

# 2018 Healthy Smiles Healthy Growth



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For additional information on the Wisconsin Oral Health Program, please visit the website at [www.dhs.wisconsin.gov/oral-health](http://www.dhs.wisconsin.gov/oral-health)

For additional information on the Wisconsin Nutrition, Physical Activity and Obesity Program, please visit the website at [www.dhs.wisconsin.gov/physical-activity/](http://www.dhs.wisconsin.gov/physical-activity/)

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# Table of Contents

<b>Executive Summary</b> .....	<b>4</b>	<b>Appendix A:</b> .....	<b>40</b>
<b>Introduction</b> .....	<b>7</b>	Department of Health Services	
<b>Methods</b> .....	<b>10</b>	Public Health Regions	
<b>Results</b>		<b>Appendix B:</b> .....	<b>41</b>
Oral Health .....	14	CDC Growth Charts	
BMI Status .....	20	<b>Appendix C:</b> .....	<b>43</b>
Limitations .....	24	Number of Outlier Values	
Conclusions .....	25		
Data Tables .....	26		
References .....	37		

## EXECUTIVE SUMMARY

During the 2017–18 school year, the Wisconsin Department of Health Services completed *Healthy Smiles Healthy Growth*, a statewide survey on the oral health and height and weight status of Wisconsin's third-grade children. More than 2,000 third-grade children in public schools participated in the survey. Dental screenings and height and weight measurements were completed by dental hygienists following the protocol of a Basic Screening Survey from the Association of State and Territorial Dental Directors. Results were compared to similar surveys conducted in 2001–02, 2007–08, and the 2012–13 school years. Overall, it was found that in the 2017–18 school year, tooth decay and obesity continue to be a problem for Wisconsin's children. Seven key findings were identified.

# 2,000+

**More than 2,000  
third-grade children  
in public schools  
participated in  
the survey.**

**Tooth decay and obesity  
continue to be a problem  
for Wisconsin's children.**







## KEY FINDINGS

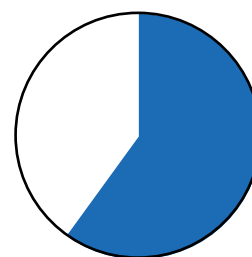
# ORAL HEALTH

Tooth decay is a significant public health problem, as 60 percent of Wisconsin's third-grade children have caries experience.

Approximately 18 percent of Wisconsin's third-grade children have untreated dental decay and 5 percent have an urgent condition causing pain and/or infection. There are approximately 3,000 Wisconsin third-graders in public schools requiring urgent dental care because of pain or infection.

Over 70 percent of third-grade children in Wisconsin have at least one dental sealant on a permanent molar. This is an improvement over previous surveys and a positive finding as dental sealants are a well-accepted clinical intervention to prevent dental caries.

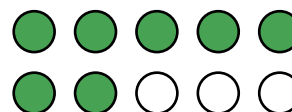
The oral health disparity gap seems to be shrinking for access to dental sealants as children of all races and socioeconomic groups have similar levels of dental sealants. The school-based sealant programs are likely to play a major role in expanding availability of dental sealants to all children.



**60 percent of Wisconsin's third-grade children have caries experience.**



**Approximately 3,000 Wisconsin third-graders in public schools require urgent dental care because of pain or infection.**



**Over 70 percent of third-grade children in Wisconsin have at least one dental sealant on a permanent molar.**



## KEY FINDINGS

### BMI STATUS

Seventeen percent of Wisconsin's third-grade children are obese; and one-third of children are either overweight or obese.

Children who attend schools with high levels of Free and Reduced Price Meals program eligibility have greater rates of overweight and obesity. Children attending schools with the highest level of Free and Reduced Price Meals (>75 percent) had the highest level of children who were classified as overweight or obese (44 percent). Comparatively, 22 percent of children are classified as overweight or obese in schools with the lowest level of Free and Reduced Price Meals (<25 percent).

For third-grade children, overweight and obesity differ among racial and ethnic groups. Overall, 48 percent of Hispanic/Latino, 41 percent of African American, 38 percent of Other, 31 percent of Asian, and 29 percent of White children were classified as overweight or obese.

### OVERALL

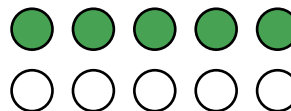
The results of this survey show that there continue to be barriers to improving the health of Wisconsin's children, especially among low-income and minority children. The results will help guide the next steps to strengthen prevention efforts and implement strategies that lead to increased treatment access for underserved populations. The disparities observed indicate the need for action among state, private, and local partners to ensure equitable access to preventive and treatment interventions all children need for optimal oral health and growth.



**One-third of children are either overweight or obese.**



**Children attending schools with the highest level of Free and Reduced Price Meals had the highest level of children who were classified as overweight or obese.**



**Almost half of Hispanic/Latino children were classified as overweight or obese.**

# INTRODUCTION

Tooth decay is an infectious disease and is the most common chronic disease of children, with approximately 42 percent of children ages 2 to 11 having tooth decay in their primary teeth.<sup>2</sup> Tooth decay affects both children and adults, but there is also a strong body of evidence that it is one of the most preventable diseases. During childhood, tooth decay is the single most common chronic disease, four times more common than asthma and seven times more common than hay fever.<sup>3</sup> Tooth decay still affects more than half of all children by the third-grade, and by the time children finish high school about 80 percent have decay.<sup>3</sup> Many believe that tooth decay is a natural and minor occurrence that deserves little attention or program funding. If left untreated, however, tooth decay can lead to difficulty speaking, chewing and swallowing; loss of self-esteem; needless pain; and lost school days.



**While tooth decay is one of the most preventable diseases, during childhood, it is the single most common chronic disease.**

**“...oral health refers to the health of our mouth and, ultimately, supports and reflects the health of the entire body.”<sup>1</sup>**

**– Former Surgeon General Regina M. Benjamin, 2010**

Poor dental health can be associated with missed school days. It has been estimated that more than 51 million school hours are lost yearly because of dental disease.<sup>4</sup> Reports validate that poor oral health increases the likelihood of missed school days. A 2011 study of North Carolina children reported that those children with poor oral health status were nearly three times more likely to miss a school day due to dental pain as compared with children with good oral health.<sup>5</sup> A 2012 study of disadvantaged children in Los Angeles reported an average of 2.2 absent days per school year for dental problems, and parents averaged 2.5 absent days from work per year because of their children’s dental problems.<sup>6</sup> Poor oral health status can be associated with more than just dental cavities as children with acute oral health problems are more likely to feel worthless, shy, unhappy, and depressed, and are less likely to make friends than those without oral health problems.<sup>7</sup> Teachers often do not correlate the effects of pain—anxiety, fatigue, irritability, depression, and withdrawal from activities—to an oral health problem.<sup>8</sup>

**51  
million**

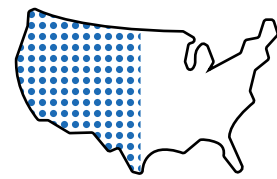
**More than 51 million school hours are lost yearly because of dental disease.**

The mouth reflects general health and well-being. Studies point to associations between oral infections and diabetes, heart disease, stroke, and preterm and low-weight births.<sup>3</sup> While the prevalence and severity of tooth decay has declined among U.S. school-aged children, it remains a significant problem in some populations—particularly certain racial and ethnic groups and low-income children. Low-income children, and racial and ethnic minority groups, have more untreated decay than the U.S. population as a whole. National data for the combined years of 2015 to 2016 indicated that about 51 percent of children ages 6 to 11 had caries experience and 15 percent had untreated dental caries in the U.S. Among children ages 2 to 19 years, the prevalence of total dental caries was highest for Hispanic children (57 percent) compared to White children (40 percent). Asian children have the lowest rate of 11 percent while 17 percent of African American children and 14 percent of Hispanic children have untreated dental caries. Additionally, those below 100 percent of the poverty level have a rate of 19 percent for untreated dental caries.<sup>9</sup>

In addition to untreated decay, this survey assessed the presence of dental sealants on permanent first molars. Dental sealants are an evidence-based preventive effort that the Wisconsin Oral Health Program supports. The Wisconsin Seal-A-Smile program is a collaborative effort between Children’s Health Alliance of Wisconsin (CHAW), the Wisconsin Department of Health Services (DHS), and Delta Dental of Wisconsin Foundation. The mission of the Wisconsin Seal-A-Smile Program is to improve the oral health of Wisconsin’s children through school-based dental sealant programs. Numerous meta-analyses and systematic reviews confirm the effectiveness of dental sealants in preventing cavities in the occlusal (biting) surfaces of molar teeth.<sup>10,11</sup> School-based sealant programs have been shown to be effective by removing barriers to accessing dental sealants and providing fluoride varnish to children at increased risk for dental disease.

Oral health is an integral part of overall health. Not all children experience the same levels of oral health, even though most dental disease is preventable and there are evidence-based strategies to prevent dental disease.

Wisconsin mirrors the nation in the childhood overweight and obesity public health crisis. Childhood obesity has more than doubled in children and tripled in adolescents in the past 30 years.<sup>13,14</sup>



**Nationally tooth decay affects more than half of all children between ages 6 to 11.**



**School-based dental sealant programs remove barriers to accessing dental sealants for children at increased risk for dental disease.**



Three measurements of Wisconsin's third-grade children's weight (2008, 2013, and 2018) indicate overweight and obesity is a public health problem in Wisconsin. Studies reveal that being overweight or obese has a profound impact on children's health throughout their lives.

Obesity can lead to high blood pressure, high cholesterol, and impaired glucose tolerance, insulin resistance and type 2 diabetes. Obese children and adolescents have a greater risk of social and psychological problems, such as discrimination and poor self-esteem, which can continue into adulthood.<sup>15</sup> Obese children are more likely to become obese adults.<sup>16–18</sup> Children who are overweight or obese as preschoolers are five times as likely as normal-weight children to be overweight or obese as adults. Adult obesity is associated with a number of serious health conditions, including heart disease, diabetes, and some cancers. If children are overweight, obesity in adulthood is likely to be more severe.<sup>19,20</sup>

**“Obesity continues to be a major public health problem. We need intensive, comprehensive and ongoing efforts to address obesity. If we don’t, more people will get sick and die from obesity-related conditions, such as heart disease, stroke, type 2 diabetes and certain types of cancer—some of the leading causes of death.”<sup>12</sup>**

**– Thomas R. Frieden, MD, MPH**

Former Director, Centers for Disease Control and Prevention

The third-grade survey of children's height and weight measurements provided an opportunity to monitor overweight and obesity rates in Wisconsin. There are surveillance systems in place to monitor younger and older children, but a gap exists for school-aged children. Children in low-income households enrolled in the Women, Infants and Children Supplemental Nutrition Program (WIC) have routine height and weight measurements. In 2018, 16 percent of these children aged 2 to 4 years were classified as overweight, while 15 percent were classified as obese, with wide variation among racial and ethnic groups.<sup>21</sup> The 2017 Youth Risk Behavior Survey (YRBS) found that 15 percent of high school students reported information that classified them as overweight, and 14 percent were classified as obese.<sup>22</sup> The Chronic Disease Prevention Program staff welcomed an opportunity to partner with the Wisconsin Oral Health Program to add a height and weight measurement as a component of the third grade survey to have a sample of overweight and obesity trends for school-aged children.

## METHODS

*Healthy Smiles Healthy Growth* included a representative sample of third-grade students in Wisconsin public schools. All public schools with at least 15 children enrolled in third grade during the 2016–17 school year were included in the sampling frame, which contained 1,049 schools and 60,955 students. The sampling frame was stratified by the five public health regions of DHS (Appendix A), and ordered within each region by the percent of students eligible for the Free and Reduced Price Meals program. Free and Reduced Price Meals participation rates are used as a surrogate for income. Probability proportional to size sampling was used to randomly select programs within each region. The Northern and Western regions are less populated and were oversampled, with 10 percent of schools selected instead of 8, to ensure an adequate sample size for regional estimates. Passive consent was used for most schools; 10 schools required active consent to participate. Parents were able to opt out of either the oral screening or height and weight screening portion of the survey, or out of both.

If a school declined to participate, another school in that region with a similar Free and Reduced Price Meals eligibility rate was randomly selected as the replacement. If the replacement school refused to participate, there were no additional efforts to replace that school. Initially 90 schools were selected to participate and each school represented a strata (subgroup).



Dental hygienists completed the screenings using gloves, headlamps, and disposable mouth mirrors. The diagnostic criteria outlined in the Association of State and Territorial Dental Director's publication Basic Screening Surveys: An Approach to Monitoring Community Oral Health: Preschool & School Children was used. The hygienists attended a training session, which included a review of the dental diagnostic criteria (Table 1), the standardized protocols and specialized equipment for obtaining and recording the height and weight measurements (anthropometric procedures). Following the didactic review, the screeners attended a calibration session, which was conducted in a school setting with third grade students. The purpose of the calibration session was to standardize implementation of the protocol and recording of indicators across all screeners.

**TABLE 1 Basic Screening Survey Indicator Definitions**

<b>BASIC SCREENING SURVEY INDICATOR</b>	<b>DEFINITION</b>
<b>TREATED DECAY</b>	The presence of any type of filling, including temporary fillings. Treated decay also includes teeth that were extracted due to decay.
<b>UNTREATED DECAY</b>	The presence of a dental cavity (caries) in which the screener can readily observe breakdown of the enamel surface. This protocol only includes cavitated lesions as untreated decay. Also, a tooth with decay that appears to be arrested (lesion is black/dark with a hard glossy appearance) but has a break in the enamel, has untreated decay.
<b>CARIES EXPERIENCE</b>	This is a calculated indicator from treated decay and untreated decay. All children with either treated or untreated decay or both have caries experience.
<b>URGENCY OF NEED FOR DENTAL CARE</b>	Children with no obvious problems were coded as having no treatment needs. Children with untreated decay without accompanying signs or symptoms of pain, infection, or swelling were coded as having early treatment needs, while those with accompanying signs or symptoms were coded as having urgent treatment needs.
<b>DENTAL SEALANTS</b>	The presence of a sealant on a permanent molar tooth. The sealant can cover all or part of the pits or fissures or can be partially lost and is still counted.
<b>DENTAL SEALANTS NEEDED</b>	The presence of a permanent molar that is free of decay, restorations, and dental sealants.

The Basic Screening Survey protocol can capture varying levels of detail to meet the needs of the program. The Wisconsin Oral Health Program opted to capture more detail during this survey by having screeners count the number of teeth with treated decay, untreated decay, and dental sealants. While this change in protocol allows more detail to be captured, the indicators can still be reported as yes/no for any treated decay, any untreated decay, and any dental sealants, to align with previous surveys and to monitor trends. In addition, the screeners counted the number of permanent molars that were eligible to be sealed, meaning that they were erupted and did not have untreated decay or restorations on them. This information was used along with the number of permanent molars with dental sealants to determine children that need dental sealants.

Demographic indicators, including date of birth, sex, and race/ethnicity were obtained from school records. Due to small numbers among American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multi-racial groups, these responses were combined along with those who were missing race/ethnicity into an “Other” category for analysis and reporting.

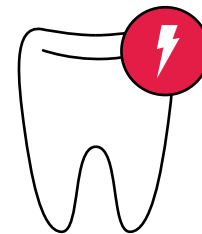
At the schools, the screeners and staff collected a child’s height using a portable stadiometer. Two height measurements, within 1/4 inch, were obtained for each child, and the average of the two was recorded. The two height measurements increase the validity of the Body Mass Index (BMI) calculations. Body weight was measured using an electronic digital scale and the average of two readings within 0.2 pounds was recorded. Children removed shoes, coats, and bulky outerwear for weight measurements. Division of Public Health staff calculated the children’s BMI categories from the height and weight measurements. BMI is a reliable indicator of body fatness for most children; it is age-and sex-specific.

The data for both oral health and BMI were adjusted to account for the complex sampling scheme and non-response. Data analysis, which included frequencies, cross tabulations, odds ratios, and 95 percent confidence intervals (CI), was completed using SAS version 9.4. BMI analysis was based on CDC sex-specific BMI-for-age growth charts to plot the BMI on the growth charts (for either girls or boys) as shown in Appendix B.23.

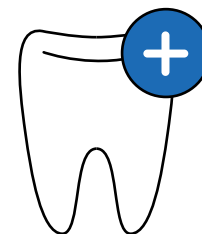
**The Wisconsin Oral Health Program opted to capture more detail during this survey by having screeners count the number of teeth with:**



**Treated Decay**



**Untreated decay**



**Dental sealants**

This analysis resulted in a BMI percentile ranking for each child in the sample. Percentiles are the most commonly used indicator to assess size and growth patterns. The percentile indicates the relative position of the child’s BMI number among children of the same sex and age. Table 2 displays the BMI-for-age and weight status categories and corresponding percentiles.

**TABLE 2   BMI-for-Age and Weight Categories and Definitions**

BMI CATEGORY	DEFINITION
UNDERWEIGHT	BMI below the 5th percentile.
HEALTHY WEIGHT	BMI between the 5th and 85th percentiles.
OVERWEIGHT	BMI between the 85th and 94th percentiles.
OBESE	BMI at or above the 95th percentile.

BMI was also evaluated for potential outliers based on values that were too low or too high for height-for-age, weight-for-age, weight-for-height, and BMI-for-age (Appendix C). These fixed exclusion ranges were calculated by the CDC using data from National Health and Nutrition Examination Survey (NHANES) and the Pediatric Nutrition Surveillance System. All BMI outliers were excluded from analysis. Risk factors, such as sex, age, race, and percent of students eligible for the Free and Reduced Priced Meal program, were evaluated for a possible relationship with childhood overweight and obesity. Bivariate logistic regression analyses were adjusted for age, while multivariate logistic analyses were adjusted for sex, age, race, and percent of students eligible for the Free and Reduced Priced Meal program.

The oral health of Wisconsin’s third-grade children was previously reported in similar surveys conducted in 2001–02, 2007–08, and the 2012–13 school years. Height and weight data were not collected during the 2001–02 survey, but were collected in the subsequent surveys.



# RESULTS

## ORAL HEALTH

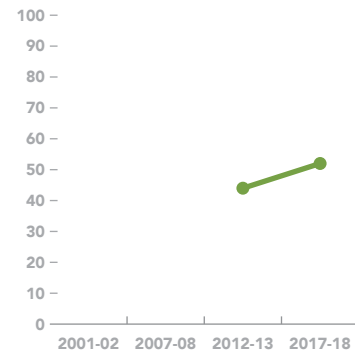
Third-grade children were screened at 60 schools from February to June 2018, representing a statewide sample. A total of 2,082 children participated in the survey, and 2,053 had dental data for analysis, while 2,066 children had height and weight data for analysis. Ninety schools within the five public health regions were selected in the sample. Only 60 schools were able to participate, which is a 67 percent participation rate at the school strata level. At the child level, the total participation rate for all schools was 69 percent. Schools that used passive consent had a participation rate of 84 percent, compared to only 30 percent among the 10 schools requiring active consent.

Caries experience is a combination of treated and untreated decay in the primary (baby) and/or permanent (adult) teeth. In Wisconsin, the 2017–18 survey found that 60 percent of third-graders had caries experience (figure 1). Nearly, 1 out of 5 third-graders (18 percent) had at least one tooth with untreated decay, while 9 percent had two or more teeth with untreated decay (Data Tables: table 9). Additionally, 52 percent of children had at least one tooth with treated decay and 17 percent had five or more teeth with treated decay (Data Tables: table 9).

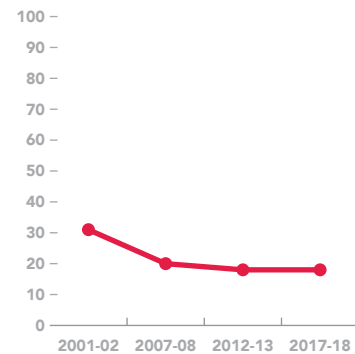
Untreated decay among Wisconsin children decreased from 31 percent in 2001–02, to 20 percent in 2007–08, to 18 percent in the last two surveys. Caries experience remains at the same level as baseline, 60 percent.

FIGURE 1

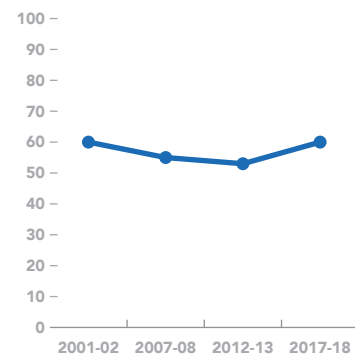
Percentage of Wisconsin's Third-Grade Children with Treated Decay, Untreated Decay, and Caries Experience, 2001–02, 2007–08, 2012–13, and 2017–18.



Treated Decay



Untreated Decay



Caries Experience

\*The Basic Screening Survey did not capture treated decay prior to the 2012–13 survey period.

Twenty-one percent of the third-grade children screened for the 2017–18 survey required dental care, which means that the child exhibited a dental condition that needed to be addressed by a dentist (figure 2). The percent of children needing dental care decreased from a baseline of 31 percent but increased slightly from 17 percent in 2012–13 to the current 21 percent. Fifteen percent required early care because the child needed to be seen by a dentist but was not experiencing signs of pain or infection (Data Tables: table 8). Five percent of children in the sample were identified as requiring urgent care (Data Tables: table 8), meaning that the oral condition involved pain or swelling and needed to be addressed within 24 to 48 hours. In 2017–18, there were about 61,000 third-grade children in Wisconsin public schools, meaning that approximately 3,000 children in third grade may need urgent dental care because of pain or infection. These dental conditions, if left untreated, can result in life-threatening complications.

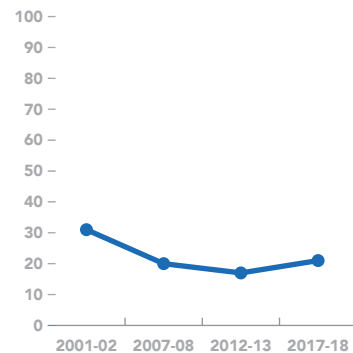
Dental sealants are plastic coatings applied to the chewing surfaces of back teeth. They are a safe, effective, evidence-based way to prevent tooth decay on the biting surfaces of molar teeth. Sealants have been shown to significantly reduce the risk of developing decay. In Wisconsin, 70 percent of third-grade children screened in 2017–18 had at least one dental sealant on their first permanent molars (figure 3).

**70%**  
of Wisconsin's third-grade  
children have at least  
one dental sealant.

The sharp increase in dental sealants from 47 percent in 2001–02 to the current level of 70 percent suggests that Wisconsin's third-grade children have increased access to dental sealants from both private dental providers and public health programs. While 70 percent of children had at least one dental sealant, 48 percent had teeth that could be sealed but were not (Data Tables: table 8). At this age, children are rapidly losing baby teeth and gaining permanent teeth and should be seen regularly by dental professionals in order to protect these teeth from decay as soon as they are erupted.

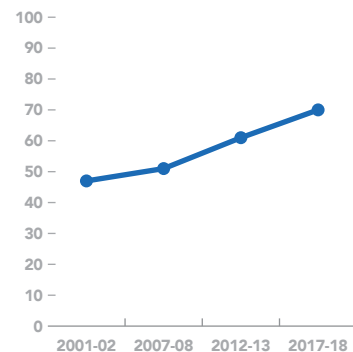
**FIGURE 2**

**Percentage of Wisconsin's Third-Grade Children Needing Early or Urgent Dental Care, 2001–02, 2007–08, 2012–13, and 2017–18.**

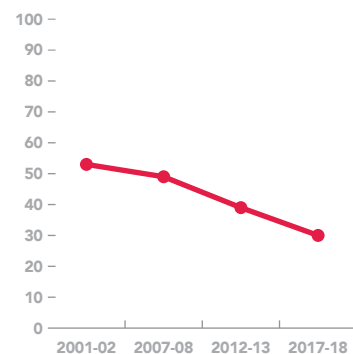


**FIGURE 3**

**Percentage of Wisconsin's Third-Grade Children with Dental Sealants, 2001–02, 2007–08, 2012–13, and 2017–18.**



**Dental Sealants**



**No Dental Sealants**

Wisconsin Seal-A-Smile provides funding to local school-based dental sealant programs that serve schools with at least 35 percent of children qualifying for Free and Reduced Price Meals. In the 2017–18 school year, over 29,000 children received almost 98,000 dental sealants through the program.

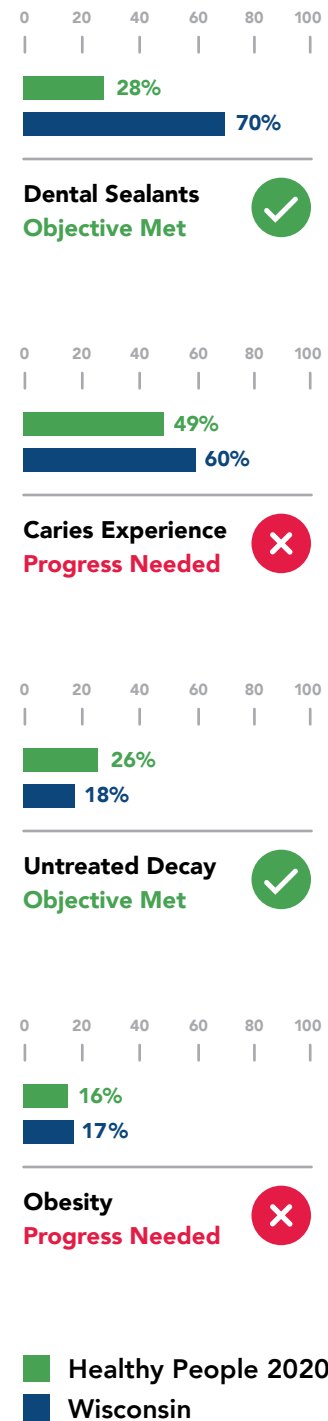
Wisconsin Seal-A-Smile has expanded dramatically since its inception in the 1999–00 school year. The program started with \$60,000 in state General Purpose Revenue (GPR) and five sealant programs. Total funding for the 2017–18 school year was \$727,212, just over \$370,000 coming from GPR and \$350,000 from Delta Dental of Wisconsin Foundation. The ability for dental hygienists to directly receive Medicaid reimbursement has contributed to the expansion of local programs to serve more high-risk schools, and ultimately provide dental sealants to more children. Since the last *Healthy Smiles Healthy Growth* survey, the schools served by Wisconsin Seal-A-Smile have increased from approximately 550 in the 2012–13 school year to almost 772 in the 2017–18 school year

Healthy People 2020 (HP 2020) provides 10-year national objectives for improving the health of Americans. These objectives provide targets for states and communities to work towards completion. HP 2020 contains four relevant objectives to this report and population:

- Reduce the proportion of children aged 6 to 11 years who are considered obese to 16 percent.
- Increase the proportion of children aged 6 to 9 years with dental sealants to 28 percent.
- Reduce the proportion of children aged 6 to 9 years with caries experience to 49 percent.
- Reduce the proportion of children aged 6 to 9 years with untreated decay to 26 percent.

**FIGURE 4**

**Progress toward Healthy People 2020 Health Objectives.**



Wisconsin has met and exceeded the HP 2020 objectives for dental sealants and untreated decay (figure 4). The finding that 70 percent of Wisconsin's third-graders have at least one dental sealant far outpaces the national objective of 28 percent. Additionally, the finding that 18 percent of Wisconsin's third-graders have untreated decay is better than the national target of 26 percent. Wisconsin narrowly missed the obesity objective, as 17 percent of third-graders are obese as compared to the national objective of 16 percent; however, significant disparities remain. Wisconsin missed the target for caries experience, as 60 percent of third-grade children had dental caries as compared to the national objective of 49 percent.

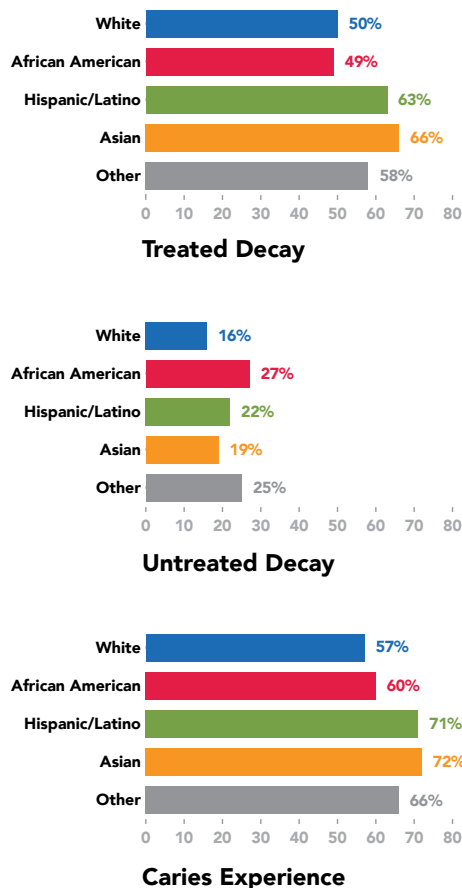
Hispanic/Latino and Asian third-grade children had significantly higher caries experience levels as compared to White children (figure 5). The prevalence of treated decay was highest among Asian children, though the sample size is small for that population. Untreated decay was significantly higher among African American children (27 percent) and children categorized as Other (25 percent) compared to lower rates among White children (16 percent). This finding suggests that children of African American and Other descent may have barriers to receiving dental treatment.

Children from all races and ethnicities exceed the HP 2020 target of 28 percent for dental sealants (figure 6). All groups exceed 50 percent for dental sealants, which suggests that dental sealants are widely available to children. However, 56 percent of African American children have dental sealants, which is significantly less than that of White children (73 percent). The success of dental sealants is a combination of private practitioners applying sealants to the patients they treat, and school-based sealant programs targeting low-income children attending schools.

**FIGURE 5**

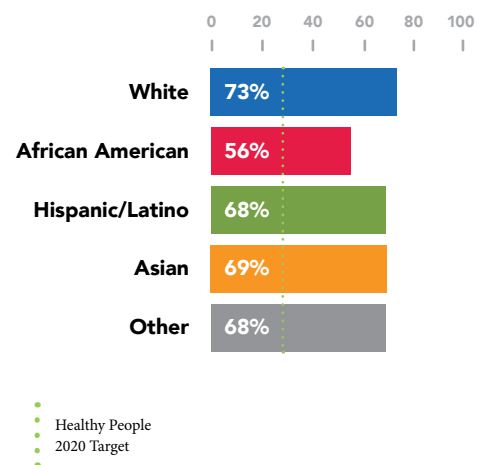
**Percentage of Wisconsin's Third-Grade Children with Decay by Race / Ethnicity, 2017–18.**

\* Other includes: American Indian/Alaska Native, Native Hawaiian/Pacific Islander, multi-racial and unknown



**FIGURE 6**

**Percentage of Wisconsin's Third-Grade Children with Dental Sealants by Race/ Ethnicity, 2017–18.**

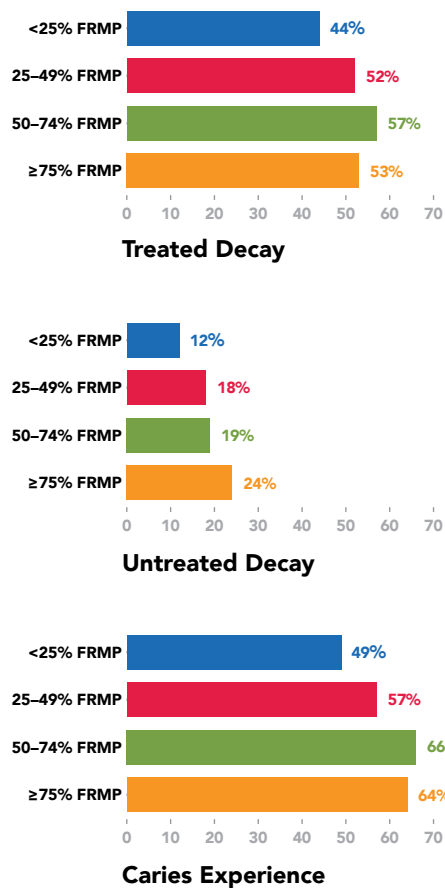


Children from all socioeconomic backgrounds have dental caries experience, though those that attend schools with higher Free and Reduced Price Meal rates have higher levels of decay, both in the treated and untreated categories (figure 7). In schools with a Free and Reduced Price Meal rate of 75 percent or greater, 64 percent of the children had caries experience, as compared to only 49 percent of children attending schools with a Free and Reduced Price Meal rate of less than 25 percent. In addition, children attending schools with 75 percent or more Free and Reduced Price Meal rates were twice as likely to have untreated decay (24 percent) compared to children at schools with the lowest Free and Reduced Price Meal rates (12 percent). This result suggests a disparity by income, as children whose parents have lower income levels—using Free and Reduced Price Meal rates as a surrogate for income—have higher levels of oral disease.

Children from all socioeconomic backgrounds have good access to dental sealants (figure 8). This survey found that children attending schools with more than 75 percent Free and Reduced Price Meal rates had the lowest sealant rates (62 percent) compared to the three lower categories of Free and Reduced Price Meal rates, but that result is still well above the national average; the differences were not statistically significant. This finding would suggest that public school-based sealant programs have allowed children attending schools with high levels of Free and Reduced Price Meal eligibility to have similar access to dental sealants as children attending schools with low eligibility. A greater proportion of children attending schools with lower levels of Free and Reduced Price Meal eligibility are more likely to have private dental insurance.<sup>24</sup>

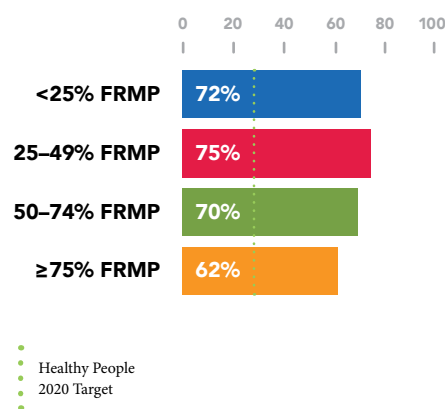
**FIGURE 7**

**Percentage of Wisconsin's Third-Grade Children with Decay by Percentage of Children in School Eligible for Free and Reduced Price Meal Program, 2017–18.**



**FIGURE 8**

**Percentage of Wisconsin's Third-Grade Children with Dental Sealants by Percentage of Children in Schools Eligible for Free and Reduced Price Meal Program, 2017–18.**

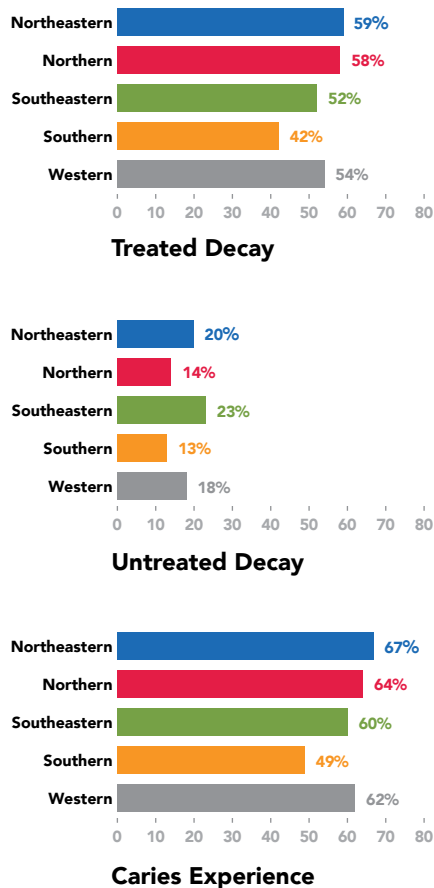




The survey sample was stratified by region in order to produce regional estimates and assess if geographic disparities exist. While there are some differences by region, caution should be used due to lower participation rates at both the school and individual level impacting the representativeness of the regional data. The Southern region had less treated decay (42 percent) and less caries experience (49 percent) compared to the other regions (figure 9). The Southeastern region had slightly more untreated decay (23 percent), while the Southern region had the least (13 percent). The percentage of dental sealants provided was also examined by region. The Northern region had the highest percentage of dental sealants (86 percent) compared to the other regions. The Northeastern region had the lowest percentage of dental sealants, at 62 percent (see Data Tables: table 14).

**FIGURE 9**

**Percentage of Wisconsin's Third-Grade Children with Decay by Region, 2017–18**



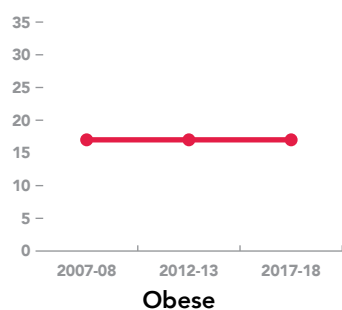
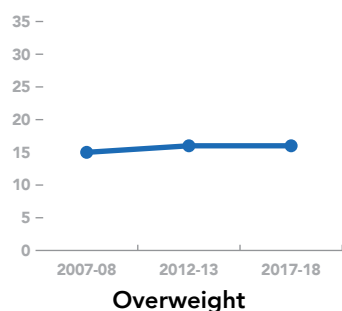
## BMI STATUS

Overall, the results indicate that 17 percent of third-grade children are obese, and one-third of children are either overweight or obese (figure 11). These proportions remain steady from the 2007–08 school year through 2017–2018. While figure 12 shows small differences among males and females, over time (figure 13) we can see the percentage of females categorized as overweight or obese has increased 5 percent compared to males who have decreased 2 percent in the same time period.

Survey results allowed for direct comparisons of Wisconsin children to the U.S. overall. An ongoing federal study measuring height and weight for children aged 6 to 11 years found that 20 percent of boys and 16 percent of girls were classified as obese in 2015–16.<sup>25</sup>

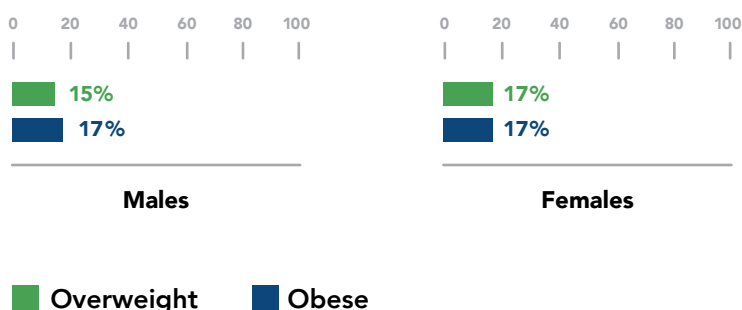
**FIGURE 11**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight and Obese, 2007–08, 2012–13, and 2017–18.**



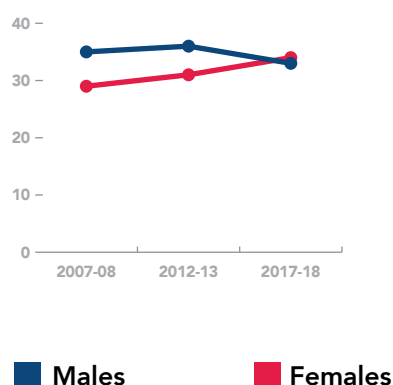
**FIGURE 12**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight and Obese by Sex, 2017–18.**



**FIGURE 13**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight or Obese by Sex, 2007–08, 2012–13, and 2017–18.**



This survey found that 48 percent of Hispanic/Latino, 41 percent of African American, 38 percent of Other, 31 percent of Asian, and 29 percent of White children were classified as overweight or obese (figure 14). Since 2012–13, all racial/ethnic groups have decreased the percentage of overweight or obesity except for African American children. These findings suggest Wisconsin may be making some progress in reducing the percentage of overweight and obesity among certain populations, but there are still health disparities that need to be addressed.

**FIGURE 14**

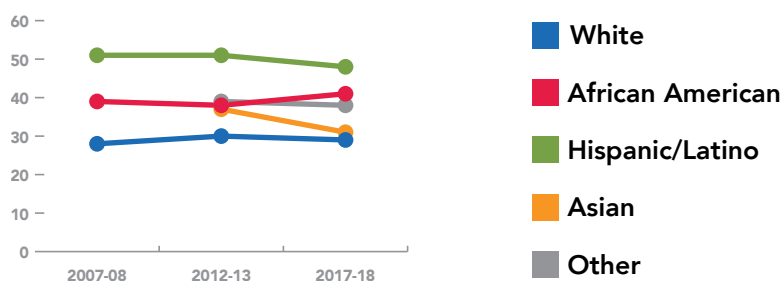
**Percentage of Wisconsin's Third-Grade Children Who are Overweight and Obese by Race/Ethnicity, 2017–18.**



**FIGURE 15**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight or Obese by Race/Ethnicity, 2007–08, 2012–13, and 2017–18.**

\* Data were not available for Asian and Other for 2007–08.



**FIGURE 16**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight and Obese by Percent of Students in School Eligible for Free and Reduced Price Meal Program, 2017–18.**

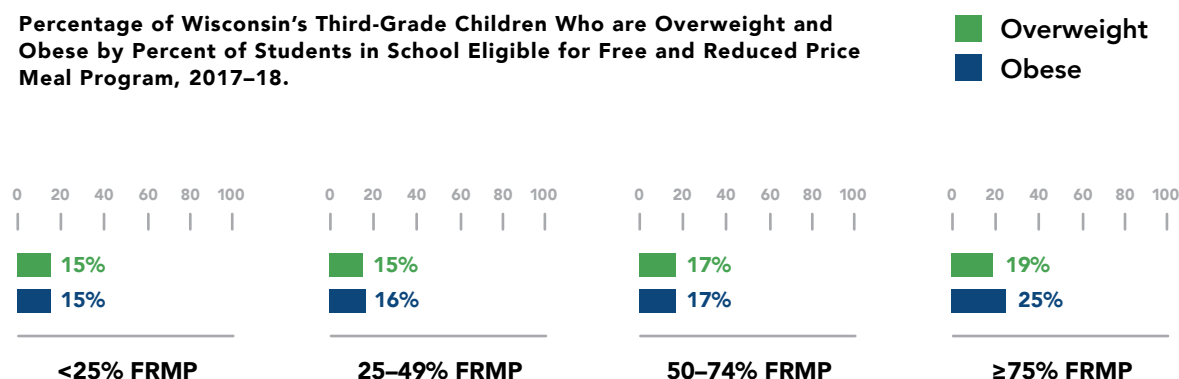
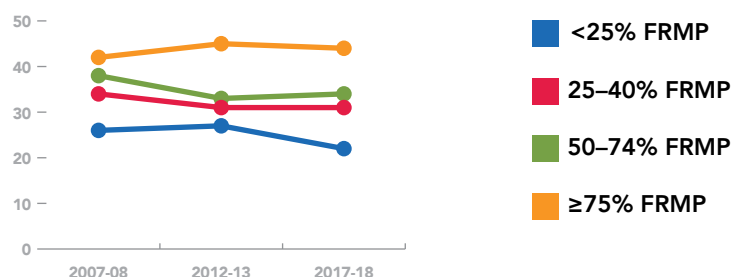


Figure 16 shows that overweight and obesity increase as the percentage of children who qualify for Free and Reduced Price Meal programs increase. This result shows a relationship between BMI and poverty. Table 16 (page 35) shows significant differences in overweight between schools with <25 percent Free and Reduced Price Meals and those with over 50 percent, and table 17 (page 36) shows significant differences in obesity between schools with <25 percent Free and Reduced Price Meals and those with over 75 percent Free and Reduced Price Meals. Figure 17 shows overweight and obesity over time at each of the different percentages of Free and Reduced Price Meals. Since the 2007–08 survey, the rate of overweight and obesity has decreased across Free and Reduced Price Meal categories. Since the 2012–13 survey, we see the greatest improvement in schools with <25 percent of students who qualify for Free and Reduced Price Meals. These findings suggest the burden of obesity is not shared equally among Wisconsin's diverse groups and communities.

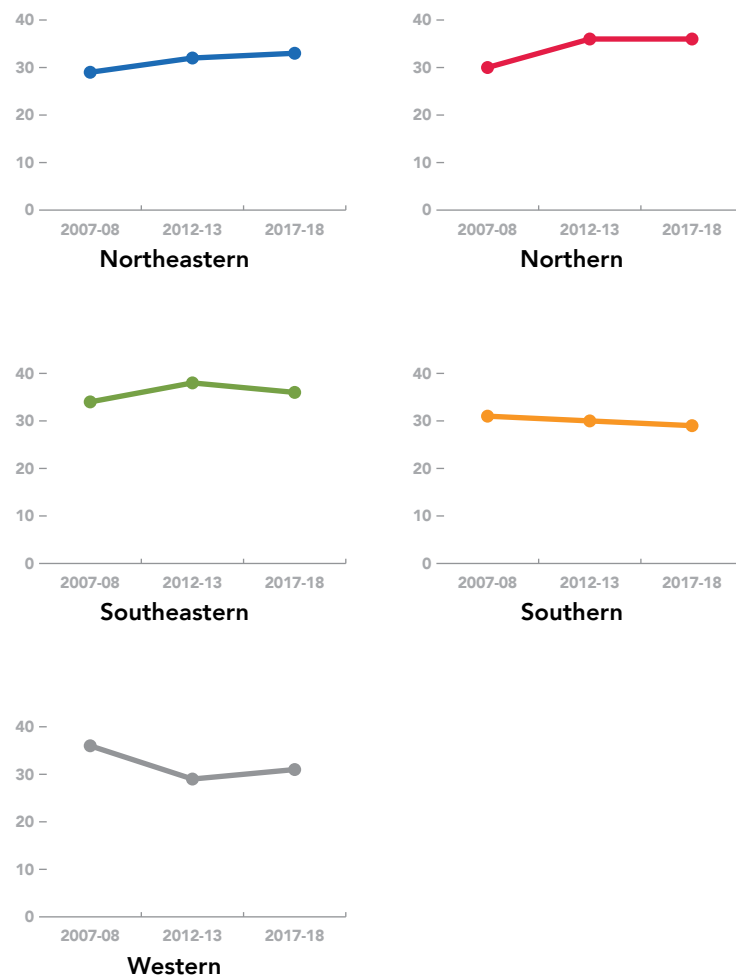
**FIGURE 17**

**Percentage of Wisconsin's Third-Grade Children Who are Overweight or Obese by Percent of Students in School Eligible for Free and Reduced Price Meal Program, 2007–08, 2012–13, and 2017–18.**



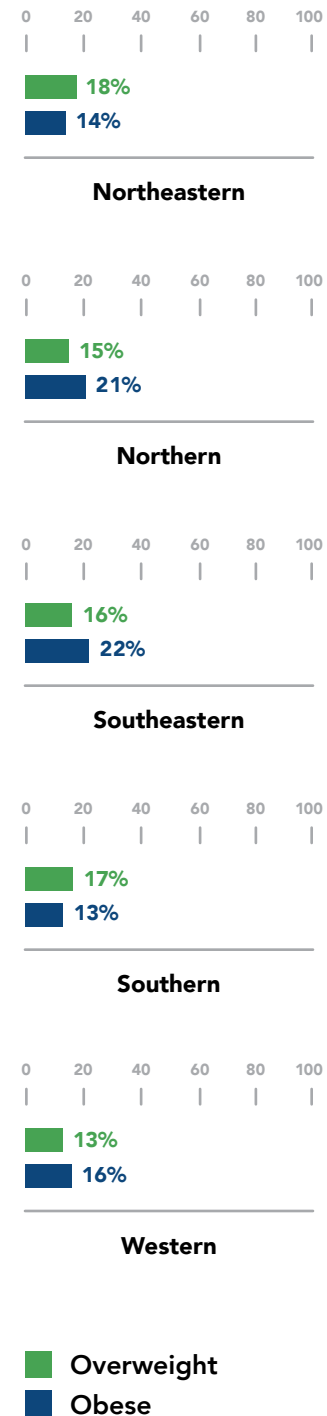
When comparing Wisconsin Public Health Regions in the 2017–18 survey (figure 18), the variations were between 29 percent overweight or obese children in the Western region and 38 percent in the Southeastern region. Over time (figure 19), we can also see large increases or decreases within regions. The Western region had the highest percentage of overweight and obesity in the 2007–08 survey, but now has the lowest rate.

**FIGURE 19**  
Percentage of Wisconsin's Third-Grade Children Who are Overweight or Obese by Region, 2007–08, 2012–13, 2017–18.



**FIGURE 18**

Percentage of Wisconsin's Third-Grade Children Who are Overweight and Obese by Region, 2017–18.





## LIMITATIONS

Several limitations should be noted. The Basic Screening Survey protocol is a visual screening with a mirror and headlamp and does not include the use of dental explorers, magnification devices, or radiographs, which results in an underestimation of untreated decay. While we trained and calibrated screeners to ensure that the Basic Screening Survey protocols were interpreted and implemented similarly by all, it is possible that there were differences in judgement for some indicators. As silver diamine fluoride becomes more common to control dental decay, it is important to ensure that screeners are trained to appropriately identify and code it for the survey.

While our sample was designed to reflect the characteristics of the entire state, participating schools ended up having slightly higher percentages of students eligible for Free and Reduced Price Meals (Data tables: table 3). Also, a slightly higher percentage of participating students were White compared to the overall percentage in participating schools, possibly due to the active consent that was required in some schools.

All districts have different approval processes that had to be followed. An increasing number of school districts have implemented their own research review processes that must be completed prior to making any contact with selected schools. These districts included three of our largest districts: Milwaukee, Madison, and Green Bay. Two of these districts required a formal memorandum of understanding between the district and Wisconsin Oral Health Program, as well as active consent for the students to participate. The active consent process resulted in low student participation rates in those schools. If this trend continues in Wisconsin, completing surveys like these will likely become more challenging.



## CONCLUSIONS

Wisconsin's *Healthy Smiles Healthy Growth* survey of third-grade children revealed caries experience increased from the last survey. Caries experience levels demonstrate that dental decay is still a problem for Wisconsin children and shows the need to keep working on prevention for young children. The survey also showed some positive trends, the prevalence of dental sealants has increased over previous surveys. The finding that 70 percent of third-grade children have access to dental sealants is important, but even more important is the finding that children of all socioeconomic classes have nearly equal access to sealants. However, even with equal access to dental sealants, the burden of oral disease is higher among children from minority populations and schools with higher rates of Free and Reduced Price Meals eligibility. It is important to work with key partners and stakeholders to increase the utilization of dental sealants in the public and private dental sector. Opportunities to expand school-based dental sealant programs should be identified in order to provide care to more students across Wisconsin.

Although these survey results show that 17 percent of children are considered obese, there are disparities among children that warrant widespread and sustained action to accelerate progress in obesity prevention efforts. The disparities are seen by race and by income, when using Free and Reduced Price Meal eligibility rates as a surrogate for income. Wisconsin has published an objective on obesity prevention in *Healthy Wisconsin 2020*.<sup>26</sup> “By 2020, Wisconsin will reduce disparities in obesity rates for populations of differing races, ethnicities, sexual identities and orientations, gender identities, and educational or economic status.” Reviewing the survey results in light of this objective, Wisconsin faces challenges to reduce disparities among third-grade children. In recent years, Wisconsin public and private partnerships have supported many initiatives that address childhood overweight and obesity. Such initiatives include school and community-based programs to provide at least 60 minutes of physical activity per day; access to healthy and affordable foods and beverages in child care, schools and communities; standards-based nutrition and physical education; and school health advisory councils and wellness policies. The Wisconsin Nutrition, Physical Activity and Obesity State Plan provides guidance and resources for obesity prevention, as it is imperative that all sectors work together for a comprehensive approach to preventing and reducing overweight and obesity.<sup>27</sup>

The results of this survey will serve as a foundation for efforts to strengthen prevention and increase treatment access for underserved populations. By recognizing and understanding the health needs of Wisconsin's children, key stakeholders can work to develop environments, systems, and policies that will ensure all children receive the preventive and treatment interventions they need for optimal oral health and growth. This survey demonstrates that there continue to be barriers to improving the health of Wisconsin's children, especially low-income and minority children. In order to reverse these trends, preventive services, through both public health approaches and the provision of optimal health care, must be emphasized.

## DATA TABLES

**TABLE 3**

**Participating Children and Schools Compared to Original Sample and Schools in Sampling Frame (Unweighted)**

VARIABLE	# SCHOOLS	# 3RD GRADERS	FRPM %	% WHITE	% AFRICAN AMERICAN	% HISPANIC
SAMPLING FRAME	1,049	60,955	47.0	65.5	11.6	13.3
ORIGINAL SAMPLE	90	5,202	46.9	63.3	12.6	14.7
PARTICIPATING SCHOOLS	60	3,004	49.0	66.0	9.7	14.1
PARTICIPATING CHILDREN	60	2,082	NA	71.3	10.9	10.3

NOTE: The sampling frame for this survey included public elementary schools with at least 15 students enrolled in third grade in the 2016–17 school year. Also, race/ethnicity percentages for the sampling frame, original sample, and participating schools are for all grades at the school, not just third grade.

**TABLE 4****Race/Ethnicity, Sex and Age of Participating Third-Grade Children  
(Unweighted)**

VARIABLE	PERCENT OR MEAN
<b>RACE/ETHNICITY (N=2,082)</b>	
WHITE	71.3
AFRICAN AMERICAN	10.9
HISPANIC/LATINO	10.3
ASIAN	3.6
AMERICAN INDIAN	0.9
NATIVE HAWAIIAN/PACIFIC ISLANDER	0.2
OTHER/UNKNOWN	2.9
<b>SEX (N=2,082)</b>	
MALE	47.5
FEMALE	52.5
<b>AGE (N=2,082)</b>	
8 YEARS	36.6
9 YEARS	62.3
10 YEARS	1.1
11 YEARS	0.1
<b>AGE (N=2,082)</b>	
MEAN (STANDARD ERROR)	8.6 (0.019)

**TABLE 5****Height, Weight, and BMI Stratified by Sex of Participating Third-Grade Children**

	MALES	FEMALES
<b>HEIGHT (cm)</b>		
NUMBER OF CHILDREN	1,088	978
MEAN (SE)	135.8 (0.24)	135.4 (0.26)
95% CI FOR MEAN	135.4–136.3	134.9–136.0
<b>WEIGHT (kg)</b>		
NUMBER OF CHILDREN	1,088	978
MEAN (SE)	34.2 (0.36)	34.7 (0.41)
95% CI FOR MEAN	33.5–34.9	33.9–35.6
<b>BMI</b>		
NUMBER OF CHILDREN	1,088	978
MEAN (SE)	18.4 (0.18)	18.7 (0.20)
95% CI FOR MEAN	18.0–18.7	18.3–19.1

**TABLE 6****Oral Health of Wisconsin's Third-Grade Children Stratified by Sex**

	FEMALES % (95% CI) (N=971)	MALES % (95% CI) (N=1,082)	P-VALUE
TREATED DECAY	50.5 (46.2–54.8)	53.5 (49.0–58.0)	0.28
CARIES EXPERIENCE	56.7 (52.5–60.9)	62.3 (58.3–66.3)	0.01
UNTREATED DECAY	16.3 (13.2–19.5)	20.5 (17.6–23.4)	0.02
NEED DENTAL CARE	18.4 (13.0–23.7)	22.6 (18.6–26.5)	0.04
DENTAL SEALANTS	71.8 (66.9–76.7)	68.6 (63.7–73.6)	0.15
NEED DENTAL SEALANTS	46.4 (40.8–51.9)	49.6 (44.4–54.7)	0.23



**TABLE 7**  
**BMI-For-Age Cutoffs Stratified by Sex**

	MALES % (95% CI) N=1,088	FEMALES % (95% CI) N=978	BOTH SEXES % (95% CI) N=2,066
UNDERWEIGHT 0 TO 5TH PERCENTILE	2.0 (1.1–2.9)	2.1 (1.2–3.0)	2.0 (1.4–2.6)
HEALTHY WEIGHT 5TH TO < 85TH PERCENTILE	65.6 (61.5–69.6)	64.1 (60.5–67.7)	64.8 (61.7–68.0)
OVERWEIGHT 85TH TO < 95TH PERCENTILE	15.3 (12.1–18.4)	16.5 (14.3–18.7)	15.9 (13.9–17.8)
OBESITY ≥ 95TH PERCENTILE	17.2 (14.0–20.5)	17.4 (14.1–20.6)	17.3 (14.9–19.7)

**TABLE 8**  
**Wisconsin's Third-Grade Children with Decay, Sealants, and Need for Care**

	PERCENT	SE	95% CI
TREATED DECAY	52.0	1.69	48.6–55.4
UNTREATED DECAY	18.4	1.27	15.9–21.0
CARIES EXPERIENCE	59.6	1.71	56.1–63.0
EARLY CARE	15.4	1.05	13.3–17.5
URGENT CARE	5.1	1.73	1.6–8.5
TOTAL NEEDING CARE	20.5	2.15	16.2–24.8
DENTAL SEALANTS	70.2	2.19	65.8–74.6
DENTAL SEALANTS NEEDED	48.0	2.29	43.4–52.6

**TABLE 9****Wisconsin's Third-Grade Children with Treated and Untreated Decay**

	PERCENT	SE	95% CI
ANY TREATED DECAY	52.0	1.69	48.6–55.4
1 TO 2 TEETH WITH TREATED DECAY	24.4	1.22	22.0–26.9
3 TO 4 TEETH WITH TREATED DECAY	10.7	0.95	8.8–12.6
5 OR MORE TEETH WITH TREATED DECAY	16.9	1.14	14.6–19.2
ANY UNTREATED DECAY	18.4	1.27	15.9–21.0
1 TOOTH WITH UNTREATED DECAY	9.1	0.78	7.6–10.7
2 OR MORE TEETH WITH UNTREATED DECAY	9.3	0.88	7.6–11.1

**TABLE 10****Oral Health of Wisconsin's Third-Grade Children Stratified by Race/Ethnicity**

	WHITE % (95% CI) (N=1,462)	AFRICAN AMERICAN % (95% CI) (N=224)	HISPANIC/ LATINO % (95% CI) (N=213)	ASIAN % (95% CI) (N=73)	OTHER* % (95% CI) (N=81)	P-VALUE
TREATED DECAY	49.7 (46.0–53.3)	49.3 (38.6–60.0)	62.5 (54.3–70.6)	65.9 (51.6–80.1)	58.1 (48.1–68.1)	0.01
CARIES EXPERIENCE	56.6 (52.8–60.4)	59.7 (50.6–68.8)	70.7 (63.5–77.8)	71.7 (59.0–84.5)	66.4 (56.3–76.4)	<0.01
UNTREATED DECAY	16.0 (13.5–18.5)	26.8 (21.0–32.6)	22.1 (16.9–27.4)	18.8 <sup>‡</sup> (6.1–31.5)	24.6 (13.2–36.0)	<0.01
NEED DENTAL CARE	16.2 (13.2–18.9)	30.9 (24.4–37.3)	32.5 (17.8–47.1)	18.8 <sup>‡</sup> (6.1–31.5)	31.0 (13.7–48.2)	<0.01
DENTAL SEALANTS	73.2 (68.8–77.7)	56.0 (46.5–65.5)	67.9 (59.6–76.2)	68.5 (56.5–80.4)	67.6 (53.0–82.2)	<0.01
NEED DENTAL SEALANTS	45.0 (40.2–49.8)	64.0 (55.6–72.4)	52.6 (44.3–61.0)	40.5 (28.7–52.3)	46.1 (34.0–58.2)	<0.01

\* Other includes: American Indian/Alaska Native, Native Hawaiian/Pacific Islander, multi-racial and unknown.

‡ Relative standard error >30. Estimate may be unreliable and should be interpreted with caution.

Note: The number of children listed for each race category is the number of children within that category who participated. Because of missing data, the number for each cell differs slightly.

**TABLE 11**  
**BMI-For-Age Cutoffs Stratified by Race/Ethnicity**

	WHITE % (95% CI) (N=1,472)	AFRICAN AMERICAN % (95% CI) (N=225)	HISPANIC/ LATINO % (95% CI) (N=213)	ASIAN % (95% CI) (N=74)	OTHER % (95% CI) (N=82)
UNDERWEIGHT < 5TH PERCENTILE	2.1 (1.3–2.8)	0.7 (0.0–1.7)	1.8 (0.3–3.2)	6.1 (0.0–13.5)	2.1 (0.0–5.1)
HEALTHY WEIGHT 5TH TO < 85TH PERCENTILE	68.7 (65.8–71.7)	58.4 (50.2–66.7)	50.5 (43.7–57.4)	62.8 (53.7–71.8)	59.8 (48.4–71.1)
OVERWEIGHT 85TH TO < 95TH PERCENTILE	14.5 (12.5–16.5)	19.6 (13.5–25.7)	16.7 (12.1–21.3)	16.9 (7.8–25.9)	24.5 (12.9–36.0)
OBESITY ≥ 95TH PERCENTILE	14.7 (12.4–17.1)	21.3 (15.9–26.6)	31.0 (25.8–36.2)	14.2 (6.9–21.5)	13.7 (4.8–22.5)

**TABLE 12**  
**Oral Health of Wisconsin's Third-Grade Children Stratified by Free and Reduced Price Meal Program Status of School**

	"HIGHER INCOME" < 25% FRPM % (95% CI) (N=313)	25–49% FRPM % (95% CI) (N=818)	50–74% FRPM % (95% CI) (N=558)	"LOWER INCOME" ≥ 75% FRPM % (95% CI) (N=364)	P-VALUE
TREATED DECAY	43.9 (33.5–54.2)	51.5 (46.9–56.0)	57.1 (50.6–63.7)	53.1 (46.6–59.7)	0.11
CARIES EXPERIENCE	49.2 (40.6–57.8)	57.0 (52.2–61.7)	65.6 (58.9–72.3)	64.4 (59.3–69.5)	<0.01
UNTREATED DECAY	12.0 (8.5–15.6)	17.5 (13.0–22.0)	18.6 (14.6–22.6)	24.0 (18.5–29.6)	<0.01
NEED DENTAL CARE	11.1 (7.1–15.1)	17.5 (12.9–22.0)	18.2 (14.1–22.3)	34.0 (21.6–46.4)	<0.01
DENTAL SEALANTS	71.5 (59.6–83.5)	74.9 (68.7–81.0)	69.8 (60.6–79.0)	62.1 (51.4–72.9)	0.21
NEED DENTAL SEALANTS	47.5 (34.2–60.8)	45.7 (38.9–52.5)	42.3 (30.8–53.8)	57.8 (47.8–67.8)	0.18

**TABLE 13****BMI-For-Age Cutoffs Stratified by Free and Reduced Price Meal Status of School**

	<b>"HIGHER INCOME" &lt; 25% FRPM % (95% CI) (N=313)</b>	<b>25–49% FRPM % (95% CI) (N=834)</b>	<b>50–74% FRPM % (95% CI) (N=557)</b>	<b>"LOWER INCOME" ≥ 75% FRPM % (95% CI) (N=362)</b>
UNDERWEIGHT < 5TH PERCENTILE	2.2 (0.8–3.6)	2.5 (1.5–3.5)	2.8 (1.4–4.2)	0.3 (0.0–0.8)
HEALTHY WEIGHT 5TH TO < 85TH PERCENTILE	75.7 (70.5–80.9)	67.1 (62.9–71.2)	63.0 (60.6–65.4)	56.0 (49.6–62.3)
OVERWEIGHT 85TH TO < 95TH PERCENTILE	12.4 (9.5–15.2)	14.8 (11.8–17.7)	17.0 (14.5–19.6)	18.8 (14.0–23.5)
OBESITY ≥ 95TH PERCENTILE	9.7 (3.9–15.5)	15.7 (12.8–18.6)	17.2 (14.9–19.5)	25.0 (19.6–30.4)

**TABLE 14****Oral Health of Wisconsin's Third-Grade Children Stratified by Public Health Region**

	<b>NORTHEAST % (95% CI) (N=346)</b>	<b>NORTH % (95% CI) (N=343)</b>	<b>SOUTHEAST % (95% CI) (N=659)</b>	<b>SOUTH % (95% CI) (N=388)</b>	<b>WEST % (95% CI) (N=317)</b>	<b>P-VALUE</b>
TREATED DECAY	58.8 (54.6–63.0)	58.4 (50.0–66.8)	52.2 (46.8–57.5)	42.0 (34.5–49.6)	53.7 (45.8–61.7)	<0.01
CARIES EXPERIENCE	66.6 (61.0–72.2)	63.7 (55.6–71.7)	60.4 (56.7–64.1)	48.8 (40.9–56.6)	61.8 (52.4–71.3)	<0.01
UNTREATED DECAY	20.0 (15.7–24.3)	14.1 (9.0–19.2)	22.6 (17.2–27.9)	13.3 (8.6–18.1)	17.6 (14.3–21.0)	<0.01
NEED DENTAL CARE	20.7 (16.3–25.2)	12.4 (7.3–17.6)	22.3 (17.1–27.5)	23.3 <sup>‡</sup> (6.9–39.6)	17.3 (13.7–21.0)	0.56
DENTAL SEALANTS	61.6 (54.4–68.8)	86.4 (82.8–90.1)	62.8 (52.6–73.1)	76.8 (69.7–84.0)	77.5 (73.1–81.9)	<0.01
NEED DENTAL SEALANTS	57.8 (49.3–66.4)	20.3 (16.9–23.8)	54.4 (43.8–65.1)	46.5 (39.1–53.8)	40.2 (36.4–44.1)	<0.01

<sup>‡</sup> Relative standard error >30. Estimate may be unreliable and should be interpreted with caution.

Note: The number of children listed for each region is the number of children within that region who participated. Because of missing data, the number for each cell differs slightly.

**TABLE 15****BMI-For-Age Cutoffs Stratified by Public Health Region**

	<b>NORTHEAST (N=357)</b>	<b>NORTH (N=345)</b>	<b>SOUTHEAST (N=659)</b>	<b>SOUTH (N=389)</b>	<b>WEST (N=316)</b>
UNDERWEIGHT < 5TH PERCENTILE	2.9 (1.7–4.0)	1.9 (0.0–3.9)	1.3 (0.3–2.4)	2.4 (0.9–3.8)	1.9 (1.0–2.8)
HEALTHY WEIGHT 5TH TO < 85TH PERCENTILE	65.0 (60.4–69.5)	62.2 (57.4–67.1)	61.1 (55.0–67.2)	67.7 (60.5–75.0)	69.5 (64.1–75.0)
OVERWEIGHT 85TH TO < 95TH PERCENTILE	17.9 (15.3–20.6)	14.9 (12.1–17.7)	15.6 (11.7–19.6)	16.8 (13.5–20.1)	13.1 (8.1–18.0)
OBESITY ≥ 95TH PERCENTILE	14.2 (11.1–17.3)	20.9 (17.3–24.6)	21.9 (17.2–26.7)	13.1 (7.2–19.0)	15.5 (12.9–18.1)

**TABLE 16****Age Adjusted Odds Ratios for Overweight (85th–94th percentile)**

	<b>BI-VARIABLE MODELS</b>		<b>MULTI-VARIABLE MODEL</b>	
	<b>ODDS RATIO (95% CI)</b>	<b>P-VALUE</b>	<b>ODDS RATIO (95% CI)</b>	<b>P-VALUE</b>
<b>SEX</b>				
FEMALE	Reference		Reference	
MALE	0.91 (0.69–1.21)	0.522	0.91 (0.68–1.23)	0.540
<b>RACE/ETHNICITY</b>				
WHITE	Reference		Reference	
AFRICAN AMERICAN	1.44 (0.96–2.17)	0.079	1.23 (0.81–1.86)	0.320
HISPANIC/LATINO	1.19 (0.80–1.77)	0.389	1.07 (0.68–1.70)	0.764
ASIAN	1.19 (0.62–2.32)	0.595	1.12 (0.58–2.16)	0.743
OTHER	1.91 (1.00–3.65)	0.050	1.78 (0.97–3.25)	0.062
<b>INCOME OF SCHOOL</b>				
< 25% FRPM	Reference		Reference	
25%–49%	1.23 (0.86–1.76)	0.257	1.23 (0.86–1.74)	0.248
50%–74%	1.46 (1.05–2.01)	0.024	1.43 (1.05–1.96)	0.026
≥ 75% FRPM	1.64 (1.10–2.45)	0.016	1.49 (1.01–2.21)	0.047



**TABLE 17****Age Adjusted Odds Ratios for Obese (> 95th percentile)**

	<b>BI-VARIABLE MODELS</b>		<b>MULTI-VARIABLE MODEL</b>	
	<b>ODDS RATIO (95% CI)</b>	<b>P-VALUE</b>	<b>ODDS RATIO (95% CI)</b>	<b>P-VALUE</b>
<b>SEX</b>				
FEMALE	Reference		Reference	
MALE	0.99 (0.73–1.35)	0.944	0.99 (0.74–1.34)	0.970
<b>RACE/ETHNICITY</b>				
WHITE	Reference		Reference	
AFRICAN AMERICAN	1.57 (1.07–2.29)	0.023	1.11 (0.72–1.71)	0.628
HISPANIC/LATINO	2.59 (1.92–3.50)	<0.0001	2.07 (1.52–2.83)	<0.0001
ASIAN	0.96 (0.53–1.74)	0.893	0.84 (0.47–1.48)	0.530
OTHER	0.92 (0.44–1.90)	0.816	0.78 (0.37–1.62)	0.494
<b>INCOME OF SCHOOL</b>				
< 25% FRPM	Reference		Reference	
25%–49%	1.73 (0.86–3.50)	0.124	1.73 (0.85–3.53)	0.132
50%–74%	1.94 (0.97–3.87)	0.060	1.92 (0.95–3.87)	0.069
≥ 75% FRPM	3.10 (1.50–6.44)	0.003	2.93 (1.36–6.30)	0.007

Table 16 and 17 include odds ratios for overweight and obesity classifications among the third-grade students. Odds ratios are ratios of the probability that an event will occur versus the probability that the event will not occur. For this report's purpose, the event is overweight or obesity classification. Odds ratio statistics show that the characteristics of Other race/ethnicity and attendance at a school with FRPM eligibility level more than 50 percent have the highest odds of children being classified as overweight. Odds ratio statistics show that the characteristics of Hispanic/Latino ethnicity and attendance at a school with FRPM eligibility level more than 75 percent have the highest odds of children being classified as obese.

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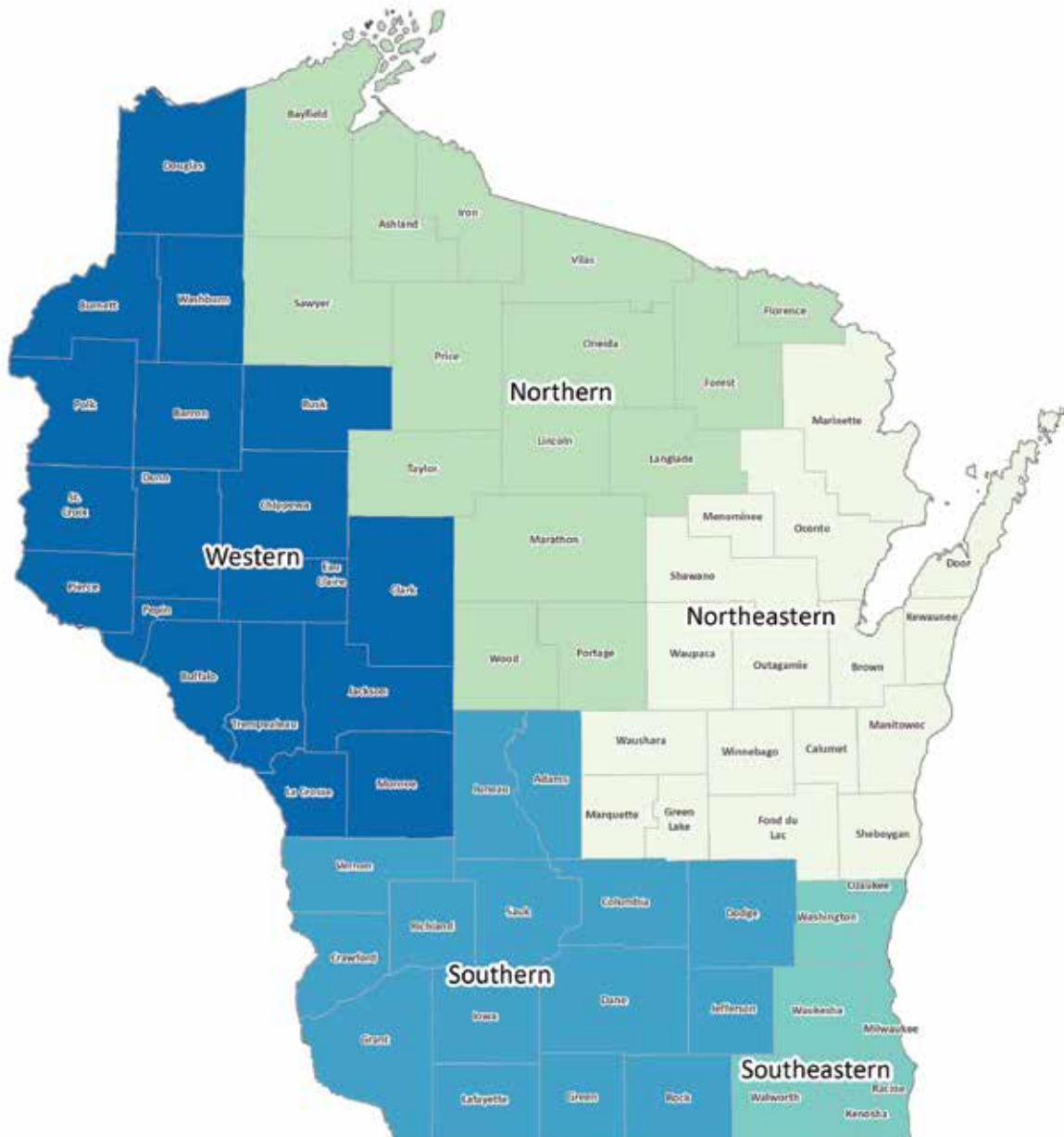
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# APPENDIX A: DEPARTMENT OF HEALTH SERVICES PUBLIC HEALTH REGIONS

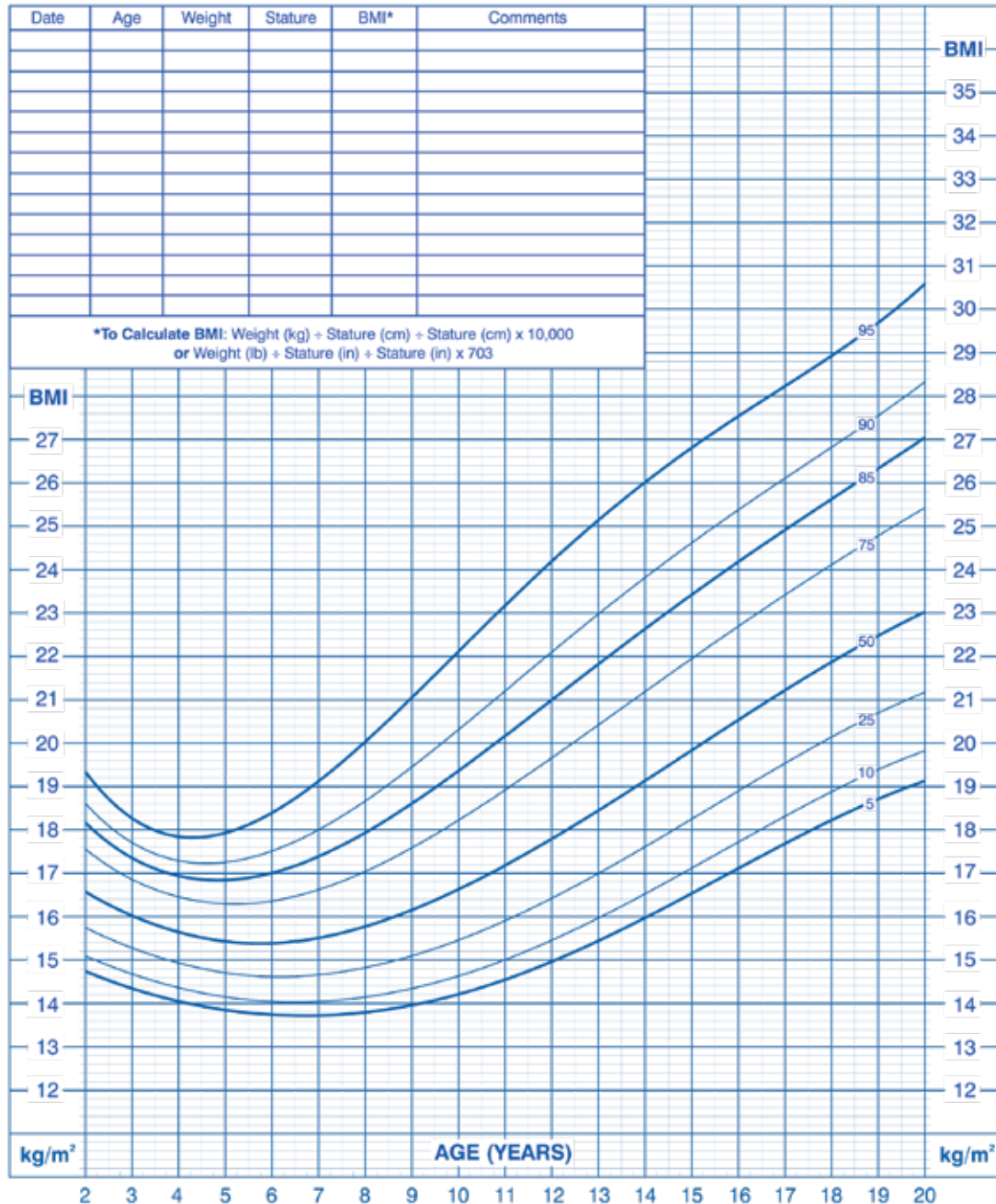


## APPENDIX B: CDC GROWTH CHARTS

**2 to 20 years: Boys**  
**Body mass index-for-age percentiles**

NAME \_\_\_\_\_

RECORD # \_\_\_\_\_



Published May 30, 2000 (modified 10/16/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). <http://www.cdc.gov/growthcharts>



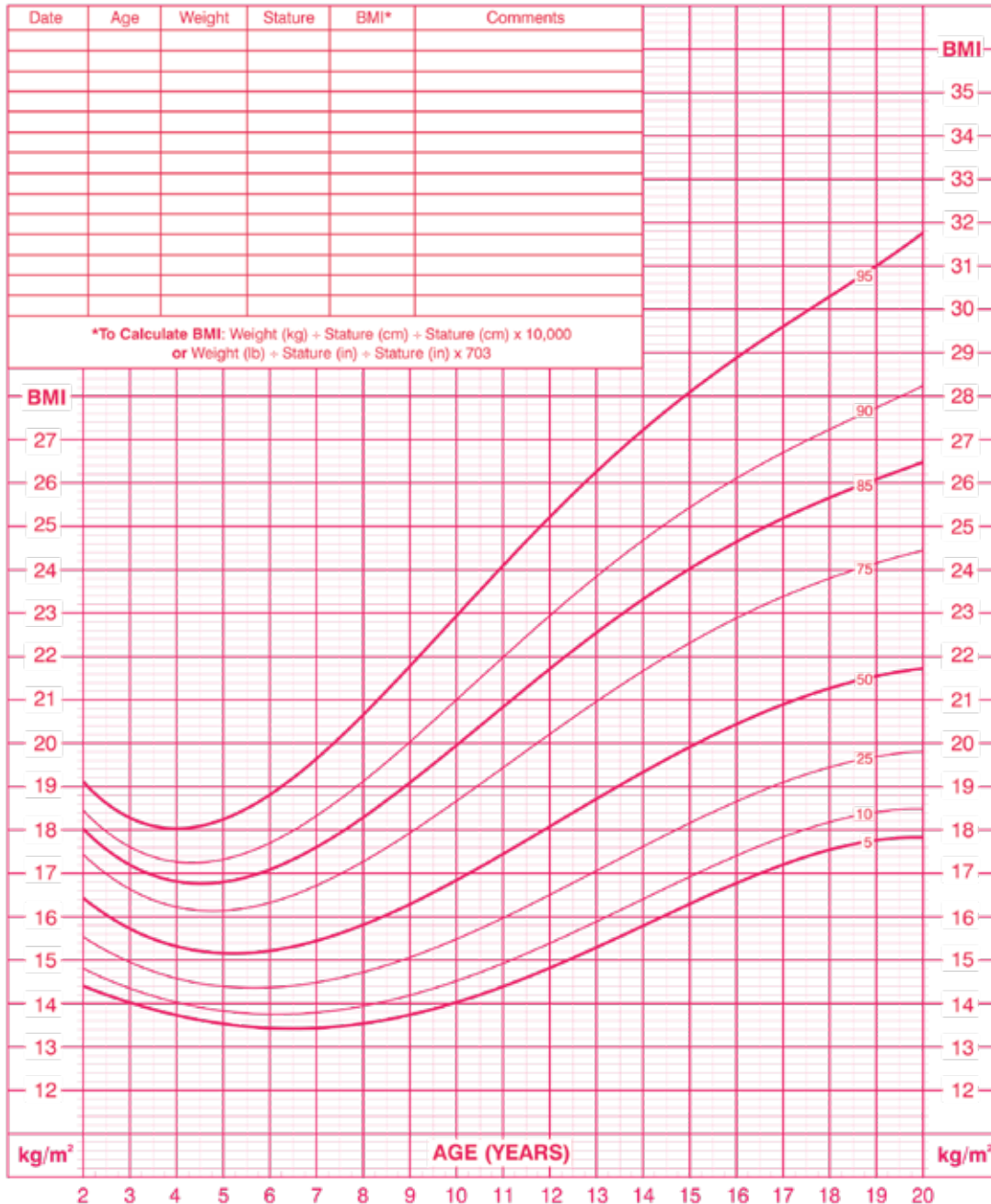
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## APPENDIX B: CDC GROWTH CHARTS

**2 to 20 years: Girls**  
**Body mass index-for-age percentiles**

NAME \_\_\_\_\_

RECORD # \_\_\_\_\_



SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000). <http://www.cdc.gov/growthcharts>



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## APPENDIX C: NUMBER OF OUTLIER VALUES (BASED ON CDC FIXED EXCLUSION RANGES)

	TOO LOW	TOO HIGH
HEIGHT-FOR-AGE	1	12
WEIGHT-FOR-AGE	0	1
WEIGHT-FOR-HEIGHT	0	0
BMI-FOR-AGE	8	1

**WISCONSIN DEPARTMENT OF HEALTH SERVICES**  
**ORAL HEALTH PROGRAM**



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