



State of Illinois
Illinois Department of Public Health

Healthy Smiles Healthy Growth 2018-19

An Assessment of Oral Health Status,
Beverage Consumption and Body Mass Index
of Third-grade Children in Illinois



Healthy Smiles Healthy Growth Partners

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EXECUTIVE SUMMARY

During the 2018-19 school year, the Illinois Department of Public Health's (IDPH) Division of Oral Health (DOH) completed the Healthy Smiles Healthy Growth (HSHG) survey. This survey collects oral health and height/weight data from third-grade children across Illinois. Demographic information, insurance status, access to oral health care services and beverage consumption over the past seven days were reported by the child's parent or guardian through a parent survey. Almost 3,000 children from 95 public schools across Illinois participated in the survey. Survey teams followed the protocol of a Basic Screening Survey (BSS) from the Association of State and Territorial Dental Directors (ASTDD). The use of this standard methodology allows for comparison between and among states and submission of these oral health status data into the National Oral Health Surveillance System. Dental screenings and height/weight measures were collected by calibrated and trained survey teams consisting of dentists, dental hygienists, and project staff. When possible, results were compared to three previous surveys conducted in 2003-04, 2008-09 and 2013-14 school years.

In previous HSHG surveys, oral disease and excessive body weight have been identified as important health issues affecting a significant segment of the Illinois third-grade population. The report of the HSHG 2018-19 survey provides updated data on these two health concerns and can be used to support strategic interventions that improve the health status of third-grade children. In addition, for the first time during HSHG 2018-19, baseline data were collected on water and sugar-sweetened beverage (SSB) consumption by Illinois third-grade children.

A total of 7,809 students were enrolled in the 100 selected schools and 3,198 students returned a positive consent. After records with missing data and outliers were excluded, 2,921 students had complete records that were analyzed (37.4% response rate).

KEY FINDINGS: ORAL HEALTH

- Caries experience (presence of untreated or treated decay) decreased by more than 21% from 54.2% in 2013-14 to 41.6% in 2018-19. While this is an improvement, caries experience is still a significant public health problem affecting two in five Illinois children.
- Fifty-three percent of Illinois third-grade children had at least one dental sealant present in a permanent molar. This percent change is increased by 6% from the previous 2013-14 survey (50%).
- Non-Hispanic (NH) Black children have the lowest dental sealant rates (45.7%) followed by NH Asian children (49.0%).
- The overall untreated dental caries rate in 2018-19 remained unchanged from 2013-14 (22.2%) and is higher than national data reported (15.3%) for a similar age group (Fleming E, 2018).
- NH Asian children and NH Black children's data showed significant disparities: NH Asian children had the highest rate of untreated dental caries (28.8%) followed by NH Black children (26.7%).
- An estimated 4% of Illinois third-grade children in 2018-19 required immediate dental treatment (due to the presence of pain, swelling, or infection) that would require treatment by a dentist, equating to

over 5,600 third-grade children sitting in classrooms with pain and infection from a dental issue. This is a doubling in the immediate need estimate as compared to the 2013-14 survey. It is important to note that the highest burden of immediate treatment need was seen in NH Black children (7.5%).

KEY FINDINGS: BEVERAGE CONSUMPTION

- Dental disease and treatment need increased with the frequency of consumption of sugar-sweetened beverages. Children who drank sugar-sweetened beverages even 2 times per day had higher rates of caries experience compared to overall findings (58.4 % vs 41.6%) and untreated caries (29.2% vs 22.2%).
- Drinking water more than three times per day may be protective, as decreased rates caries experience (38.8% vs 41.6%) and untreated caries (21.0% vs 22.2%) and were observed in this subgroup as compared to overall data for these indicators.

KEY FINDINGS: BODY WEIGHT STATUS

- The estimated overall proportion of third-grade children that are overweight or obese (according to Body Mass Index or BMI) decreased from a high of 41.0% in 2003-04 to 32.6% in 2018-19. However, in 2018-19, one in two Hispanic/Latino third-grade children were overweight and obese.
- Third-grade children eligible for the Free and Reduced Meal Program (FRMP) are more affected by overweight and obesity (37.6%) than non-eligible children (24.3%).
- Nearly one in five Illinois third-grade children lives with obesity (18.0%) as defined by U.S. Centers for Disease Control and Prevention (CDC).

OVERALL FINDINGS

The results of this survey show continued progress in access to prevention services and reveal challenges in accessing or completing corrective treatment for dental caries. Dental sealant rates have increased in this survey period and the dental sealant disparity gap continues to decrease by race/ethnicity, urban/rural, low-income and Illinois Public Health Regions. However, corrective treatment that addresses untreated dental caries continues to be an unmet need. County and regional level data confoundingly show a high proportion of children with dental sealants co-existing with high levels of untreated dental caries. This suggests that children that have a high prevalence of dental sealants also frequently have a high prevalence of untreated caries and immediate dental care needs.

The estimated overall proportion of third-grade children that are overweight or obese decreased to 32.6% in HSHG 2018-19. Since the first measure in 2003-04, this represents a decrease of 20% over the 15 year period. However, alarmingly, more than 50% of Hispanic/Latino children are overweight or obese.

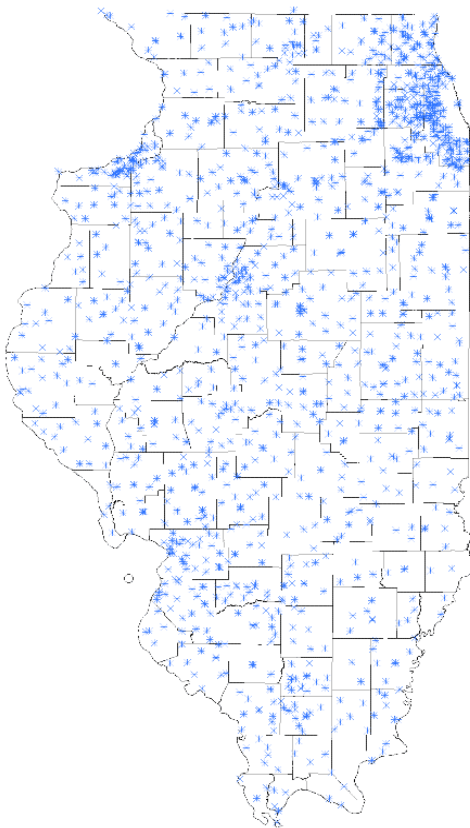
Finally, this survey provides important clinical health information and baseline data on beverage consumption of Illinois' third-grade children. This survey's findings will help state and local, public, and private partners formulate programmatic and policy strategies that address the health care needs of Illinois' children.

INTRODUCTION

Health and well-being include all aspects and parts of the body, including the mouth. Good oral health supports life-long health and achievements in education, employment, and social relationships. Unfortunately, tooth decay or dental caries (cavities) and periodontal disease are bacterially mediated processes that infect many children, and most adults and elderly. These two common diseases are preventable, but they remain highly prevalent. The best protection from dental caries is good oral hygiene, regular access to professional care, a healthy diet of low sugar food and beverages, the mineral fluoride, and dental sealants.

For over 50 years, Illinois residents have benefited from optimally fluoridated water. CDC, in their 2016 biennial water fluoridation report calculates that optimally fluoridated water reaches 98.5% of Illinois'

Figure 1. Fluoridated Community Water Systems, IDPH 2009. This map of Illinois fluoridation water systems shows the widespread geographic availability of optimally fluoridated water.



population (Figure 1). This is important to mention because drinking optimally fluoridated water decreases dental caries rates. Another effective way to prevent dental caries is the widespread use of dental sealants in the elementary school-aged population. Sealants are effective in protecting teeth as they seal the deeply grooved chewing surfaces of molar teeth preventing bacterial invasion and dental caries from starting. CDC reports that “sealants protect against 80% of cavities for 2 years, 50% of cavities up to 4 years,” however nationally, 60% of school-aged children ages 6-11 do not get dental sealants (Centers for Disease Control and Prevention). Dental caries experience, that is history and burden of dental caries, impacts most of the child population. Data from the 2015-16 National Health and Nutrition Examination Survey (NHANES) reports that 15.3% of US 6- to 11-year-old children had untreated tooth decay and 50.5% had caries experience (Fleming E, 2018).

Shifts in the profile of the public school student population pose challenges to ending disparities and gaps in achievement and health. The trends

from 2008 to 2018 in the student body of Illinois public schools show that low-income student enrollment increased from 41.1 % to 49.4 % in 2018, minority student population (non-white students) increased from 46% to 52%, and the chronic truancy rate increased from 8.6% (in 2012 when this rate was first measured) to 11.2 % in 2018. These changes indicate that the student population may be of higher risk for health-related disparities due to the impacts of social determinants that result in poor health.

Addressing inequalities begins with the delivery of quality early learning programs and appropriate parent engagement that supports the health and well-being of all children (Illinois State Board of Education, 2019). Further, Illinois student demographics indicate that opportunities exist to make positive, lasting health impacts in subpopulations that have a current or projected future higher health care needs. Some bright spots in trends in Illinois public schools for the same period (2008 to 2018) include: student enrollment mobility has decreased from 14.9% to 6.9%, the non-white teachers increased from 15.1 % to 16.8%, and 3 of 4 high school graduates enroll in college within 12 months of completing high school. College enrollment increased from 68% in 2016 to 75% in 2018 (Illinois State Board of Education, 2018-2019). These positive trends may, in time, improve health and academic trajectories of more Illinois children.

To promote prevention and address the extensive burden of dental disease in school-age children, Illinois has developed a strong school-based health program. Schools are an appropriate place to provide preventive dental services that reach vulnerable, low-income children. Starting in 2005, Illinois law required all children in kindergarten, grade 2, and grade 6 to submit proof of an oral health examination conducted by a dentist. This required health assessment activated parents and school districts to provide an opportunity for more children to receive an oral health assessment, prevention services and, when needed, corrective treatments. IDPH began supporting dental sealant programs for uninsured children and Healthcare and Family Services, Illinois' Medicaid agency, expanded preventive dental services to children through school-based programs. In the last 15 years, school-based dental sealant programs targeted for public school students have increased in number and geographic reach to over 1,200 of the 3,388 Illinois public schools. Illinois school-based oral health programs incorporate oral health education, dental screening, dental cleaning, fluoride varnish application, application of dental sealants on eligible teeth, referral for dental treatment and where possible, a direct link to corrective dental treatment.

Food and beverage consumption habits, in addition to levels of physical activity, greatly impact weight status and are risk factors for oral disease, obesity, diabetes, cardiovascular disease and cancer (U.S. Department of Health & Human Services). In addition, excessive weight in children may limit the ability to engage with peers in positive relationships, as well as to learn and maintain markers of physical and emotional health. Many beverage products including a variety of SSBs have come to market and risen in popularity in the last 20 years. Regular consumption of SSBs poses an increased risk for dental caries and is positively associated with weight gain in both adults and children (Luger M., 2018). The widespread availability and consumption of SSBs have the potential to shift the consumption of liquids away from the protective effects of fluoridated water. The 2017 National Survey of Children's Health states that nationally, 15.3% and 15.4% of children age 10-17 are overweight and obese, respectively. In Illinois, these rates are slightly higher with 16.5% of children being overweight and 17.5% obese (Child & Adolescent Health Measurement Initiative, 2019).

To obtain a current understanding of oral health status, overweight, obesity, and recent beverage consumption behaviors, the Illinois Department of Public Health coordinated a statewide in mouth oral health survey of third-grade children attending public schools. This surveillance activity is called Healthy Smiles Healthy Growth 2018-19 (HSHG 2018-19). Data from 2,921 children were collected through

parent/guardian questionnaires, dental screening, and height and weight measures in the 2018-19 school year. As in years past, this survey used standardized national methodology, allowing the presentation of trends over the four survey points spanning 15 years. Illinois data will also show progress towards four topical Healthy People 2020 (HP2020) objectives relevant for the third-grade age group (U.S. Department of Health and Human Services, 2011).

The four HP 2020 objectives included in this report are:

- 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
- Reduce the proportion of children aged 6 to 11 years who are considered obese to 16 percent

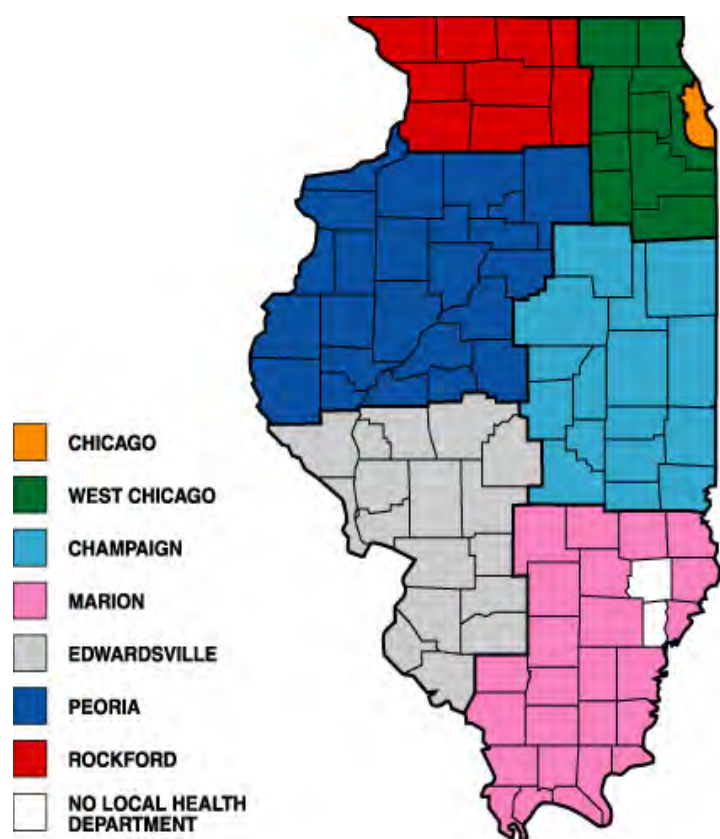
Differences in oral health status exist and are the result of unequal access to education, resources, and preventive and corrective treatments. Surveillance activities such as HSHG 2018-19 continue to build a data-driven understanding of clinical and behavioral variables in oral health and obesity that inform health professionals, schools, public health and policy leaders so that we can address these important health issues.

METHODS

This survey occurred during the 2018-19 school year with most of the clinical data collection taking place between November 2018 and May 2019. A randomized, representative sample of third-grade children from Illinois public schools was selected by following the National Oral Health Surveillance System protocol. The average age of a third-grade child is between eight and nine years of age and presents with primary dentition (baby teeth) as well as permanent dentition. The presence of mixed dentition allows for documentation of dental disease experienced, untreated dental disease, and access to preventive dental sealants. The survey method is the Basic Screening Survey protocol developed by the Association of State and Territorial Dental Directors, which was also used in 2003-04, 2008-09 and 2013-14 surveys for Illinois. The methodology recommends that states conduct this survey every five years; the 2018-19 HSHG is Illinois' fourth such survey.

One-hundred hundred schools were selected with probability proportional to size (PPS) from a statewide sampling frame of schools with 95 schools participating in the survey. The list of schools was sorted to achieve a stratified selection: first by Illinois public health region (Rockford, Peoria, Edwardsville, Marion, Champaign, West Chicago, Suburban Cook County (not highlighted), and Chicago (see Figure 2); then by urbanicity within Rockford, Peoria, Edwardsville, and Champaign regions and by county in the West Chicago collar region, and then finally, by socioeconomic status (percent of children eligible for Free and Reduced Meal Program (FRMP)) of the schools. This survey design ensures proportional representation of the Illinois public school third-grade population by geography and socioeconomic status (SES).

Figure 2. Public Health Regions, Illinois Department of Public Health.



The sample size of 100 schools was determined to be logistically and economically feasible and ensured that a minimum of two schools were selected from each urban/rural and collar county category in each health region. Schools that declined were replaced with random PPS selected schools in the same region/urbanicity/SES sampling interval to ensure that the survey remained representative of the state public school population. At the end of the study, principals at participating schools will be provided with a school-specific report of findings and oral health-related books for their library.

Survey teams, including dentists and dental hygienists, attended a hands-on calibration session that reviewed screening methods, dental diagnostic criteria and standard protocols to collect and record the height, and weight measures. Consent forms, data

collection forms, incentives for children (toothbrush kit, plastic bracelet, and pencil) and IDPH calibrated scales and stadiometers were provided to survey teams. Illinois licensed dentists and dental hygienists completed the screenings at schools following the diagnostic criteria outlined by the ASTDD. Dental screening measures are presented in Table 1. Basic Screening Survey Measures and Definitions for HSHG 2018-19, Illinois (Appendix: HSHG 2018-19 Tables).

In addition to the active consent provided by the parent or guardian, the protocol required the positive assent of the child on the day of the survey. Parents or guardians were able to opt-out of the oral screening, the height, and weight assessment, or not answer the optional questions. Demographic and non-clinical information was obtained from parents using the survey consent form and included child's date of birth, sex, child's eligibility for the FRMP (yes, no, or don't know), whether a child was insured for dental care (yes, no, or don't know), race (White, African American, American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, Other), ethnicity (Hispanic or non-Hispanic), and the primary language spoken at home. Hispanic/Latino refers to children whose ancestors can be traced to the regions of Central and South America, Mexico, and the Caribbean. Questions regarding the experience of dental pain, condition of teeth, recent use of dental services, inability to obtain dental services, and beverage intake in the past seven days were also asked. Sample consent form, survey instrument can be found in the Appendix of this report.

Oral health education was provided in most of the schools before the distribution of consent form. At this time, goody bags containing toothbrush, toothpaste, floss, and oral health education brochure were provided to all third-grade children in the participating school. Children who returned a consent form (positive or negative) were given an imprinted “I ❤️ my teeth” plastic bracelet.

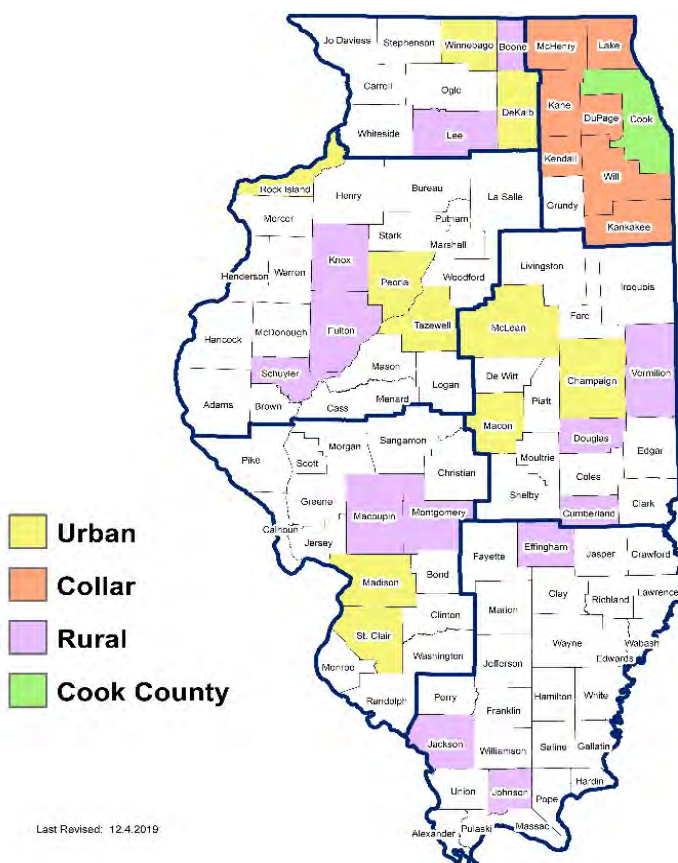
Survey teams used a disposable mouth mirror, light source, disposable gloves, tongue depressors, calibrated height, and weight measuring equipment to conduct the screening and collection of clinical variables. Cotton gauze and toothpicks were available to clean tooth surfaces but were not routinely used. Children removed shoes and heavy outerwear before weighing. A wooden 90-degree angle portable stadiometer was used for the height, and weights were measured with a digital scale. The oral assessment, height, and weight measurement took about five minutes per child and were recorded on the HSHG 2018-19 Data Collection Form (see Appendix). At the end of the screening, each child received a letter addressed to their parent or guardian noting the results of their oral assessment and selected a pencil with the writing “I ❤️ my teeth”.

Survey data collected on paper were sent to IDPH and entered into a database that was analyzed by an ASTDD consultant using SAS software. The data were weighted to account for the complex sampling scheme design and for non-response. Analyses included frequencies, cross-tabulations, and 95% confidence intervals. Height and weight measurements were used to calculate BMI for each child, based on the CDC sex and age-specific growth charts. Children were ranked into defined percentiles for Healthy Weight, Overweight and Obese BMI categories (Appendix: Table 2). The Institutional Review Board of IDPH granted exemption from Human Subjects Research for the survey. The Chicago Public School (CPS) Research Review Board also approved the survey.

RESULTS

A stratified PPS state-wide sample of 100 schools was selected for the survey with 95 schools ultimately participating, for a school-level participation rate of 95%. This group of schools represented 31 Illinois counties distributed within the six Illinois public health regions (Figure 3). A total of 7,809 students were enrolled at the 95 schools in the school year 2018-19; 3,198 students returned a positive consent and of these 3,054 students were screened. BMI and clinical variables that were outliers or missing data were excluded from the analysis. Ultimately, 2,921 students had complete data yielding a 37.4% student participation rate. Demographic characteristics,

Figure 3. Participating Counties by Illinois Public Health Regions and Urbanicity, HSHG 2018-19.



clinical and non-clinical data of participating children are presented in tables found in the Appendix of this report.

PERFORMANCE ON SELECTED HEALTHY PEOPLE 2020 OBJECTIVES

Healthy People 2020 objectives provide a focus for improving the nation's health. For the first time, Illinois met three key oral health Healthy People 2020 (HP2020) objectives: dental sealant, untreated dental caries, and caries experience. However, data from HSHG 2018-19 survey shows that Illinois has not yet met the HP2020 obesity objective for 6 to 11-year-old children.

The finding that the Illinois dental sealant rate of 53% is higher than the national goal of 28% means that Illinois children have better access to this preventive service than the established national goal. A higher sealant rate is good, and Illinois should strive to reach 60% by the next five-year surveillance period.

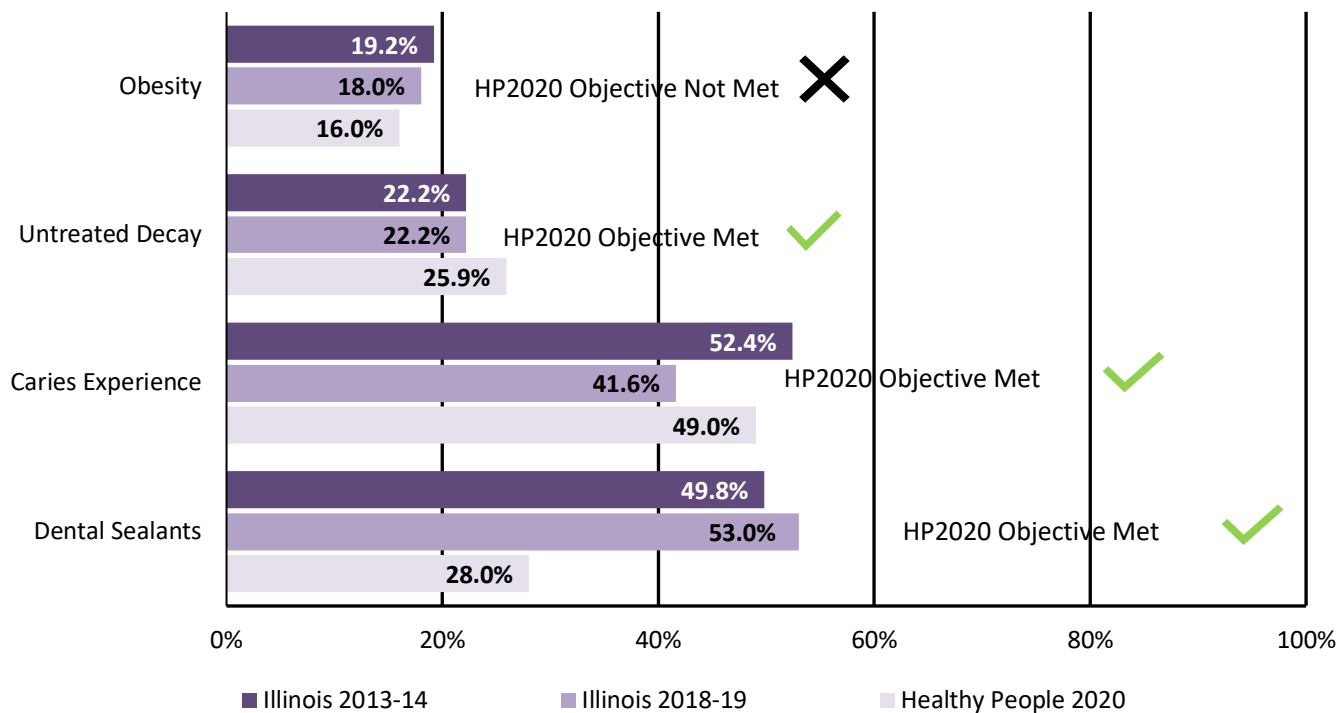
Caries experience (treated decay and untreated dental caries) in Illinois children was measured at 41.6%, lower than the 49% national goal set by HP2020. This is a good result and may indicate that dental disease burden is decreased in part by widespread access to fluoridated water and increased prevalence of dental sealants.

The Illinois untreated decay rate remained at 22.2%, which is lower than the HP2020 goal of 25.9%, but much higher than the 15.3% stated in the 2015-16 NNHANES report (Fleming E, 2018). Lower untreated decay rate is good, and Illinois should strive to decrease the overall untreated decay rate to 20% by the next five year surveillance period.

Illinois third-grade children missed the national target for obesity, as 18% of Illinois children are obese as compared to the HP2020 objective of 16%. The obesity rate did decrease from the 2013-14 survey, but much more work needs to be done to bring all Illinois children into the healthy weight category.

In addition to measuring Illinois' progress against HP2020 indicators, data from the 2018-19 survey show that Illinois has improved in three of four indicators as compared to the 2013-14 previous survey period: obesity, caries experience, and dental sealants (Figure 4). The untreated decay rate held steady in third-grade children between 2013-14 and 2018-19 time periods.

Figure 4. Healthy People 2020 Objectives by 2013-14 and 2018-19 Performance Illinois is meeting the selected oral health HP2020 Objectives, but progress is needed on the HP2020 obesity objective for this age group.



ORAL HEALTH

Trends in Healthy Smiles Healthy Growth 2003-04 to 2018-19

Figure 5 shows trends over the last 15 years in untreated dental caries (A), treated decay (B), caries experience (C), and presence of dental sealant (D). Presence of dental sealants indicates access to evidenced-based therapies that prevent dental caries, the presence of untreated dental caries (active disease) may indicate a lack of treatment access, treated decay indicates the availability of treatment access and caries experience describes the burden of dental caries.

Untreated dental caries had been on a downward trend since 2008-09, but the rate has plateaued since 2013-14. Untreated dental caries has remained steady at 22.2% in the last two surveys yet remains higher than the nationally reported 15.3% in youth aged 6-11 years (Fleming E, 2018). This result indicates that more than one in five third-grade children need follow-up care that goes beyond preventive care. This finding may indicate insufficient opportunity to access disease corrective services that can be provided by a dentist, most often in a separate location from the school-based oral health program.

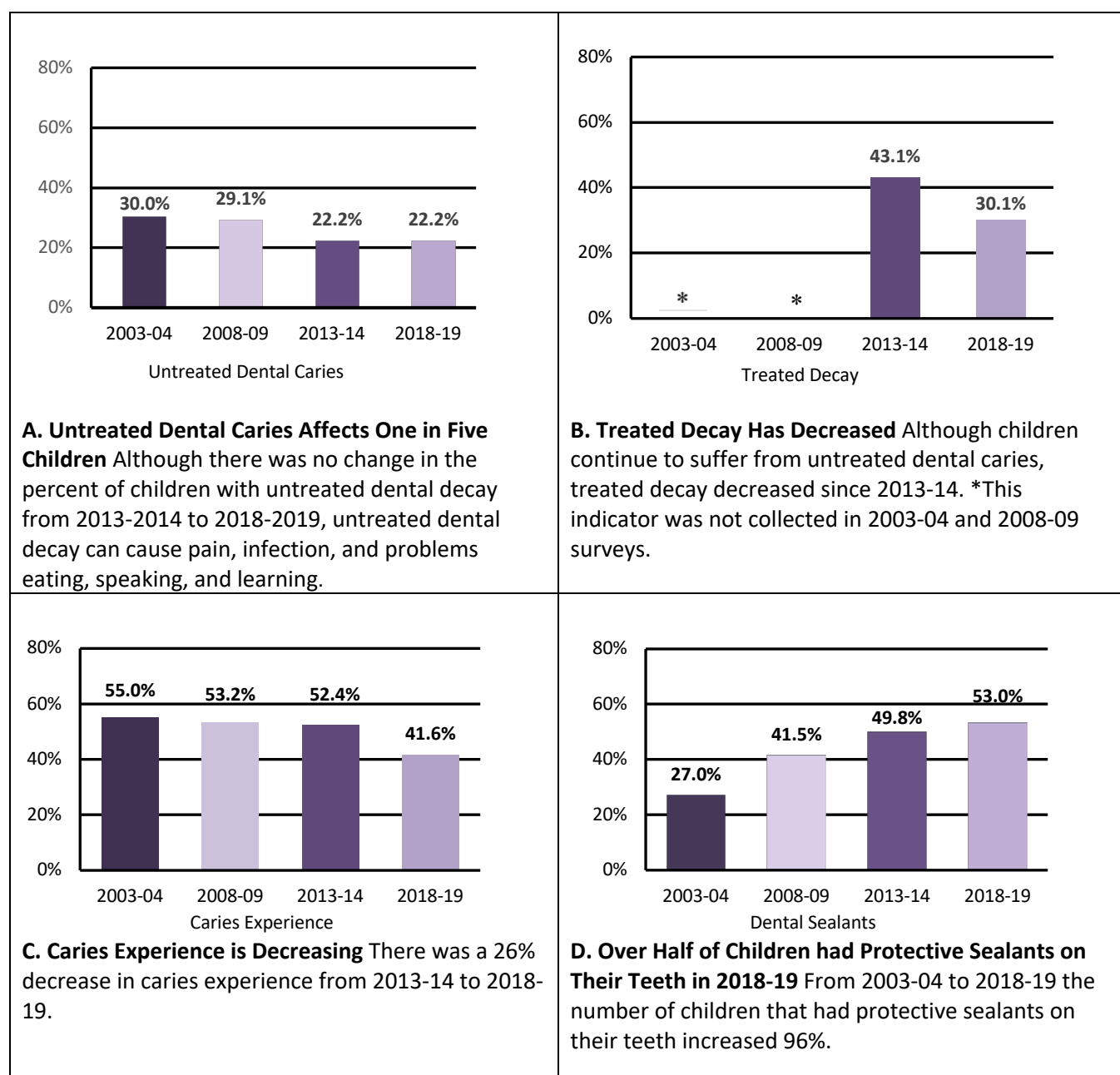
Caries experience, a combination of treated and untreated dental caries in primary and or permanent teeth and a proxy for disease burden, has decreased across the four survey periods.

Around 42% of third-grade children in the state had caries experience, a decrease of 20% compared to the previous 2013-14 survey (52%). The decreases in caries experience may be the result of an increased

presence of dental sealants and access to other protective preventive services such a fluoride varnish application through school-based and community providers.

Dental sealants that prevent the entry of dental caries causing bacteria have increased consistently with each survey period. In the baseline survey conducted in 2003-04, less than one child in three had a dental sealant. This percent change increased by 96% to more than one child in two in the 2018-19 HSHG survey. School-based oral health programs and contributions by private practice providers are responsible for the doubling of dental sealant rates and decreases in untreated dental caries and caries experience (Valencia, 2015).

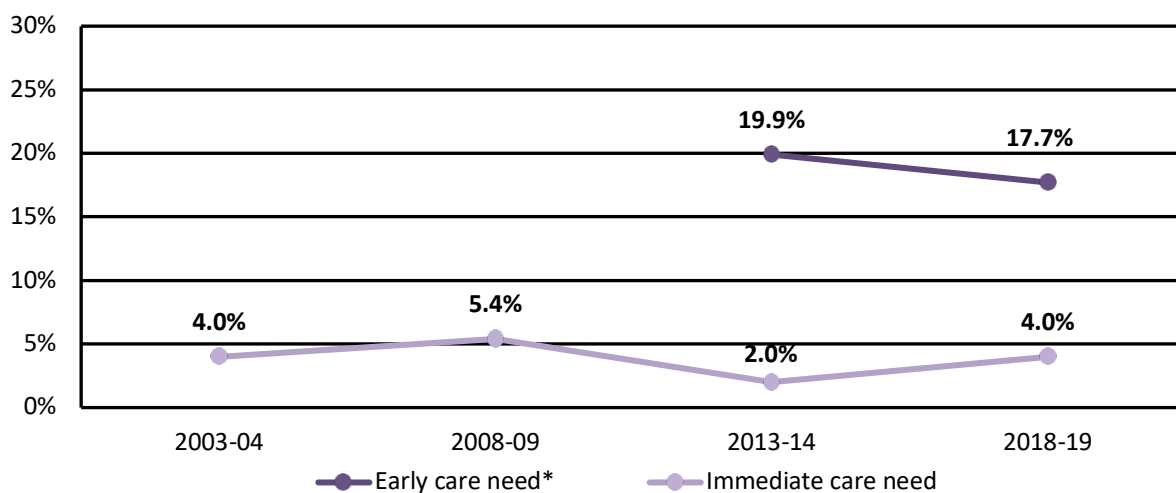
Figure 5. Trend Over Time in Percentage of Illinois' Third-grade Children with Dental Sealant, Treated Decay*, Untreated Decay, and Caries Experience



The data provided in Figure 6 divides the 22.2% in unmet treatment into an early and immediate need for disease corrective dental care. Children with dental caries without accompanying signs or symptoms were coded as having early dental care needs. The percentage of children with early care needs decreased slightly in the 2018-19 survey to 17.7% from 19.9% in 2013-14. Children with signs or symptoms that included pain, infection or swelling were coded as having immediate treatment needs that should be addressed within 24 to 48 hours. Children with an immediate care need increased in 2018-19 survey to 4% from 2% in 2013-14. In 2018, ISBE enrolled 141,097 Illinois third-grade children in public schools (Illinois State Board of Education, 2018). Using this enrollment number and an estimated rate of 4% of children needing immediate care, we calculate that over 5,600 third-grade children are sitting in classrooms with pain or swelling. This finding is not only a concerning health threat but also highly likely to impact the child's academic performance and social interaction with their peers.

Figure 6. Level of Immediate Care Need Remains the Same Since 2003-04 At this level, over 5,600 students need immediate care because of pain or infection.

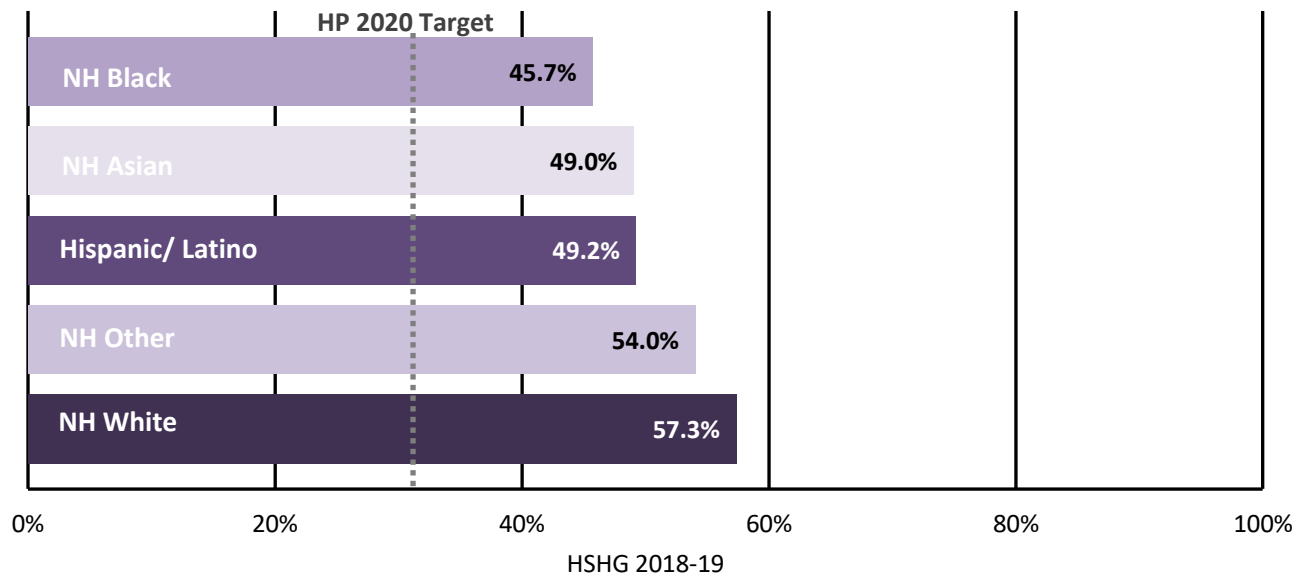
*Early care need data were not collected during the 2003-04 and 2008-09 survey but were collected in the subsequent surveys.



Healthy Smiles Healthy Growth 2018-19

Children of all races/ethnicities meet the HP2020 objective for dental sealants (Figure 7) of 28.0%, however, non-Hispanic Black (NH Black) children followed by non-Hispanic Asian (NH Asian) children had the lowest percentage of dental sealants. Children's sealant rates by race/ethnic groups are 57.3% of NH White, 49.2% of Hispanic/Latino, 49.0% of NH Asian, 45.7% of NH Black children.

Figure 7. Race/Ethnicity is a Factor in Dental Sealants NH Black children were least likely to have dental sealants followed by NH Asian and Hispanic/Latino children.



Comparing sealant rates between HSHG 2018-19 and 2013-14, the disparity gap by race/ethnicity for dental sealants seems to be decreasing. The presence of dental sealants increased or remained the same for all racial/ethnic groups in comparison to the previous survey except for Hispanic/Latino and Asian children. Alarminglly, Hispanic/Latino children saw their dental sealant rate decrease to 49.2% from 56.3% in the previous survey (Figure 8).

Figure 8. Variation in Accessing Dental Sealants Exist by Race/Ethnicity Comparison of 2013-14 and 2018-19 dental sealant rates show most racial/ethnic groups have gained in dental sealant rates except Hispanic/Latino and NH Asian children.

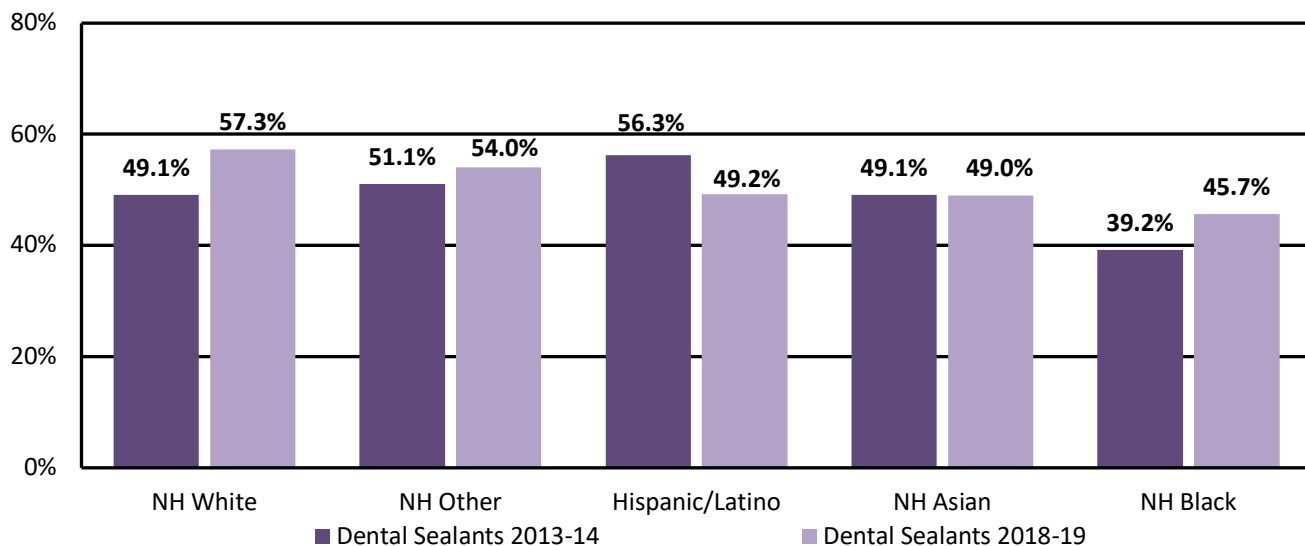


Figure 9 below shows levels of untreated caries and caries experience (untreated decay, treated decay or both). The proportion of children affected by untreated caries and caries experience differs for racial/ethnic groups. Overall, 18.8% of NH White, 22.3% of Hispanic/Latino, 26.7% of NH Black, and 28.8% of NH Asian third-graders are affected by untreated caries. Untreated dental caries is the highest in NH Asian and NH Black children and overall caries experience is the highest for children of Hispanic/Latino descent.

Figure 9. Race/Ethnicity can be a Factor in Untreated Dental Caries and Caries Experience Asian children were more likely to have untreated dental decay, while Hispanic/Latino children carried the most disease burden.

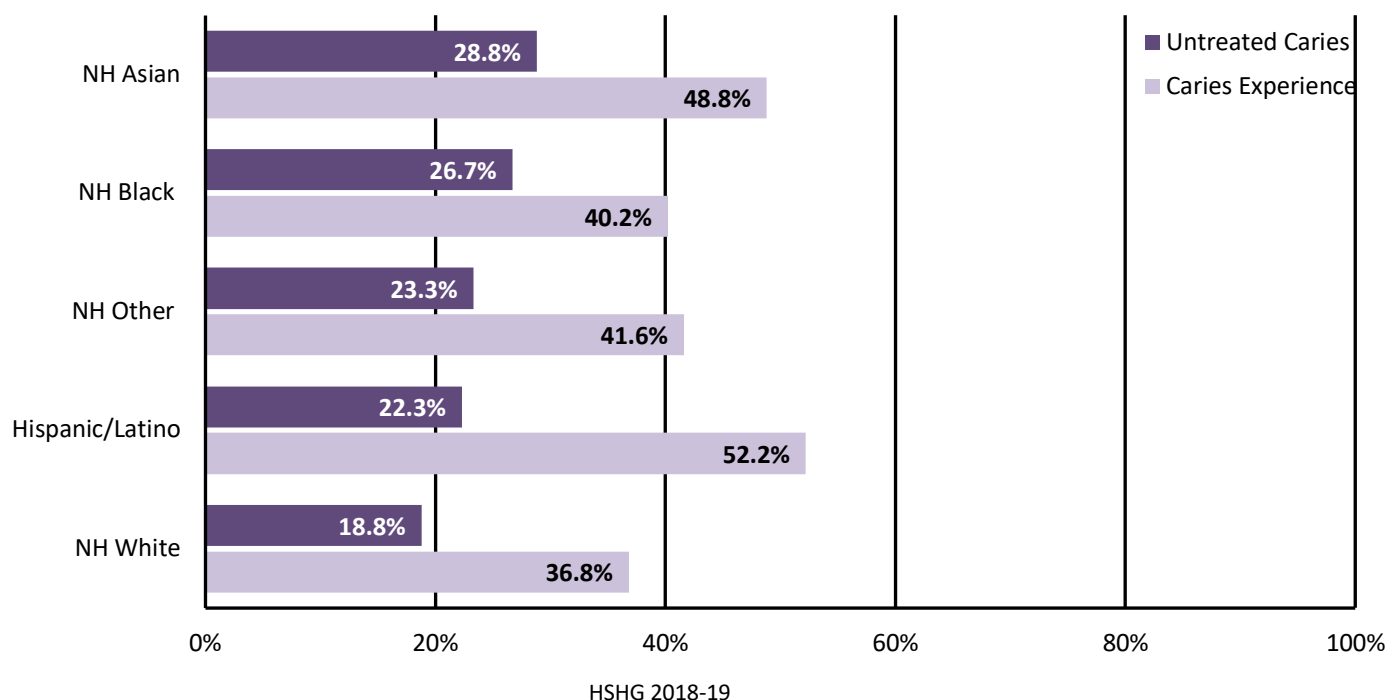
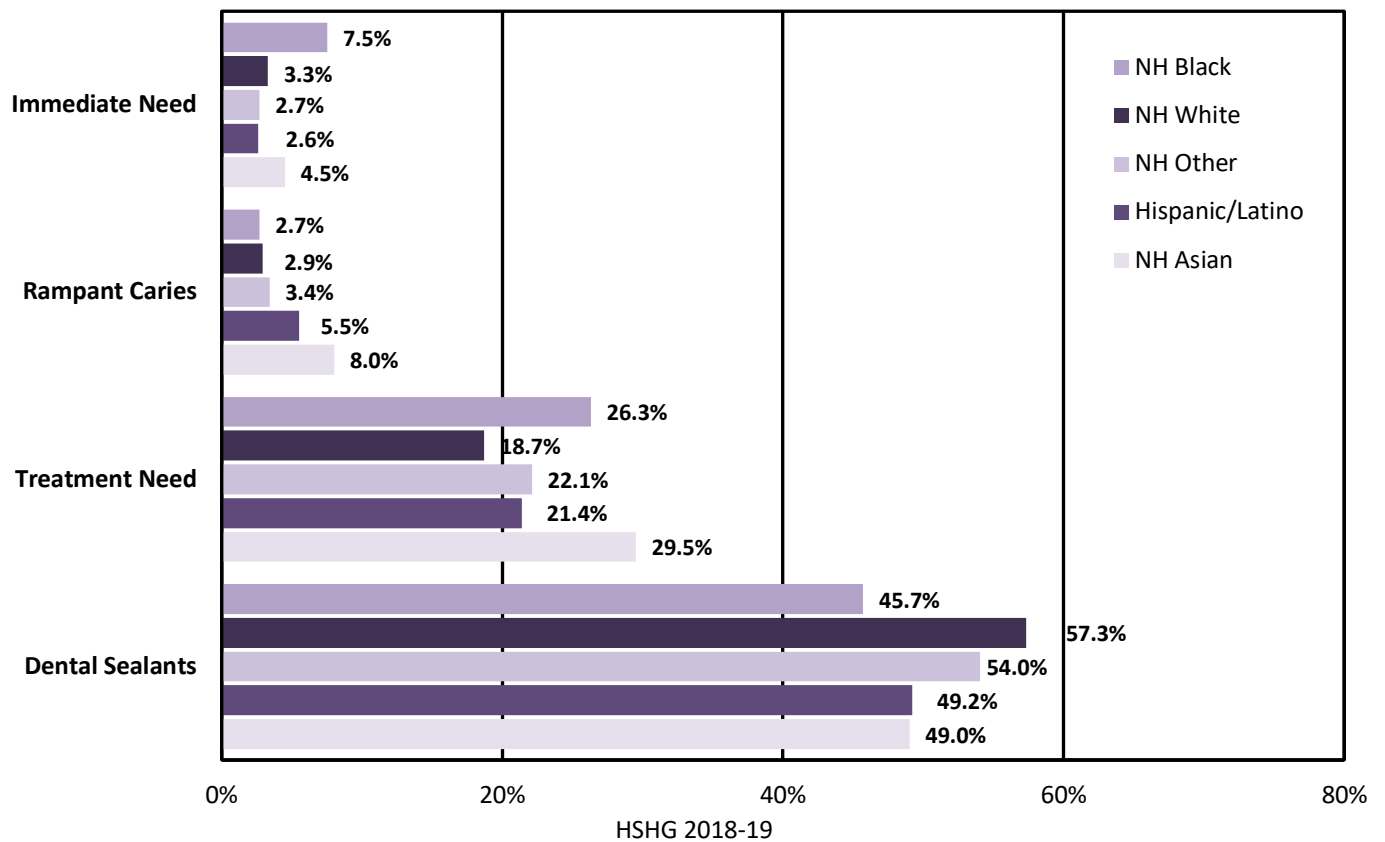


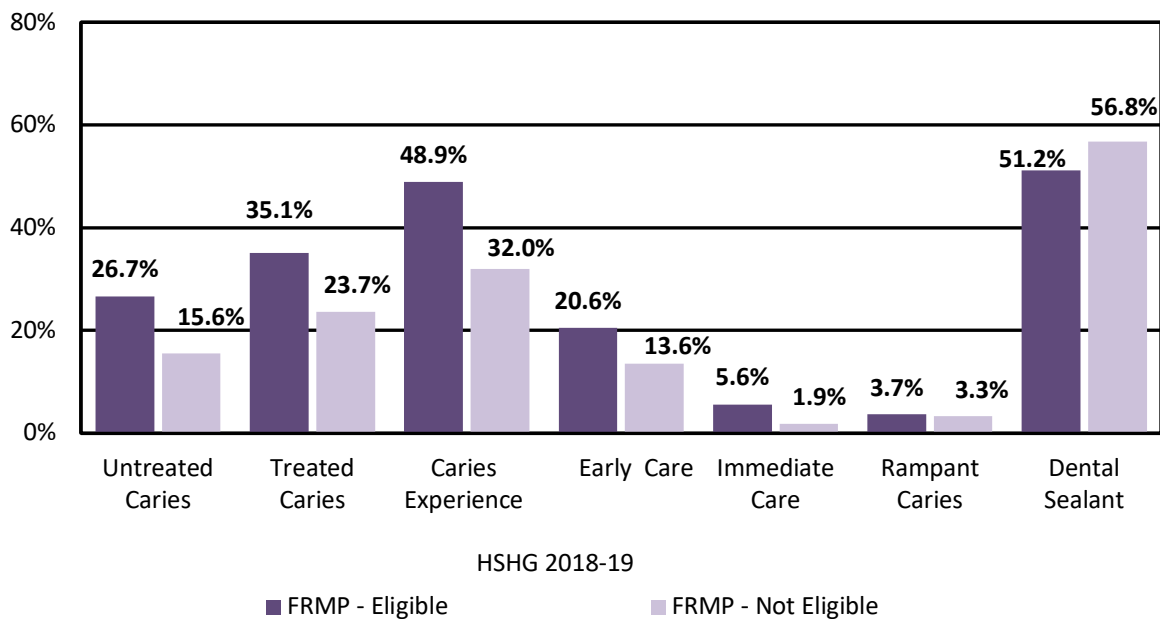
Figure 10 shows disparity by race/ethnicity in clinical variables measured. HSHG 2018-19 shows that NH Black have the lowest dental sealants rates, highest rate of treatment need, and the highest rate of immediate need. Asian children are the most impacted by rampant caries and second highest by rate in the immediacy of treatment need. Rampant caries describes the severity of dental disease and is coded when a child presents with seven or more teeth with untreated and or treated decay. These findings indicate that prevention and treatment work need to continue, with a focus on NH Black and NH Asian children.

Figure 10. Race/Ethnicity is a Factor in Presence of Dental Sealants, Treatment Need, Rampant Caries (severity) and Immediacy of Need NH Black and NH Asian children were less likely to have dental sealants and more likely to have active dental disease and immediacy in care needs.



Since the passage of the Affordable Care Act and expansion of Medicaid, more Illinois children are covered by public and private health insurance plans that also include dental services (Kaiser Family Foundation, 2013-2017). In the last several years, the use of dental services between privately and publicly insured children have reached parity (Children's Dental Health Project, 2019). However, disparities remain. These can be attributed to differences in the risks for dental disease, and limitations of accessing preventive and treatment services (Fleming E, 2018). Figure 11 shows that children eligible for FRMP, a proxy measure for low socioeconomic status, were more affected by all measures of dental disease (untreated caries, treated caries, caries experience) and needed to access early and immediate care at higher rates than FRMP not eligible third-grade children. Dental sealants were present in 51.2% of low-income children, compared to 56.8% in their high-income counterparts. The disparity in overall dental sealant rate between these two groups of children continues to decrease, suggesting access to preventive services for FRMP eligible children in Illinois is improving. The larger disparity in untreated caries (early and immediate care) and caries experience between these two groups indicates a need for disease treating programs that target low-income children attending public schools.

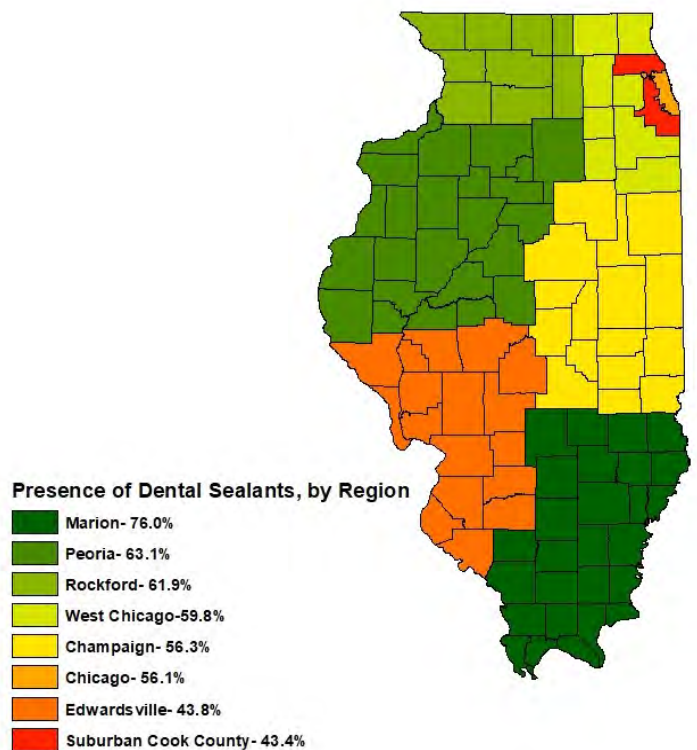
Figure 11. Free and Reduced Price Meal Program (FRMP) Eligibility is Factor in Disease Burden, Immediacy of Care Needs and Lower Prevalence of Dental Sealants



Dental sealants are an important prevention tool against the development of dental caries, preventing the need for more complex and costly treatment needs such as dental fillings, crowns, and oral surgeries. The next set of figures begin to unravel the complexity of health disparity gaps and challenge our existing programs.

The overall presence of dental sealants has doubled since first measured in 2003-04, and in several public health regions, sealant rates exceed HP2020 by almost three times. As can be seen in Figure 12, there is a large geographic variability in the presence of dental sealants. Seventy-six percent of children living in the Marion Public Health Region had at least one dental sealant, greater than any other public health region (Figure 12, dark green). The lowest dental sealant rate is in Suburban Cook County at 43.4% (Figure 12, red). However, significant

Figure 12. Presence of Dental Sealant Varies by Where a Child Lives. Dental sealants are an easy way to protect children's teeth, however, the use of dental sealants varies greatly depending on where a child lives.



improvement has occurred since the 2013-14 survey when the Suburban Cook dental sealant rate was the lowest at 18.2% (Valencia, 2015). Improvements in dental sealant rates indicate successes of a focused approach in reaching this school-aged population with this effective preventive service.

As with the clinical findings by other variables, regional level data confoundingly show high levels of dental sealants co-existing with high levels of untreated dental caries, and rampant caries in the third-grade public school population (Figure 13). Conceptually we know that even in the presence of a strong school-based preventive program, the dental caries rate will never reach zero. However, high levels of untreated dental caries indicate that better coordination between school-based programs with strong disease treatment programs are needed to address the unacceptable levels of active dental disease in some Illinois regions.

When Illinois regional data from HSHG 2018-19 and 2013-14 HSHG survey (Valencia, 2015) are compared, several improvements can be articulated particularly for Suburban Cook County children: caries experience was reduced from 61.5% to 39.4%, untreated dental caries from 36.1% to 19.5%, and the presence of dental sealants increased from 18.2% to 43.4%. However, in 2018-19, Suburban Cook County remained as the Illinois public health region with the lowest percentage of children with a dental sealant and the third highest rate of rampant caries, a measure of severity of disease within an individual.

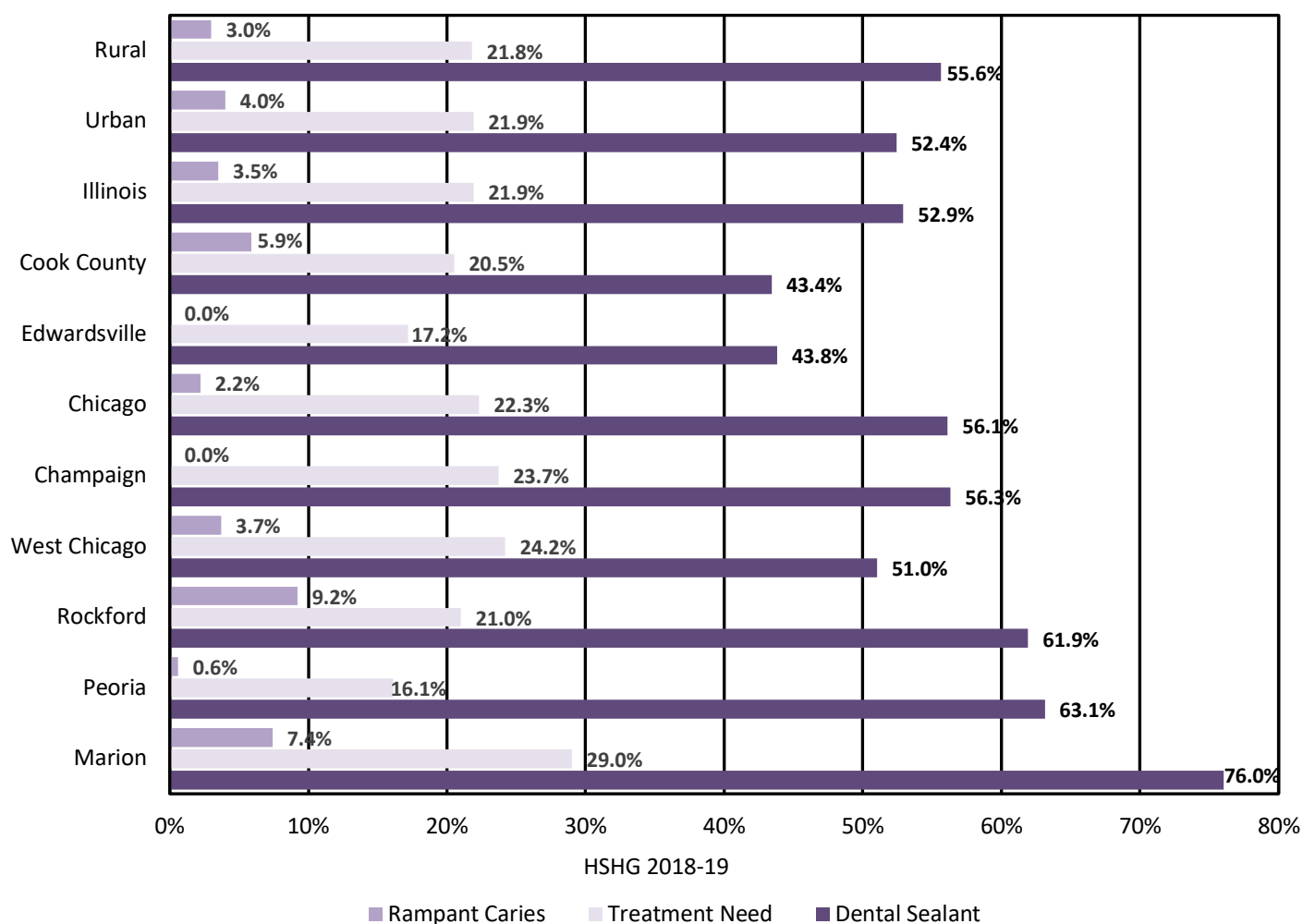
Additional detail for HSHG 2018-19 shows that Marion Public Health Region had the highest percentage of children with a dental sealant at 76.0% and the highest rate of untreated dental caries 29.0% and caries experience (54.5%) and the second-highest rate of rampant caries (7.4%). It is baffling to consider that even with the very high infiltration of dental sealant services, the burden of oral diseases is highest in children living in the Marion region (54.5%, HSHG 2018-19 Tables, see Appendix), demonstrating that even highly successful prevention programs can only go so far to address the overall burden of carious disease. Alternatively, dental disease could become worse in this region, if left without a dental sealant program.

The summary of oral health data by urban/rural and by public health region (Figure 13) is as follows:

- Dental sealant rate for **rural** children is 55.6%, slightly higher than children attending **urban** schools (52.4%) with the treatment need for both at almost 22%. Rampant caries, a measure of severity of disease within individual children, is similar for children attending urban and suburban schools.
- As stated earlier, **Suburban Cook County** is lowest in dental sealant rate, slightly below the statewide average for treatment need (20.5%) with rampant caries rate of 5.9%.
- Children living in the **Edwardsville Public Health Region** had the second-lowest dental sealant rate and the second-lowest treatment need rate at 43.8% and 17.2% respectively.
- **Chicago School District** recorded the average on all indicators of oral health. Access to prevention as reported by presence of dental sealants is 56.1%, treatment need is at 22.3%, and rampant caries rate is 2.2%.
- Children living in the **West Chicago Public Health Region** have the second-highest rate of treatment need (24.2%), lower than the state average for dental sealant (51%) and a rampant caries rate of 3.7%.

- Oral health data from children living in the **Rockford Public Health Region** show better than the statewide average for dental sealant (61.9%), and treatment needs (21.0%). However, the rampant caries rate was the highest of any Illinois region at 9.2%.
- Children living in the **Peoria Public Health Region** record better than average on all indicators of oral health. Access to prevention as reported by presence of dental sealants is second highest for an Illinois region at 63.1%, treatment need is at the lowest for any region at 16.1%, and a rampant caries rate is only 0.6%.
- **Marion Public Health Region**, as stated earlier, has the highest rate of dental sealant (76.0%), the highest rate of treatment need (29.0%) and the second highest rate for rampant caries.

Figure 13. Presence of a Protective Dental Sealant Treatment Need and Rampant Caries (severity) Varies by Where a Child Lives Illinois regions with the highest rates of the protective dental sealants may also have the highest unmet treatment need and high severity of the disease.



BEVERAGE CONSUMPTION

As children increase their intake of sugar-sweetened beverages (SSBs), they may shift away from drinking fluoridated water, putting them at increased risk of dental caries. Therefore, for the first time, the HSHG 2018-19 survey asked parents about the frequency of SSB and water consumption by their child in the previous seven days. Frequency of SSBs and water intake were correlated with clinical findings: untreated dental caries, treated caries, and need for immediate treatment (Figures 14 and 15). Figure 14 shows that children who consumed two or more SSB per day had higher rates of untreated caries, caries experience and need for immediate treatment. A shift in drinking patterns from dental caries protective (fluoridated water) to dental caries enabling (SSB) may explain the very high rates of documented untreated caries and caries experience found in children who frequently consume SSBs.

Figure 14. Dental Caries Increases with Frequency of Sugar-sweetened Beverage Consumption

Measures of untreated caries and caries experience for children who consumed SSBs four or more times per day were more than two times the averages for the state.

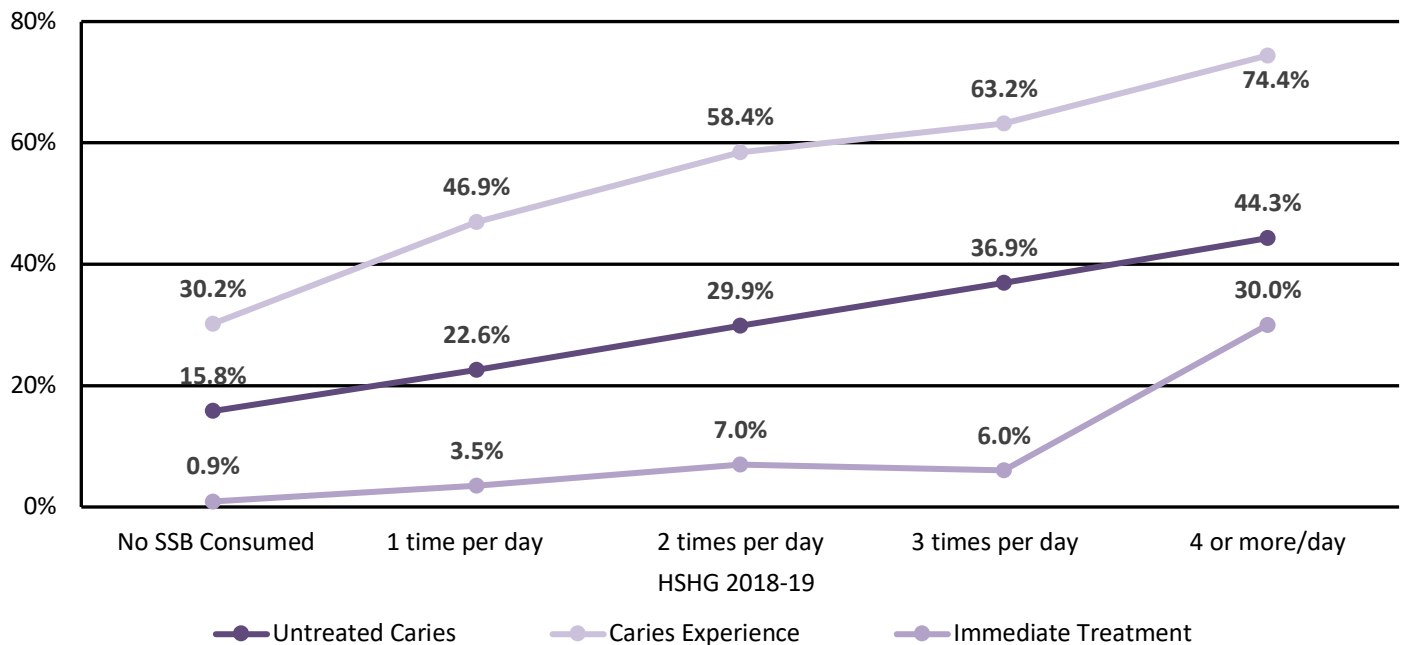
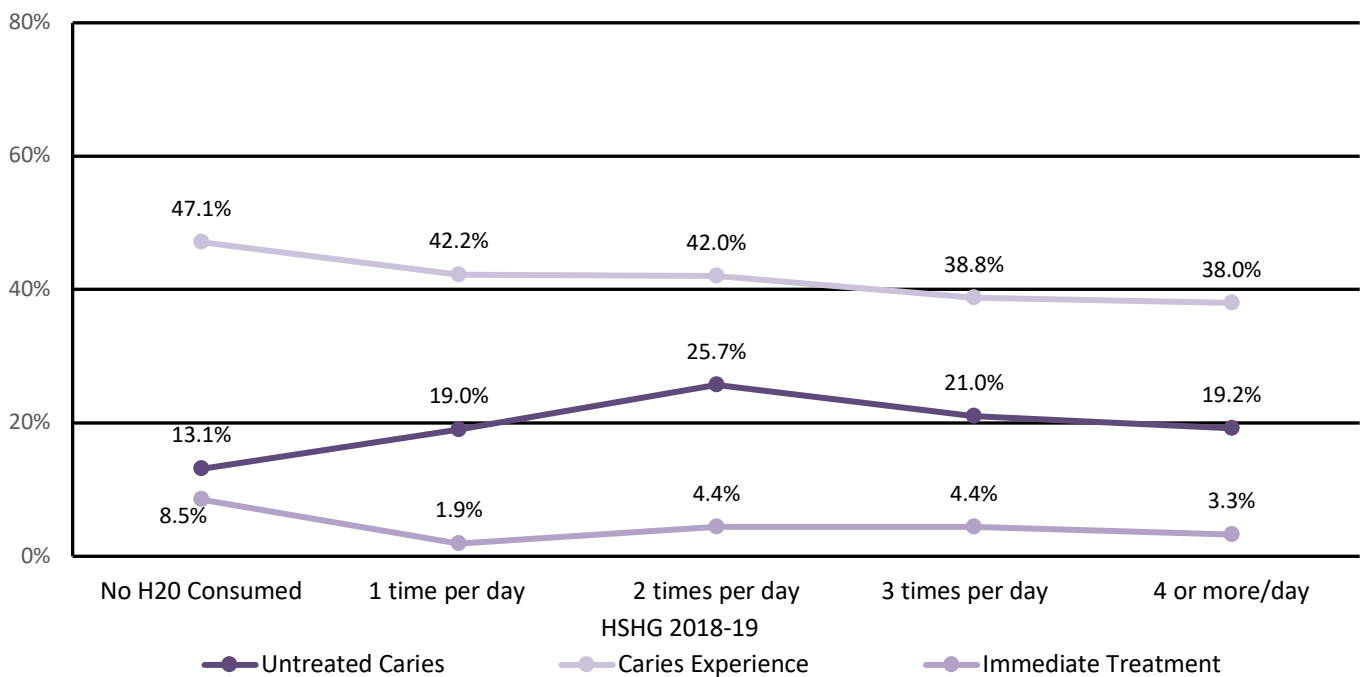


Figure 15 shows data for parent reports of their child's frequency in drinking plain, tap or non-flavored sparkling water. Children who drank no water seem to have a higher risk for immediate treatment need. Drinking water up to four times per day had a small effect on untreated caries, caries experience, and immediate treatment need were observed in this subgroup as compared to overall data for these indicators.

Figure 15. Children Who Drank Water had Lower Rates of Untreated Caries and Caries Experience

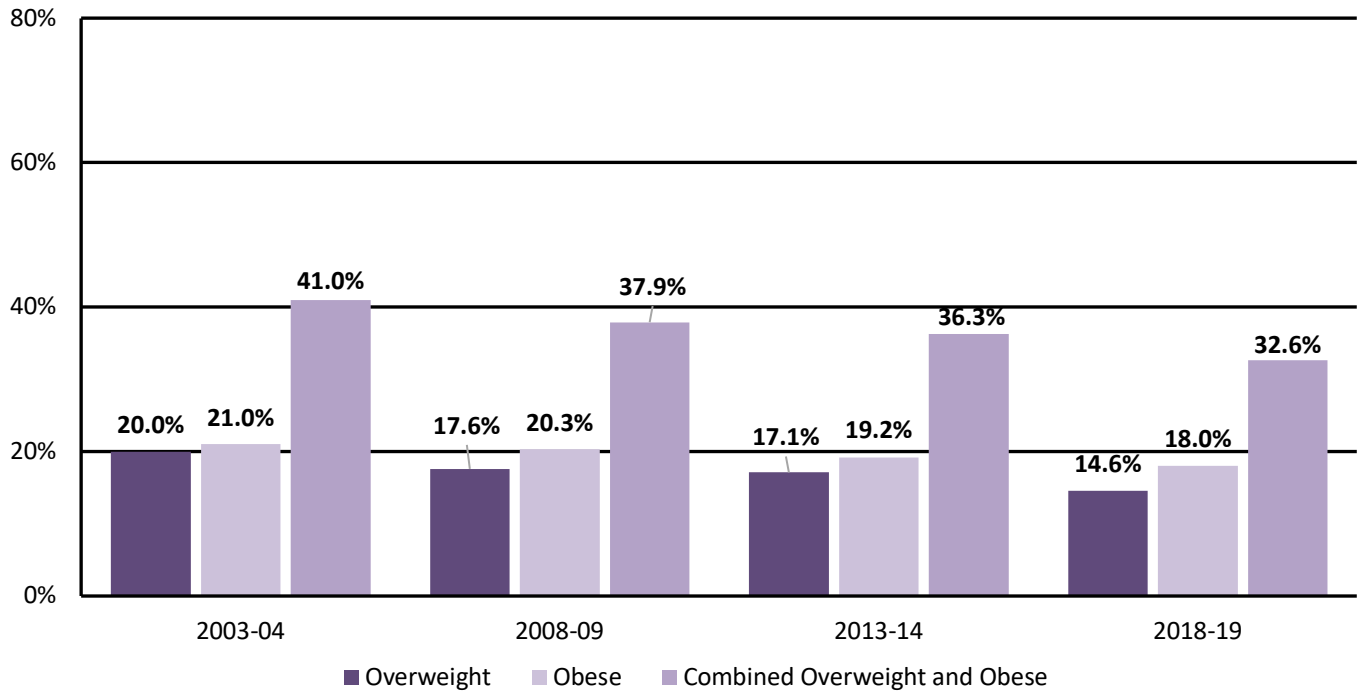
Drinking water, up to four times per day, only had a mild effect on untreated caries, caries experience, and need for immediate care.



BODY MASS INDEX STATUS

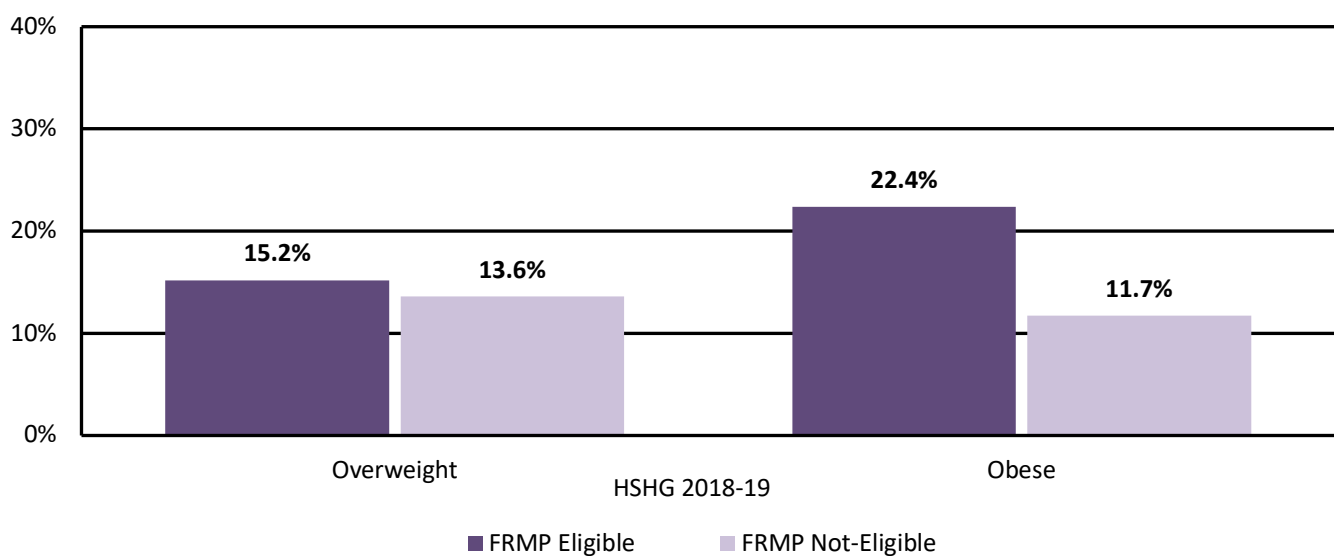
BMI results from the 2018-19 HSHG survey indicate that 18% of Illinois third-grade children attending public schools are obese, and about one of three children (32.6%) are either overweight or obese (Figure 16). Both overweight and obesity in the third-grade student populations have shown steady decreases since 2003.

Figure 16. One in three Children Surveyed Were Overweight or Obese While the percentage of overweight and obese children has decreased, one out of three children surveyed live with excessive weight.



When BMI data are examined by FRMP eligibility (Figure 17), the disparity is startling. Most of the disparity can be attributed in the obesity measure where 22.4% of FRMP eligible children are obese compared to 11.7% of FRMP not-eligible children. When obesity and overweight categories are combined, 37.6% of children who qualify for FRMP are overweight or obese as compared to 25.3% of children who are not eligible for FRMP. Although the overall combination of obesity and overweight trend over the last 15 years has been heading steadily down from a high of 41.0% in 2003-04, it remains higher than the national average of 30.8% (Child & Adolescent Health Measurement Initiative, 2019).

Figure 17. Children who live in Low-income Households are at Increased Risk for Overweight and Obesity. One-third of children were overweight or obese while the overall percentage of overweight and obese children has decreased, one out of three Illinois third-grade children continue to live with excessive weight during the 2018-19 school year.



When the BMI data are examined by race/ethnicity, children with the highest burden of overweight or obesity are Hispanic/Latino children (Figure 18). This rate was higher than recorded in the 2013-14 survey. We also see a large, over a 10 percentage point increase in overweight or obesity in NH Asian as a group. NH Other group consists of diverse population that includes Native Hawaiian, Pacific Islander, American Indian and Alaskan Native children. NH Other scores the second highest when overweight and obesity categories are combined (40.6%). HSHG 2018-19 findings indicate that children from low-income and minority households are more affected by excessive weight.

Figure 18. Race/Ethnicity is a Strong Factor in BMI Status. Hispanic/Latino children continue to be disproportionately challenged with unhealthy combined overweight and obesity.

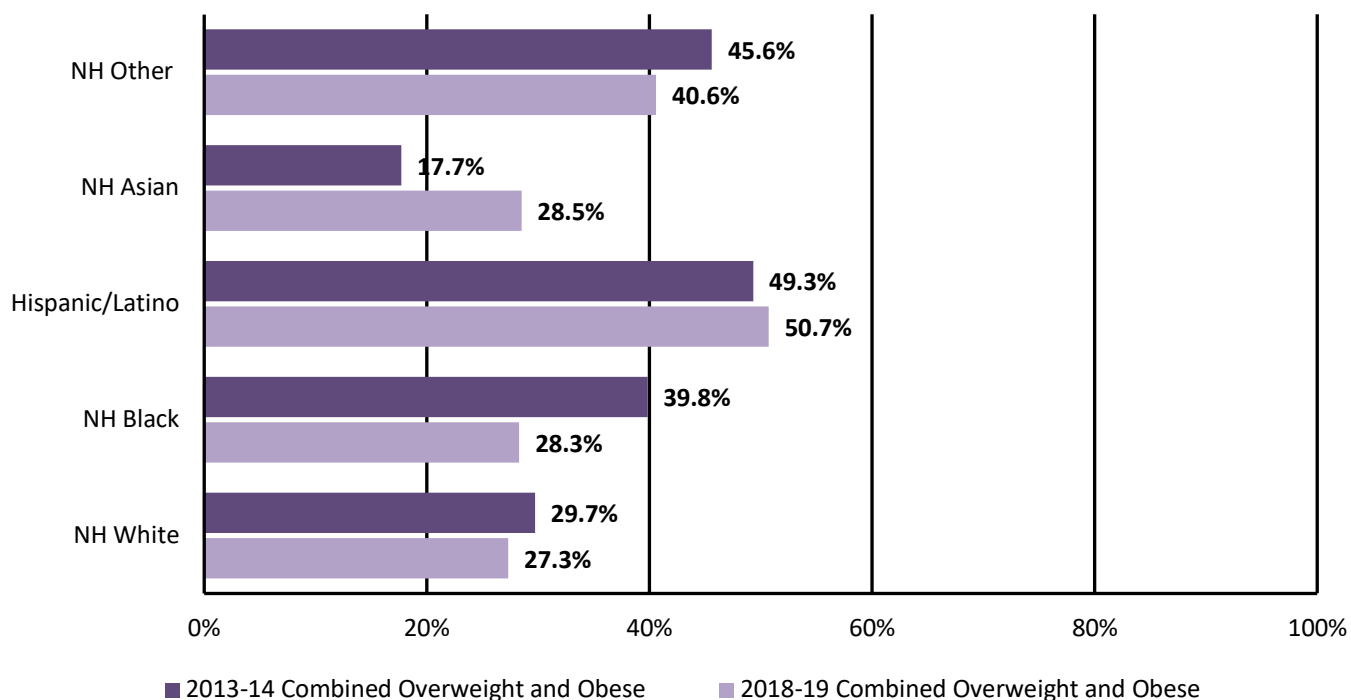
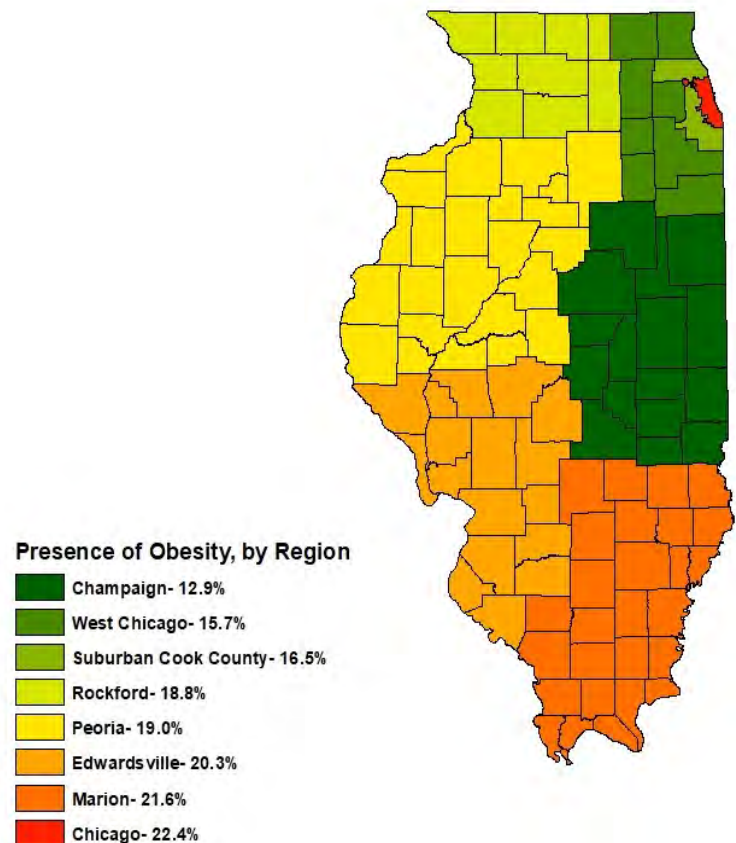


Figure 19 illustrates the large range in child obesity across Illinois Regions. Children living in Chicago experience the highest rate of obesity (22.4%, area indicated in red) and children living in the Champaign Public Health Region have the lowest rate of obesity at 12.9% (area indicated in dark green). When overweight and obesity rates are combined and examined by Illinois Region, the greatest total burden is seen in children attending Chicago Public Schools (38.3%). This is lower than the 44.6% measured in the 2013-14 HSHG survey but is much higher than the average for Illinois (32.6%). Children in urban areas have a higher percent of being overweight and obese than those attending public schools in rural areas, 33.1% vs. 29.8% respectively.

Figure 19. Obesity Varies by Illinois Region. Children attending Chicago public schools experience the greatest burden.



CONCLUSION

Illinois' Healthy Smiles Healthy Growth 2018-19 survey of third-grade children revealed that too many children live with untreated dental caries and the need for immediate care. The findings demonstrate dental decay continues to be a significant problem for Illinois children. The survey also showed some positive trends: the prevalence of dental sealants increased, and caries experience decreased. The finding that all three HP2020 oral health objectives for this age group were met for Illinois is a welcoming sign. However, when these objectives are analyzed by income level, low-income children lag behind HP2020 objectives. Low-income and minority children have a lower prevalence of protective dental sealants, a higher burden of disease, and have significant unmet treatment needs.

As seen in this report, dental caries concentrates in population groups, such as among those who are socioeconomically disadvantaged, are of racial or ethnic minority populations and are geographically isolated. Populations that have limited options to education, prevention services, and corrective treatment services become burdened by a disease that is additive and disproportionate. We need to address these issues at their root with cohesive public health approaches.

Illinois' Healthy Smiles Healthy Growth 2018-19 survey of third-grade children revealed that the overall proportion of third-grade children that are overweight and obese decreased in the 2018-19 survey. However, minority groups continue to live with excessive weight that will have a compounding impact on their overall health. These findings merit approaches directed to lessen the overweight and obesity burden seen by race, income, and location of residence.

Lastly, the Illinois' Healthy Smiles Healthy Growth 2018-19 survey of third-grade children provides important baseline information on children's sugar-sweetened beverage and water consumption behaviors. Building on this knowledge in future surveys will be important and may help address dental disease and obesity conditions.

Gaining health and timely access to services are multifactorial and complex public health issues. Working with an equity focus, we can direct efforts and resources to groups, communities, and regions of Illinois to improve health and overcome disparities. Widespread efforts in education (self-care and understanding of disease processes), health promotion (foundation of health and health behaviors), and access to professional care (evidence-based prevention and treatment therapies) need to be the core of health improvement efforts.

LIMITATIONS

Several limitations should be noted. The survey protocol is minimally invasive and thus did not routinely use dental instrumentation, magnification, or radiographs, which result in an underestimate of untreated decay and caries experience when compared to findings from a comprehensive clinical examination. The survey used trained calibrated screeners to follow HSHG protocols and indicator definitions. However, there may have been differences in clinical judgment that resulted in differences in coding.

School sampling methods were maintained to reflect Illinois demographics, however, as in HSHG 2013-14, Rockford School District, a large school district in the Rockford Public Health Region, declined to participate which may have shifted the sampling design for the Rockford Public Health Region. Data are limited as the results presented here are weighted population estimates rather than raw numbers from the sampled children. Point estimates may differ between HSHG 2018-19 and previous surveys due to sampling error/variation.

RECOMMENDATIONS

The following are recommendations based on the findings in this report:

1. By the time a child achieves third-grade, nearly 1 of 2 children have a history of dental caries. Fluoride varnish coupled with health promotion and prevention-oriented self-care programs led by diverse health care professionals (including primary care providers) needs to be widespread, risk-based and reach all children under the age of 6. This will help in attaining optimal oral health before entering formal school settings.

2. Access to prevention programs needs to be strongly coupled with access to disease treating programs. It is not enough to place dental sealants and fluorides and not address the adjacent tooth in need of a dental filling. It is important to build treatment capacity, strategically, to address regional variation in unmet needs.
3. Since first measured in 2003-04, the dental sealant disparity gap continues to decrease by race/ethnicity, urban/rural and income status. Strategic expansion of prevention programs needs to occur, especially in regions and groups that lag in the statewide average for dental sealants.
4. To further decrease the burden of dental disease, Illinois should continue to build upon the success of existing prevention programs and strive to reach a statewide dental sealant rate of 60% by the next survey period and work to expand use of caries arresting medicaments such as Silver diamine Fluoride for ages.
5. Strategies that focus efforts on healthy weight need to be available, specifically for low-income and minority racial and ethnic groups. A targeted community and policy approaches are needed to achieve the desired outcome of a healthy weight for all.
6. Public health messaging on the increased intake of SSBs should be considered coupled with improving the availability of free fluoridated water as an alternate beverage choice. This has the potential to improve oral disease measures and decrease excessive weight.
7. Nutrition, physical activity and beverage consumption by young children are important factors in maintaining health and weight. Information on children's sugar-sweetened beverage and water consumption behaviors should be included in future surveys to better understand opportunities to intervene in the progression of dental disease and obesity conditions.
8. The Principal at each participating school should use the individualized school report as a call to action to improve the health and wellbeing of their student population. By recognizing, understanding and acting on the health care needs of their student body, principals can directly impact student health and academic outcomes.

Surveillance activities such as HSHG 2018-19 seek to inform professionals, public, and policymakers to institute targeted policy, programmatic improvements, and expansions that address important health issues. Data presented here should help state and local, public and private partners formulate programmatic and policy strategies to address the health care needs of all Illinois children.

APPENDIX

HSHG 2018-19 CONSENT FORM AND SURVEY INSTRUMENT

Please complete this form and return it to your child's teacher. Thank you.

Child's Name: _____

YES, I give permission for my child to (check all that apply)

- ☐ have her/his teeth checked.
☐ have her/his height & weight taken.

No, I do not give permission for my child to (check all that apply)

- ☐ have her/his teeth checked.
☐ have her/his height & weight taken.

Signature of Parent or Guardian: _____ Date: _____

Child's Date of Birth: ____/____/____ Child's Gender: ☐ Female ☐ Male

Child's Race (circle all that apply):

- | | |
|-------------------------------------|--|
| 1 - Black / African American | 4 - Asian |
| 2 - White / Caucasian | 5 - Native Hawaiian / Pacific Islander |
| 3 - American Indian / Alaska Native | 6 - Other |

Child's Ethnicity (circle one): 1 - Hispanic 2 - Non-Hispanic

What is the primary language spoken at home? _____

Is your child eligible for the free or reduced price school lunch program? (Check one)

- ☐ No ☐ Yes ☐ Don't know

Please answer the following questions. Your answers will remain private and will not be shared.

These questions are optional. You may answer all, any, or none of them.

If you do not want to answer the questions, you may still give permission for your child to have his or her teeth checked.

1. Do you have any kind of insurance that pays for some or all of your child's DENTAL CARE? Include health insurance obtained through employment or purchased directly as well as government programs like Medicaid. (Check one)

- ☐ No ☐ Yes ☐ Don't know

2. How would you describe the condition of your child's teeth? (Check one)

- ☐ Excellent ☐ Very Good ☐ Good
☐ Fair ☐ Poor

3. During the past 6 months, did your child have dental pain more than once when eating or chewing? (Check one)

- ☐ No ☐ Yes ☐ Don't know

4. During the past 12 months, did your child see a dentist for any kind of dental care, including check-ups, dental cleanings, X-rays, or filling cavities? (Check one)

- ☐ No ☐ Yes ☐ Don't know

5. During the past 12 months, was there any time when your child NEEDED dental care (including check-ups) but didn't get it because you couldn't afford it? (Check one)

- ☐ No ☐ Yes ☐ Don't know

6. During the past 12 months, did your child have a toothache, decayed teeth, or unfilled cavities? (Check one)

- ☐ No ☐ Yes ☐ Don't know

7. Do you have any concerns about your child's dental health or their ability to get dental care?

(Write any concerns on the back of this form)

8. During the past 7 days, how many times did your child drink a bottle or glass of plain water? Count tap, bottled, and unflavored sparkling water. (Check one)

- ☐ Did not drink plain water in the past 7 days
☐ 1 to 3 times in the past 7 days
☐ 4-6 times in the past 7 days
☐ 1 time per day ☐ 2 times per day
☐ 3 times per day ☐ 4 or more times per day

9. During the past 7 days, how many times did your child drink a can, bottle, or glass of soda or pop, lemonade, sweetened tea or coffee drinks, energy drinks, or other sugary drinks, such as Coke, Pepsi, Snapple, Red Bull, or Sunny Delight? (Check one)

- ☐ Did not drink sugary drinks in the past 7 days
☐ 1 to 3 times in the past 7 days
☐ 4-6 times in the past 7 days
☐ 1 time per day ☐ 2 times per day
☐ 3 times per day ☐ 4 or more times per day

OFFICE USE ONLY: Student ID Number

HSHG 2018-19 DATA COLLECTION FORM

Oral Health Screening Form 2018-2019

IF THIS DOCUMENT IS FILLED OUT, THIS MEANS THE STUDENT HAS GIVEN VERBAL ASSENT TO BE SCREENED

Screen Date (mm/dd/yy) ____/____/____	School ID _____	Student ID _____	Screener's Initials _____
Date of Birth (mm/dd/yy) ____/____/____	Gender (circle one) 1 - Male 2 - Female	Primary language spoken at home? _____	
Race (circle all that apply) 1 - Black / African American 2 - White / Caucasian 3 - American Indian / Alaska Native 4 - Asian 5 - Native Hawaiian / Pacific Islander 6 - Other		Ethnicity (circle one) 1 - Hispanic 2 - Non-Hispanic	
Height (nearest ¼ in) _____		Weight (nearest 10 th of a lb) _____	
Untreated Decay / Cavitated Lesion 0 - No 1 - Yes	At least ½ mm of tooth structure loss at the enamel surface. This applies to pit and fissure as well as those on smooth surfaces. If retained root, assume that the whole tooth was destroyed by caries. Broken or chipped teeth, plus teeth with temporary fillings, are considered sound unless a cavitated lesion is also present.		
Treated Decay 0 - No 1 - Yes	A filling (temporary/permanent, OR a tooth is missing because it was extracted as a result of caries OR missing permanent first molars.		
Sealants on Permanent First Molars 0 - No 1 - Yes	Treatment? Early 2 - Urgent		
Code/Category	Criteria		
1 - No obvious problem	No problems observed		
2 - Early dental care is needed	Cavitated lesion without accompanying signs of symptoms. Suspicious white or red soft tissue areas.		
3 - Immediate dental care is needed	Signs or symptoms that include pain, infection, or swelling.		
Rampant decay 0 - No 1 - Yes	Individual has seven or more teeth with untreated and/or treated decay		
Comments: 			

HSHG 2018-19 TABLES

Table 1. Basic Screening Survey Measures and Definitions for HSHG 2018-19, Illinois	
Basic Screening Survey Measures	Definition
Untreated Dental Caries (Decay)	The presence of dental caries in which the screener can readily observe the breakdown of the enamel surface. Only cavitated lesions with at least ½mm of tooth structure loss were considered untreated decay.
Treated Caries (Decay)	The presence of any type of filling, including a temporary filling. Teeth that were extracted due to dental decay were also included.
Caries Experience	Children with treated decay, untreated decay, or both.
Dental Sealants on Permanent Molars	The presence of at least one sealant on a permanent first molar. The sealant can cover all or part of the pits or fissures or it can be partially lost.
Treatment Need for Dental Care Early Care Immediate Care	Children with no observed problems were classified as having no treatment needs. Children with cavitated lesions without accompanying signs or symptoms were coded as having early dental care needs. Children with signs or symptoms that included pain, infection or swelling were coded as having immediate treatment needs.
Rampant Caries	Children with seven or more teeth with untreated and/or treated decay.
Height	The stature of the child was recorded to the nearest 0.25 inches (rounded up to the nearest quarter).
Weight	Weight measures were recorded to the nearest 10th of a pound (000.0).

Table 2. Body Mass Index (BMI) Categories and Definitions, CDC	
BMI Category	Definition
Underweight	BMI at or below 5th Percentile
Healthy Weight	BMI between the 5th and 85th percentiles
Overweight	BMI between 85th and 95th percentiles
Obese	BMI at or above the 95th percentiles

Table 3. Demographic Characteristics of Participating Third-grade Children, HSHG 2018-19, N=2,921

Variable	N (Percent of Sample)
Gender	
Male	1,360 (46.5)
Female	1,454 (49.8)
Age	
8 years	1460 (50.1)
9 years	1426 (49.0)
10 years	21 (0.7)
Mean (SD)	9.0 (0.4)
Race/Ethnicity	
NH White	1,323 (46.2)
NH Black	418 (14.6)
NH Asian	147 (5.1)
NH Other or Multi-Racial	618 (21.6)
Hispanic	360 (12.6)
Urbanicity	
Urban	2,487 (84.2)
Rural	467 (15.8)
Illinois Public Health Region	
Chicago	21.1
Suburban Cook County	18.7
West Chicago (collar counties)	28.4
Rockford	6.3
Peoria	7.4
Champaign	7.4
Edwardsville	7.4
Marion	3.2
Income & Insurance	
Eligible for FRMP	1319 (54.7)
FRMP Unknown	510 (14.8)
Have Dental Insurance	2,278 (77.1)

For Tables 4-11: Prevalence estimates and 95% Confidence Intervals (CI)s are provided for selected health status indicators in the following tables; the percentages have been weighted to be representative of all third-grade children attending public schools in Illinois. These indicators were stratified by demographic characteristics of interest when possible. Please note that confidence intervals that include the value “0” and are large in the range should be interpreted with caution as the stated value may not be precise and maybe 0.

Table 4. Oral Health Status of Illinois' Third-grade Children, Overall, HSHG 2018-19	
Variable	Weighted Percent (95% CI)
Untreated Dental Caries	22.2 (19.1-25.2)
Treated Decay	30.1 (27.5-32.6)
Caries Experience	41.6 (38.7-44.6)
Dental Sealants	53 (49.0-57.1)
Total Treatment Need	21.7 (18.7-24.7)
Early Need	17.7 (15.2-20.2)
Immediate Need	4.0 (2.8-5.2)
Rampant Caries	3.5 (2.6-4.4)

Table 5. Oral Health and BMI-For-Age Status of Illinois Third-grade Children by Gender, HSHG 2018-19		
Variable	Male Weighted Percent (95% CI)	Female Weighted Percent (95% CI)
Untreated Dental Caries	22.7 (18.9-26.4)	22.0 (18.6-25.4)
Treated Decay	30.4 (27.0-33.9)	29.9 (26.8-33.1)
Caries Experience	42.2 (38.1-46.3)	41.6 (38.1-45.0)
Dental Sealants	53.9 (48.7-59.0)	51.8 (47.7-56.0)
Total Treatment Need		
Early Need	19.6 (16.4-22.9)	16.3 (13.5-19.1)
Immediate Need	3.0 (1.7-4.4)	4.8 (3.1-6.4)
Rampant Caries	3.9 (2.7-5.1)	3.1 (2.1-4.2)
Overweight	15.1 (12.8-17.4)	15.1 (13.1-17.2)
Obese	21.1 (18.0-24.1)	16.4 (13.4-19.4)

Table 6. Oral Health and BMI-For-Age Status of Illinois Third-grade Children by Race/Ethnicity, HSHG 2018-19

Variable	NH White Weighted Percent (95% CI)	NH Black Weighted Percent (95% CI)	Hispanic/Latino Weighted Percent (95% CI)	NH Asian Weighted Percent (95% CI)	NH Other Weighted Percent (95% CI)
Untreated Dental Caries	18.8 (14.4-23.3)	26.7 (19.7-33.8)	22.3 (16.2-28.5)	28.8 (19.1-38.4)	23.3 (18.0-28.6)
Treated Decay	27.3 (23.7-30.9)	22.9 (18.0-27.9)	42.0 (36.0-48.1)	35.1 (24.3-45.9)	34.8 (30.0-39.6)
Caries Experience	36.8 (32.5-41.2)	40.2 (32.9-47.6)	52.2 (47.4-56.9)	48.8 (38.5-59.1)	45.5 (40.1-50.9)
Dental Sealants	57.3 (52.5-62.1)	45.7 (37.4-54.0)	49.2 (38.5-59.8)	49.0 (36.8-61.2)	54.0 (47.8-60.2)
Total Treatment Need	18.7 (14.2-23.2)	26.3 (19.2-33.4)	21.4 (15.0-27.7)	29.5 (19.3-39.6)	22.1 (16.9-27.3)
Early Need	15.4 (12.2-18.6)	18.8 (12.4-25.2)	18.8 (12.6-25.0)	25.0 (15.8-34.2)	19.3 (14.1-24.5)
Immediate Need	3.3 (1.5-5.1)	7.5 (3.9-11.2)	2.6 (0.9-4.2)	4.5 (0.0-9.3)	2.7 (1.2-4.3)
Rampant Caries	2.9 (1.5-4.3)	2.7 (1.1-4.4)	5.5 (2.5-8.5)	8.0 (1.6-14.5)	3.4 (2.0-4.8)
Overweight	13.6 (11.3-15.8)	13.5 (10.3-16.7)	20.5 (15.2-25.8)	18.9 (10.7-27.1)	14.6 (11.1-18.0)
Obese	13.7 (11.1-16.2)	14.8 (11.1-8.4)	30.2 (21.8-38.7)	9.6 (5.5-13.7)	26.0 (21.8-30.2)

Table 7. Oral Health and BMI-For-Age Status of Illinois Third-grade Children by Frequency of Sugar-sweetened Beverage (SSB) Consumption, HSHG 2018-19

Variable (N=2,921)	No SSB in 7 days		1 time per day		2 times per day		3 times per day		4 or more/day	
	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)
Untreated Dental Caries	15.8	(11.9-19.7)	22.6	(15.1-30.0)	29.9	(19.9-39.9)	36.9	(17.8-55.9)	44.3	(22.7-65.9)
Treated Decay	23.6	(18.9-28.3)	32.1	(24.5-39.7)	45.9	(35.5-56.3)	40.7	(22.2-59.2)	43.3	(21.3-65.3)
Caries Experience	30.2	(24.9-35.6)	46.9	(38.9-55.0)	58.4	(49.9-67.0)	63.2	(45.0-81.4)	74.4	(57.2-91.7)
Dental Sealant	58.1	(51.0-65.1)	49.0	(40.1-57.8)	52.2	(40.3-64.2)	50.5	(32.4-68.5)	53.4	(31.5-75.3)
Total Treatment Need	15.4	(11.7-19.1)	23.0	(15.6-30.3)	26.2	(15.5-36.9)	36.9	(17.8-55.9)	44.3	(22.7-65.9)
Early Need	14.5	(10.6-18.3)	19.5	(12.7-26.2)	19.2	(9.2-29.1)	30.8	(12.5-49.2)	14.3	(2.4-26.3)
Immediate Need	0.9	(0.0-1.8)	3.5	(0.9-6.1)	7.0	(1.8-12.3)	6.0	(0.0-14.3)	30.0	(7.0-52.9)
Rampant Caries	1.3	(0.4-2.3)	3.6	(1.3-5.8)	5.2	(0.1-10.3)	2.4	(0.0-5.9)	1.9	(0.0-5.6)
Overweight	16.0	(11.5-20.6)	16.8	(11.8-21.8)	11.2	(4.7-17.7)	7.0	(0.0-14.4)	21.6	(4.2-39.1)
Obese	10.5	(6.6-14.5)	21.9	(16.0-27.8)	23.0	(15.1-30.9)	28.3	(10.4-46.2)	25.9	(6.8-44.9)

Table 8. Oral Health and BMI-For-Age Status of Illinois Third-grade Children by Frequency of Water Consumption, HSHG 2018-19

Variable (N=2,921)	No H ₂ O in 7 days		1 time per day		2 times per day		3 times per day		4 or more/day	
	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)	Weighted Percent	(95% CI)
Untreated Dental Caries	13.1	(0.0-26.4)	19.0	(12.2-25.7)	25.7	(18.9-32.4)	21.0	(14.8-27.1)	19.2	(15.3-23.2)
Treated Decay	37.9	(17.3-58.6)	36.0	(27.9-44.2)	28.8	(22.8-34.7)	27.8	(23.2-32.4)	27.7	(23.8-31.6)
Caries Experience	47.1	(25.4-68.9)	42.2	(33.9-50.4)	42.0	(35.0-48.9)	38.8	(32.4-45.2)	38.0	(33.5-42.5)
Dental Sealant	44.9	(22.7-67.1)	56.6	(46.8-66.3)	55.7	(48.7-62.8)	57.2	(50.3-64.0)	53.6	(47.2-59.9)
Total Treatment Need	13.1	(0.0-26.4)	17.5	(11.0-24.0)	25.6	(18.8-32.3)	20.8	(14.9-26.7)	18.2	(14.2-22.1)
Early Need	4.6	(0.0-11.5)	15.6	(8.9-22.4)	21.1	(15.1-27.2)	16.4	(12.2-20.7)	14.9	(11.2-18.6)
Immediate Need	8.5	(0.0-19.2)	1.9	(0.0-3.8)	4.4	(1.4-7.4)	4.4	(1.5-7.2)	3.3	(1.6-5.0)
Rampant Caries	7.2	(0.0-16.4)	4.1	(1.0-7.2)	4.6	(2.1-7.1)	3.2	(1.2-5.1)	1.9	(0.9-2.8)
Overweight	7.4	(0.0-18.7)	12.0	(7.5-16.5)	9.7	(6.6-12.9)	16.6	(11.9-21.4)	16.6	(13.4-19.8)
Obese	38.0	(14.6-61.4)	14.7	(9.3-20.0)	17.8	(13.2-22.4)	19.0	(14.7-23.3)	17.5	(13.5-21.5)

Table 9. Frequency of Water and Sugar-sweetened Beverage (SSB) Consumption of Illinois Third-grade Children by Race/Ethnicity, HSHG 2018-19

Variable	NH White Weighted Percent (95% CI)	NH Black Weighted Percent (95% CI)	Hispanic/Latino Weighted Percent (95% CI)	NH Asian Weighted Percent (95% CI)	NH Other Weighted Percent (95% CI)
Water Consumption					
No Water in 7 Days	20.7 (0.7-40.6)	44.1 (15.1-73.1)	7.1 (0.0-15.5)	--	28.2 (4.8-51.6)
1 Time per Day	53.3 (44.9-61.6)	9.3 (3.7-15.0)	8.5 (4.0-13.0)	3.2 (1.0-5.4)	25.7 (18.9-32.4)
2 Times per Day	53.1 (46.2-60.1)	14.2 (7.8-20.6)	8.9 (5.0-12.7)	3.6 (1.4-5.9)	20.1 (15.0-25.3)
3 Times per Day	49.1 (42.5-55.7)	15.5 (9.9-21.2)	15.4 (10.6-20.1)	2.9 (1.2-4.7)	17.1 (12.7-21.5)
4 or More Times per Day	44.2 (38.4-49.9)	16.9 (11.6-22.2)	8.6 (5.2-12.0)	7.6 (3.8-11.4)	22.8 (18.6-27.0)
SSB Consumption					
No SSB in 7 Days	53.6 (47.4-59.9)	8.7 (4.6-12.9)	9.7 (5.0-14.4)	10.0 (5.3-14.6)	18.0 (13.5-22.4)
1 Time per Day	34.0 (26.8-41.2)	18.3 (10.6-26.1)	17.3 (10.4-24.2)	2.6 (0.3-5.0)	27.7 (20.7-34.7)
2 Times per Day	37.6 (26.5-48.7)	22.9 (11.7-34.0)	12.6 (5.8-19.5)	4.4 (0.9-9.5)	22.5 (12.9-32.2)
3 Times per Day	41.3 (23.5-59.0)	32.5 (12.5-52.4)	4.9 (0-10.6)	--	21.4 (6.8-35.9)
4 or More Times per Day	17.6 (2.1-33.0)	50.2 (26.3-74.0)	2.0 (0-6.2)	--	30.2 (7.7-52.7)

Table 10. Oral Health and BMI-For-Age Status of Illinois Third-grade Children Stratified by Eligibility for Free and Reduced Priced Meal Program (FRMP), HSHG 2018-19

Variable	Eligible-FRMP Weighted Percent (95% CI)	Not FRMP Eligible Weighted Percent (95% CI)
Untreated Dental Caries	26.7 (22.9-30.5)	15.6 (11.5-19.8)
Treated Decay	35.1 (31.8-38.3)	23.7 (20.1-27.2)
Caries Experience	48.9 (45.0-52.8)	32.0 (27.8-36.1)
Dental Sealants	51.2 (45.7-56.6)	56.8 (50.9-62.7)
Total Treatment Need	26.2 (22.5-29.9)	15.5 (11.4-19.6)
Early Need	20.6 (17.4-23.8)	12.6 (9.6-17.5)
Immediate Need	5.6 (3.9-7.2)	2.0 (0.7-3.2)
Rampant Caries	3.7 (2.5-4.9)	3.3 (1.9-4.8)
Overweight	15.2 (12.7-17.7)	13.6 (10.9-16.4)
Obese	22.4 (19.5-25.3)	11.7 (8.9-14.4)

Table 11. Oral Health and BMI-For-Age Status of Illinois Third-grade Children by Illinois Public Health Regions, HSHG 2018-19

Variable	Chicago Weighted Percent (95% CI)	Suburban Cook Weighted Percent (95% CI)	West Chicago Weighted Percent (95% CI)	Rockford Weighted Percent (95% CI)	Peoria Weighted Percent (95% CI)	Champaign Weighted Percent (95% CI)	Edwardsville Weighted Percent (95% CI)	Marion Weighted Percent (95% CI)	Urban Weighted Percent (95% CI)	Rural Weighted Percent (95% CI)	Total Weighted Percent (95% CI)
Untreated Dental Caries	24.9 (18.5- 31.4)	19.5 (14.7- 24.3)	24.2 (18.9- 29.5)	21.0 (9.7-32.2)	16.1 (7.8-24.3)	24.8 (3.3-46.4)	17.2 (7.8-26.6)	29.0 (9.8-48.2)	22.4 (19.4- 25.5)	21.8 (10.8- 32.7)	22.3 (19.3- 25.4)
Treated Decay	24.8 (17.9- 31.6)	29.3 (25.5- 33.0)	34.9 (30.7- 39.2)	40.5 (23.9- 57.2)	20.0 (11.3- 28.8)	22.9 (10.7-35.2)	32.1 (25.7-38.5)	44.3 (35.7- 53.0)	29.4 (26.4- 32.3)	34.8 (29.4- 40.1)	30.2 (27.6- 32.8)
Caries Experience	40.8 (34.5- 47.0)	39.4 (34.5- 44.3)	46.9 (42.6- 51.3)	46.0 (27.5- 64.4)	30.0 (19.0- 40.9)	35.9 (17.6-54.2)	41.0 (30.6-51.4)	54.5 (40.4- 68.5)	41.5 (38.4- 44.6)	44.3 (35.1- 53.4)	41.6 (38.9- 44.8)
Dental Sealants	56.1 (45.8- 66.4)	43.4 (33.6- 53.3)	51.0 (44.2- 57.7)	61.9 (51.9- 71.9)	63.1 (45.8- 80.4)	56.3 (38.4-74.2)	43.8 (34.5-53.1)	76.0 (64.7- 87.3)	52.4 (47.8- 57.0)	55.6 (50.2- 61.1)	52.9 (48.8- 56.9)
Total Treatment Need	22.3 (16.2- 28.4)	20.5 (15.0- 26.0)	24.1 (18.7- 29.5)	21.0 (9.5-32.5)	16.1 (7.8-24.3)	23.7 (1.9-45.6)	17.2 (7.8-26.6)	28.5 (9.9-47.1)	21.9 (18.8- 24.9)	21.8 (10.9- 32.7)	21.9 (18.8- 24.9)
Early Need	19.3 (14.0- 24.6)	15.9 (12.0- 19.8)	20.5 (15.4- 25.5)	14.7 (5.6-23.8)	13.1 (5.0-21.1)	15.8 (1.1-30.4)	15.7 (7.7-23.8)	24.8 (8.7-40.9)	17.8 (15.3- 20.4)	18.2 (9.9-26.4)	17.9 (15.4- 20.4)
Immediate Need	3.0 (0.5-5.5)	4.5 (1.3-7.8)	3.7 (2.1-5.2)	6.3 (3.3-9.3)	3.0 (0.0-6.1)	8 (0.0-16.4)	1.5 (0.0-3.4)	3.7 (0.0-11.1)	4.0 (2.8-5.3)	3.6 (0.2-7.1)	4.0 (2.8-5.1)
Rampant Caries	2.2 (0.7-3.7)	5.9 (3.0-8.8)	3.7 (2.1-5.3)	9.2 (4.9-13.5)	0.6 (0.0-1.9)	0.0 (0.0)	0.0 (0.0)	7.4 (0.0-15.5)	3.6 (2.6-4.5)	3.0 (1.3-4.8)	3.5 (2.6-4.4)
Overweight	15.9 (13.4- 18.3)	13.6 (10.7- 16.5)	16.4 (13.6- 19.2)	10.3 (4.7-16.0)	14.7 (7.2-22.1)	16.9 (12.1-21.7)	9.4 (3.4-15.5)	12.0 (7.6-16.5)	15.1 (13.5- 16.6)	11.9 (8.4-15.4)	14.6 (13.2- 16.0)
Obese	22.4 (16.5- 28.4)	16.5 (13.6- 19.3)	15.7 (12.9- 18.4)	18.8 (14.4- 23.2)	19.0 (10.6- 27.6)	12.9 (7.7-18.2)	20.3 (9.2-31.4)	21.6 (5.1-38.0)	18.0 (15.9- 20.2)	17.9 (12.7- 23.1)	18.0 (16.0- 20.0)

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