental, emotional and physical benefits of being physically fit.
- differentiate aerobic and anaerobic exercise and provide examples of each.
- design a personal fitness plan.
- compare a physically fit person to a sedentary person (e.g., body weight, mental health, blood pressure, life expectancy).

- examine popular fitness products (e.g., shoes, clothing, equipment, foods, sports drinks, facilities).
- define and differentiate isometric, isotonic and isokinetic exercises.
- calculate resting, maximum and target heart rates.
- recognize and apply proper warm-up and cool-down procedures associated with exercise.
- differentiate moderate and high intensity exercises and give examples of each.
- practice skills associated with different cardiovascular activities.
- examine common injuries associated with exercise.
- identify the major muscles of the muscular system.
- identify the bones of the skeletal system.
- identify the parts of the heart and describe how blood circulates through the heart.

At Level 3, the student will:

- analyze a friend’s exercise plan and make suggestions for improvement.
- discuss how steroids affect the body.
- identify biomechanical principles of the health components of fitness.

Sample Task #1:

Resting Heart Rate, Maximum Heart Rate and Target (Working) Heart Rate

Resting heart rate (RHR): To determine resting heart rate, count pulse at carotid or brachial site. Take three readings and average.

Time 1 (T1) = _____ Time 2 (T2) = _____ Time 3 (T3) = _____

Average all time trials (Avg.): (add all time trials and divide by 3)

T1 _____ + T2 _____ + T3 = Total _____

Total _____ ÷ 3 = Avg. _____

Maximum Heart Rate (MHR): Never exercise heart at maximum heart rate during any exercise period.

$$220 - \text{your age} = \text{Maximum Heart Rate.}$$

$$220 - \underline{\hspace{2cm}} = \text{MHR } \underline{\hspace{2cm}}$$

Target Heart Rate (THR): This is the range in which you should exercise to benefit from cardiovascular activity.

$$\text{Maximum Heart Rate} \times .70 = \text{Low End of Target Heart Rate}$$

$$\text{MHR} \text{ _____ } \times .70 = \text{THR} \text{ _____ } \text{ (low end of range)}$$

$$\text{Maximum Heart Rate} \times .85 = \text{High end of Target Heart Rate}$$

$$\text{MHR} \text{ _____ } \times .85 = \text{THR} \text{ _____ } \text{ (high end of range)}$$

Sample Task #2:

Differentiating Moderate Intensity and High Intensity Exercise

The purpose of the activity is to differentiate moderate intensity from high intensity exercise by comparing heart rates.

1. Each student must find their individual resting heart rate.
2. The students walk one lap on a ¼ mile course at their own pace.
3. Upon completion of the lap, the students should take their individual heart rates either with a heart rate monitor or counting the pulse from the carotid artery.
4. Repeat procedure with students running one lap at their own pace on the same ¼ mile course.
5. Compare the difference between heart rates and discuss the reasons for the differences.
6. As an additional assignment, post a chart displaying the number of calories burned during various forms of exercise and have the students determine the calories used during the walk and the run.
7. As an option, increase the exercise time to 12 minutes, increasing intensity each class session:
 - a. students can calculate and chart resting heart rate, maximum heart rate, and target heart rate zone for most efficient burning of calories, and
 - b. by using a ¼ mile track divided into 10ths of a mile by using cones numbered 1-10, students can determine pace; hand one straw per lap to each student to aid in lap counting; pace can be determined by counting the number of complete laps to the nearest tenth of a mile and dividing that figure into 12 minutes (ex.: running six laps or 1.5 miles in 12 minutes converts to an 8-minute pace).

Integration

Math, Science

Standard: **Safety and First-Aid**

Course Level Expectation:

The student will acquire the knowledge and skills necessary to recognize, respond and apply appropriate procedures to accidental and life-threatening situations.

Checks for Understanding:

The student will:

- 5.1 identify hazardous and life-threatening situations and the consequences of each.
(Linkage: 3.5, 3.9, 4.4, 7.1, 7.6)
- 5.2 explain how individual attitudes and behaviors affect personal safety and the safety of others.
 - a. identify potential hazards associated with technology (e.g., internet, cell phones, digital cameras, video games).
 - b. analyze and apply strategies to avoid or manage conflict associated with school violence and bullying (e.g., harassment, name calling, teasing, exploitation, physical contact).
(Linkage: 2.7, 2.9, 6.10, 7.2)
 - c. recognize and apply personal safety guidelines regarding modes of transportation (e.g., automobile, motorcycle, bicycle, all-terrain vehicles, marine vehicles, skateboards, utility vehicles).
(Linkage: 4.4)
 - d. identify dangers associated with participating in high-risk behaviors (e.g., misuse of firearms, not using safety equipment including seatbelts, impaired driving).
(Linkage: 4.4, 7.2)
- 5.3 identify and demonstrate the skills necessary in responding to medical emergencies.
- 5.4 describe and demonstrate proper first aid techniques for common injuries.
- 5.5 identify and demonstrate the steps for aiding a choking victim.
- 5.6 explain and demonstrate the steps used in administering Cardiopulmonary Resuscitation (CPR), rescue breathing and the use of an Automated External Defibrillator (AED).

Student Performance Indicators:

At Level 1, the student will

- review vocabulary (e.g., first-aid, CPR, AED, rescue breathing, predator, exploitation, wounds, shock, Heimlich maneuver, ABC's: airway, breathing, circulation, severe bleeding).
- list situations considered to be emergencies (e.g., breathing problems, severe bleeding, broken bone, chest pain).
- identify the relationship between attitudes and safety behavior.

- identify safe and unsafe behaviors.
- list guidelines for using 911 (e.g., caller's name, location, number of victims, condition of victims).

At Level 2, the student will:

- distinguish CPR and rescue breathing.
- identify signs and symptoms of life-threatening and non-life-threatening situations (e.g., stroke, seizures, heart attack, asthma attack, sprains).
- describe first-aid treatment involved in treating common injuries.
- role play first-aid procedures for life threatening and non-life-threatening situations.
- simulate steps for aiding a choking victim.
- simulate steps for administering CPR and using an AED.
- describe ways to avoid being susceptible to exploitation (e.g., internet predators, child pornography, inappropriate physical and/or emotional contact).
- list appropriate and inappropriate usage of technology (internet, cell phones).
- evaluate the consequences of participating in high-risk behaviors.
- describe and role play the relationships among attitudes, behaviors, vulnerability to violence and the prevention of violence.
- design a disaster plan.

At Level 3, the student will:

- earn certification for First-Aid, CPR and AED.
- create first-aid kit.
- create safety infomercials.

Sample Task #1:

Risky Behavior

The purpose of this activity is to identify reasons why people take unnecessary risks.

1. Students will develop a list of risk taking behaviors.
2. Discuss the concept of an accident-prone personality.
3. Students will role play high risk behaviors and the steps needed for the prevention of accidents.

Sample Task #2:

Role Play Emergency Situations

The purpose of this activity is to have students react appropriately to an emergency situation while role playing.

1. Prepare several different task cards each with a specific emergency (e.g., a bicycle accident, heart attack, seizure, ankle sprain, fractured leg, automobile accident, potential drowning, contact by predator), and a specific setting (e.g., mountains, playground, home, lake, highway).
2. Each student randomly picks a card and role plays the appropriate first aid procedure explaining each step along the way.

Sample Task #3:

First Aid Kit

The purpose of this activity is for all students to create their own first-aid kit.

1. All kits will be graded (see grading sheet at the bottom of the task or create your own grading scale).
2. All kits will be returned to students after being graded.
3. Students shall not bring items in their first-aid kits that are not allowed at school (e.g., Tylenol).

First Aid Kit

Due Date: _____

- It is not mandatory that you spend any money on this project.
- Look around your house for items you may already have.
- You may share items with classmates.
- Choose a container large enough in which to put 25 first aid items.
- A medium tackle box will work well. It contains compartments in which to place different items.
- All items must be labeled and in a container of some type.
 - o Exceptions (scissors, tweezers, flashlight)
- You must label the outside of your first aid kit with the following information
 - o "First Aid Kit"
 - o Your name
 - o Non-emergency phone number 862-8600
- You must turn your first aid kit in _____.
- You are not allowed to put Tylenol, Advil, aspirin, cough medicine, etc. in your first aid kit.

The following items are only suggestions and not mandatory

- Band-aids (variety of sizes) (however, only counts as one item)
- Rubber gloves
- Breathing barrier
- Sterile gauze pads
- Q-tips
- Alcohol pads (wipes)

- Zip Lock bags
- Triangular bandage
- Calamine lotion
- Safety pins
- Paper/pen
- Cotton balls
- Thermometer
- Sting relief gel
- Ice pack (chemically activated)
- Tweezers
- Small scissors
- Antibacterial soap (or hand wipes)
- Antiseptic towelettes
- Gauze tape
- Eye wash
- Sterile eye pads
- Rubbing alcohol (small plastic bottles)
- Peroxide (small plastic bottles)
- Burn cream
- Aloe gel (sunburn relief)

First Aid Kit Checklist for Grading

- _____ "First Aid Kit," Name, and Non-emergency phone number on kit (5 points)
- _____ 25 items (3 points each)
- _____ Organization of items in container (10 points)
- _____ Appropriate sized container (5 points)
- _____ Durable container (5 points)

Integration:

Biology, Math, Driver Education, Drama

Standard: **Sexuality and Family Life**

Course Level Expectation:

The student will examine human sexuality (e.g., biology, behavior, responsibilities, attitudes) and recognize the influence of society and family values on decision making.

Checks for Understanding:

The student will:

- 6.1 define the aspects of positive relationships (e.g., family, dating, friendship, professional, community).
- 6.2 examine the influence of families, cultural traditions and economic factors on human development (e.g., personality, values, sexuality, self-esteem).
- 6.3 describe gender differences, expectations and biases often encountered in today's society and compare them to the past.
- 6.4 explain human reproduction (i.e., male and female reproductive systems, pregnancy).
- 6.5 Recognize the skills necessary for maintaining reproductive health (e.g., self-examinations, annual doctor visits, prenatal care).
- 6.6 recognize abstinence from all sexual activity as a positive choice.
- 6.7 identify and practice skills needed to resist persuasive tactics regarding sexual activity.
- 6.8 identify the potential outcomes of engaging in sexual behaviors (e.g., pregnancy, STIs including HIV/AIDS, emotional).
- 6.9 compare various contraceptive methods.
- 6.10 identify short-term and long-term effects of sexual harassment and date rape.
- 6.11 discuss the alternatives of an unplanned pregnancy (e.g., adoption, single parenting, marriage, abortion).
- 6.12 discuss the consequences associated with teen pregnancy (e.g., physical, mental, emotional, social, economical).
- 6.13 examine the lifelong responsibilities and requirements of parenthood.

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., abstinence, relationship, friendship, dating, date rape, puberty, sexual activity, reproduction, reproductive system, sexually transmitted infections, sexual harassment).
- examine the positive outcomes pertaining to abstinence.
- review the characteristics of puberty.

- list and discuss different family structures.
- recognize the effects of media and marketing in forming attitudes toward sexual activity.

At Level 2, the student will:

- state factors contributing to a positive relationship (e.g., trust, honesty, caring, consideration, loyalty, communication).
- recognize that abstinence from all sexual activity is the healthiest choice.
- discuss reasons for abstaining from all sexual activity.
- identify the anatomy and functions of the male and female reproductive systems.
- identify disorders of the male and female reproductive systems.
- identify proper care of the male and female reproductive system.
- explain the menstrual cycle (e.g., hormonal changes, ovulation, uterine lining changes, menstrual period).
- identify signs of pregnancy.
- describe tests used to determine pregnancy (i.e., blood, urine).
- describe the stages of fetal development.
- discuss hormones and their effects on body changes.
- provide examples of positive peer pressure and negative peer pressure and manipulation.
- practice refusal skills using verbal and nonverbal tactics.
- research teen pregnancy statistics and issues.
- define contraception.
- identify and discuss contraceptive methods.
- identify causes, modes of transmission, treatment and prevention measures associated with STIs, including HIV/AIDS.

At Level 3, the student will:

- discuss the process of heredity relative to human reproduction.
- discuss the future of genetics and its influence on reproduction.

Sample Task #1:

Resisting Pressure Brainstorm

Divide the class into six small groups. Ask each of the groups to brainstorm ways to refuse sexual involvement as follows:

Groups 1 & 4: Ways to resist/refuse using words/verbal communication

Groups 2 & 5: Ways to resist/refuse using body language/nonverbal communication

Groups 3 & 6: Ways to resist/refuse using actions/behaviors

Verbal Communication

No
I'm not ready now

Nonverbal

serious facial expression
cross arms over chest

Behavior

turn on lights
get around other people

Don't pressure me

stand-up

get something to eat/distract

Sample Task #2:

Life Plans

The purpose of this activity is to allow students to explore and discuss the changes necessitated by parenthood to short-term and long-term life plans.

1. Have each student list the following on paper:
 - a. his or her plans for later that day,
 - b. his or her plans for the upcoming weekend,
 - c. where they will go on their next vacation,
 - d. where they want to be and what they want to be doing a year from today,
 - e. where they want to be and what they want to be doing five years from today.
2. Students should list the changes unexpected parenthood would bring to those plans.
3. Have a class discussion on the various plans and the changes that would occur.

Integration

Biology, Math, Home Economics, Drama

Standard: Substance Use and Abuse

Course Level Expectation:

The student will differentiate appropriate and inappropriate use of chemical substances.

Checks for Understanding:

The student will:

- 7.1 describe the illegal use of alcohol, tobacco and other chemical substances.
- 7.2 identify the effects of substance misuse and abuse on society (e.g., school, crime, disease, pregnancy, STI, job, personal relationships, physical enhancement, athletic performance).
- 7.3 recognize that combining chemical substances can have serious consequences (e.g., death, injury, sensory impairments).
- 7.4 identify school and community resources for treatment and intervention (e.g., DARE, school counselor, teacher, local health department, hotlines, Alcoholics Anonymous).
- 7.5 identify strategies to avoid misuse of chemical substances.
- 7.6 explain the effects of chemical substances on total wellness.

7.7 list the benefits of a lifestyle free from chemical misuse.

Student Performance Indicators:

At Level 1, the student will:

- review vocabulary (e.g., substance abuse, illicit drugs, gateway drugs, misuse, abuse, OTC, prescription, steroids, drug interaction, tar, nicotine, carbon monoxide, blood alcohol level, co-dependency, enabling).
- distinguish between over-the-counter and prescription drugs.
- list reasons individuals might use tobacco products and alcohol.
- describe behaviors and practice refusal skills necessary to resist peer pressure.
- identify consequences of substance misuse (e.g., legal, physical, social, emotional).

At Level 2, the student will:

- discuss legal issues of buying and consuming alcohol and tobacco.
- explain the effects of chemical substances on behavior (e.g., alcohol, prescription medication, methamphetamine, gasoline, paint, glue, aerosols).
- describe physiological (e.g., brain, liver, fetus, central nervous system) effects of substance use.
- list effects of alcoholism (e.g., physical, social, economic).
- identify smokeless tobacco products and their effects (e.g. cancer, gingivitis, tooth decay, discoloration of teeth).
- discuss effects of secondhand smoke.
- discuss media influences on tobacco, alcohol and substance use.
- list the classifications of drugs and give examples of each (e.g., depressants, stimulants, hallucinogens, narcotics, inhalants, designer drugs, performance-enhancing drugs).
- discuss and explain harmful effects of methamphetamine on individuals and society (e.g., families, socioeconomic impact, health, environment, government funding).
- discuss risks associated with alcohol consumption (e.g., DWI, DUI, riding with an impaired driver, cirrhosis, alcohol poisoning, underage drinking, sexual activity).
- discuss risks associated with substance use and misuse (e.g., death, overdose, sensory impairment).

At Level 3, the student will:

- identify programs designed to treat alcoholism and substance abuse.
- debate laws relative to alcohol, tobacco, and other chemical substances.

Sample Task #1

Alternative Party

The purpose of this activity is to have students will identify non-alcoholic ways to entertain and/or have fun. Each student will (1) List 10 things they do for fun and enjoyment (2) Learn

how to make at least one non-alcoholic beverage, and (3) Learn how to play a group game (4) Plan a party for their friends.

Introduction: Open discussion about why people drink, the effects of drinking. Talk about alcohol as a social lubricant and how it alters mood and impairs ability to function properly.

Step 1: Have each student write 10 ways they have fun. They have to be legal and cannot harm others in any manner. Have the class combine their examples until you have 101 ways. A fun idea is to compile their combined responses into a handout to give each of them entitled "101 non-alcoholic ways to have fun."

Step 2: Divide into pre-assigned groups and hand out recipes that you as the teacher supply. You could also have each group come up with their own favorite drink recipe in advance as an option which works great and gives the students ownership rights. Each group should have a blender and a different recipe. Groups should make enough drinks to share with the entire class so that everyone receives a taste of each drink. A compiled sheet of drink recipes should be made and given to each of the students entitled 'Tasty Drink Recipes for an Absolutely Sober Party.'

Step 3: Each group should be assigned a couple of days in advance to come up with a group game to teach and play with the entire class. This provides students with yet another non-alcoholic way to have fun. Students are responsible for teaching and providing any necessary equipment needed for the game. Each group should also prepare a handout for each student in the class with the name of their game, the rules, and instructions on how to play. Assess each group using a scoring rubric based on elements you established with the assignment, i.e. creativity/originality, fun factor, group involvement, clear rules and instructions, etc.

Step 4: Clean-Up/Closure. Debrief with students on the activity getting their valuable feedback, insights, and comments.

Sample Task #2:

Drug Combo

The purpose of this activity is to recognize that combining chemical substances can have serious consequences.

1. The student will identify several famous personalities who have lost their lives or their lives have been altered as the result of the abuse of substance combinations.
2. Have students develop a chart showing the stages of becoming a substance abuser.
3. As a group, have students develop a collage of positive alternatives to substance use.

Integration

Biology, Math, Technology, Art, Music, Social Studies, History, Home Economics, Drama, Driver Education