STATE OF IOWA DEPARTMENT OF

Health AND Human SERVICES

2022 Iowa Third Grade Oral Health Survey Report

August 2022

Acknowledgements

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Glossary

Decay: Readily observable breakdown of a tooth's enamel surface (cavitated lesion) or dark pits or fissures of primary (baby) molars.

Demineralization: Tooth enamel, adjacent or close to the soft tissue margin, appearing chalky and white. No clinically visible or irreversible loss of enamel or break in enamel surface is present.

Filled Teeth: The presence of any type of restoration, including a temporary filling, or a tooth that is missing because of extraction as the result of tooth decay.

Sealed Teeth: The presence of any type of dental sealant on a permanent molar.

History of Decay: The presence of decayed and/or filled teeth.

Referral Need (refer to Appendix E):

- **Immediate**: Child has suspected abscess, pain, or large amount of decay;
- **Within 3 Months**: Child does not meet any of the above criteria and (a) has suspected decay or (b) dark pits or fissures on primary (baby) molars;
- **Within 6 Months**: Child does not meet any of the above criteria and has any of the following: (a) demineralization, (b) poor oral hygiene practices, (c) deep tooth pits or fissures, (d) restorations, (e) orthodontia (has braces or tooth irregularities), (f) dry mouth, (g) qualifies for Medicaid or Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), or free and reduced lunch, (h) has less than annual dental visits, or (i) has frequent exposure to juice or sugar/carbohydrates;
- **Within 12 Months**: Child does not meet any of the above criteria and has shallow tooth grooves, fluorosis, and no history of decay (no filled or decayed teeth).

Metropolitan: (1) Having at least one urbanized area of 50,000 population or more and (2) may include adjacent counties with a minimum of 25% of workers commuting to the central counties of the metropolitan statistical area. As of 2020 in Iowa, these counties are: Benton, Black Hawk, Boone, Bremer, Dallas, Dubuque, Grundy, Guthrie, Harrison, Jasper, Johnson, Jones, Linn, Madison, Mills, Polk, Pottawattamie, Scott, Story, Warren, Washington and Woodbury.

Micropolitan: (1) Having at least one urban cluster of 10,000 or more but less than 50,000 population and (2) may include adjacent counties with a minimum of 25% of workers commuting to the central counties of micropolitan statistical area. As of 2020 in Iowa, these counties are: Buena Vista, Carroll, Cerro Gordo, Clay, Clinton, Davis, Des Moines, Dickinson, Jefferson, Keokuk, Lee, Mahaska, Marion, Marshall, Muscatine, Wapello, Webster and Worth.

Rural: (1) Not having an urban cluster of 10,000 population or more and (2) having less than 25% of workers commuting to central counties of micropolitan or metropolitan areas. As of 2020 in Iowa, these are the remaining 60 counties not listed in the metropolitan or micropolitan descriptions.

Percent Change (percent increase/decrease): is calculated by subtracting the original value from the new value and dividing the difference by the original value. For example, if a rate changed from 53% (original) to 46% (new), the percent change would be (.46 - .53) = -.07 / .53 = -13%, equaling a 13% decrease.

List of Acronyms

DOE ..... Iowa Department of Education

HHS ..... Iowa Department of Health and Human Services

MCAH ..... Maternal, Child and Adolescent Health

Report

Introduction

A child's oral health is an important factor in overall health, school readiness, and even self-esteem. In Iowa, the I-Smile™ and I-Smile™ @ School programs work to assure optimal oral health for children by facilitating access to care and providing preventive services for at-risk children and families. I-Smile™ @ School provides preventive dental services to children ages 6-14 with parental consent attending schools with free-reduced lunch rates of 40% or greater.

The Iowa Department of Public Health coordinated an oral health survey of children enrolled in selected Iowa third grade classrooms from October 1, 2021 through May 31, 2022. (In July, the Departments of Public Health and Human Services merged to form what is now known as the Iowa Department of Health and Human Services.) This report describes the importance, survey methods and results of this oral health survey, in addition to the impact of I-Smile™ on children's oral health in Iowa.

Background

Oral health surveys provide an understanding about oral health status and dental disease prevalence among a selected population. Understanding the prevalence of dental decay is crucial, as it is the most common chronic illness among children and affects a child's ability to eat, sleep, learn, and function at their full potential at home and school.[1,2] Dental decay can be painful and is irreversible. Unless properly treated, decay leads to infection of the teeth and gums, ultimately leading to tooth loss or infections in other areas of a child's body. Additionally, the aesthetics of dental decay can negatively affect a child's social development and self-esteem.[2] Furthermore, dental decay can influence a child's school attendance and performance.[3]

The Department of Health and Human Services (HHS) manages the I-Smile™ program, which includes I-Smile™@ School, to assure optimal oral health of Iowa's children, especially those at highest risk for dental disease. As the oral health component of the statewide Title V Maternal, Child, and Adolescent Health (MCAH) program, I-Smile™ connects children and families with dental, medical and community resources to ensure a lifetime of health and wellness. Each of Iowa's 23 local Title V MCAH contractors has a dental hygienist who serves as the I-Smile™ Coordinator for designated service areas and manages the I-Smile™ @ School program. The coordinators carry out I-Smile™ @ School strategies, focusing on preventing dental disease through dental screenings, fluoride varnish applications, and dental sealant applications; identifying ways to help families receive care from dentists; and promoting the importance of oral health within the communities they serve.

I-Smile™ @ School prioritizes serving children who may face barriers to receiving dental care, including those with Medicaid health and dental coverage, those uninsured, or those that are underinsured. I-Smile™ @ School serves 92 of Iowa's 99 counties; similar programs exist in the other seven (Polk, Dallas, Wapello, Keokuk, Scott, Clinton and Jackson Counties).

This is Iowa's fourth third grade oral health survey, with the most recent prior survey completed in 2016[4]. The results from the 2022 third grade oral health survey allow for comparison across 6, 10 and 16 years and among demographic populations, as well as the ability to consider impact of I-Smile™ and I-Smile™ @ School. Available resources, such as the I-Smile™ @ School infrastructure and requirements, partnerships, and consistent and meaningful data collection, resulted in minimal additional staff time or funding needed to complete this survey.

Objectives

This oral health survey fulfilled two important goals:

1. To acquire an understanding of dental disease prevalence among third grade children enrolled in an Iowa third grade classroom; and
2. To evaluate dental disease prevalence among third graders in comparison with the 2016 and 2009 third grade oral health surveys and the potential impact of I-Smile™ @ School.

Methods

Sample

A stratified random sampling method was used to complete this survey. Iowa Department of Education (DOE) data from the 2020-2021 school year was used to inform and create the sample dataset. The preschool through grade 12 enrollment file was merged with the free and reduced lunch file as well as the public and non-public school building directory information file to create a master dataset. The following data were added to the dataset based on the county within which the school building is located: if the school participates in the I-Smile™ @ School program, the Title V service area of the county in which the school building is located, and urbanity (metropolitan, micropolitan, or rural).

Through DOE enrollment data, an estimated 37,419 students were enrolled in third grade for the 2020-2021 school year. Iowa third grade schools were included in the sampling frame if they are a private or public school, students were educated on-site, and have at least 15 children enrolled in third grade. The decay rate and the response rate from the 2016 third grade oral health survey were used in conjunction with the number of third graders in Iowa to calculate the needed sample size and, as a result, number of schools to be included in the sample. It was determined 5,600 third graders would need to be sampled in 92 schools – 4 schools per Title V service area.

To prepare the sample dataset, the master data file was sorted by (1) non-white enrollment (descending), (2) urbanity (metropolitan, micropolitan, and then rural), and then (3) by Title V service area (ascending). A sampling interval was calculated per Title V service area by dividing the total number of third grade students enrolled in the service area by 4 (the total number of schools needed per strata). A random number was then generated through random.org with the minimum number being '1' and the maximum number being the value of the sampling interval per each strata. The random number was then used to select the schools. The generated random number was compared to the cumulative total enrollment by each school in the Title V service area and the school in which that number fell was selected (i.e. if the random number generated was '29', and the enrollment of the first school 'X' in the list was 15 and the enrollment of the second school 'Y' on the list was 33 (15+33=48), the second school 'Y' would be selected because 29 is greater than 15 but less than 48). The random number was then added to itself (i.e. 29+29=58) to select the second school and the process repeated until four schools were selected within each Title V service area. The 92 selected schools contained 6,107 enrolled third grade students. Forty-five of the 92 selected schools regularly participate in the I-Smile™ @ School program.

Due to the COVID-19 pandemic and changes from the 2020-2021 school year to the 2021-2022 school year, 10 of the 92 selected schools refused to participate in the survey. When this occurred, the school was replaced by selecting a school within the same Title V service area using the same sampling methodology. After all initially refused schools were replaced, the final sample included 92 selected schools enrolling 6,270 third grade students. Of the 92 selected schools, 48 regularly participate in the I-

Smile™ @ School program. I-Smile™ Coordinators were asked to serve all selected third grade schools within their service area from October 1, 2021 through May 31.

I-Smile™ Coordinators gave consent forms to 6,364 third graders to participate in the survey; 2,892 returned a consent form (45%) and 2,150 returned a *positive* consent form (34%). Through this survey, 2,014 students were screened, a response rate of 32%.

Data Collection

All third graders selected as a part of the third grade survey were screened from October 1, 2021 through May 31, 2022. Using I-Smile™ program data entry standards, data were entered in the data system in place for MCAH Title V and I-Smile™ (**signify**community). This allowed HHS staff to use regularly collected data to achieve the survey objectives, thus reducing overall costs for the survey.

To assure consistency among the dental hygienists who provide dental screenings at selected third grade schools, a calibration training was recorded by HHS and released to dental hygienists work in the I-Smile™ program in September 2021. All I-Smile™ dental hygienists who would be providing dental screenings as a part of the third grade survey were required to watch the recorded calibration training and complete an online calibration quiz prior to screening third graders. The quiz also helped to recognize inconsistencies across screeners as explained by the required webinar training.

Dental hygienists provided dental screenings to children enrolled in a selected third grade school, using previously approved program forms (I-Smile™ @ School consent and screening forms for schools participating I-Smile™ @ School and I-Smile™ consent and screening forms for schools not participating in I-Smile™ @ School). Four screening indicators (decay, filled, history of decay, and sealed permanent molars) and two consent form indicators (payment source for child's dental care and child's last dental visit) were the focus for this survey, along with demographic information (race, ethnicity, age, gender and county of service). While screening indicators were collected on the day of screening, consent indicators and race, ethnicity, and gender could be collected up to 12 months prior to the day of screening, following program protocol. The I-Smile™ and I-Smile™ @ School consent forms were used to collect demographics and consent indicators and the I-Smile™ and I-Smile™ @ School screening forms were used to collect screening indicators. These indicators were addressed in the calibration training and required to be collected for every child screened.

Lastly, a newly created data entry dashboard in **signify**community, along with monthly to biweekly emails, allowed contractors to make necessary and timely data entry corrections. This facilitated error correction for both the contractors and HHS staff.

Statistical Analyses

The final dataset is weighted to represent third graders in Iowa and help adjust for non-response bias. The weight is calculated per selected school based on the sampling design. It is calculated by dividing the sampling interval for each Title V service area by the number of children screened for each school. All analyses are run with the strata as the Title V service area, the cluster as the school identifier (ID), and the weight as the calculated weight per school. Microsoft Excel is used to calculate the weight per school and SAS is used for descriptive analyses. SAS-callable SUDAAN was used for log-binomial regressions to determine statistical difference within categorical variables for oral health outcomes.

Children screened and enrolled in selected third grades are included in all analyses. Missing responses to pertinent variables were excluded from cross-tabulation analyses.

Percent change (percent increase/decrease) is calculated by subtracting the original value from the new value and dividing the difference by the original value. For example, if a rate changed from 53% (original) to 46% (new), the percent change would be (.46 - .53) = -.07 / .53 = -13%, equaling a 13% decrease.

Consent/Demographics

Consent form indicators and demographic information used a multiple-choice format for data collection. Additionally, the consent form indicator "child's last dental visit" was asked as a multiple-choice question with the answer options: within the past 6 months/1 year/3 years/5 years/Never.

The race and ethnicity questions on the paper consent form have slightly different response options than the **signify**community values. A crosswalk of appropriate **signify**community values to be entered per consent form value is standard for the I-Smile™ @ School program based on set guidelines. Racial and ethnic categories are condensed due to small numbers. If the ethnicity field on the consent contained "Hispanic/Latino," the child was reported as "Hispanic." If the ethnicity field indicated they were "Not Hispanic/Latino," the child was reported within one of the following race categories. "White" is reported if the only race selected is "White." "Black" is reported if the only race selected is "Black or African American.". Finally, "Other" is reported if the race selected on the consent is another race not described in the above list (i.e. Asian or Pacific Islander, American Indian or Alaska Native, Other). Additionally, 5% of participants did not indicate a race or ethnicity.

Geographical classification is determined based on county of school location due to the autofill nature of county of residence. Iowa counties considered "metropolitan" by the U.S. Office of Management and Budget are: Benton, Black Hawk, Boone, Bremer, Dallas, Dubuque, Grundy, Guthrie, Harrison, Jasper, Johnson, Jones, Linn, Madison, Mills, Polk, Pottawattamie, Scott, Story, Warren, Washington and Woodbury. Counties determined "micropolitan" are: Buena Vista, Carroll, Cerro Gordo, Clay, Clinton, Des Moines, Dickinson, Jefferson, Lee, Mahaska, Marion, Marshall, Muscatine, Wapello, Webster and Worth. The remaining 61 counties are considered "rural" (refer to Appendix F).[9]

Screening

Three of the four primary screening indicators are yes or no questions, "yes" indicating the indicator is present, and "no" that it is not present. The definition of 'decay' changed for this survey from the 2016 survey to include 'dark pits and fissures on baby teeth'. In 2016, decay only was defined as a cavitated lesion.[4] History of decay is calculated with "yes" representing that either a filled tooth and/or decay are present, and "no" demonstrating neither a filled tooth nor decay is present in the child's mouth. Referral need illustrates the timeframe in which a child needs to see a dentist for either follow-up or treatment. This is based on a number of factors including oral health status, oral health access, behaviors, and social determinants of health using the I-Smile™ Decay Risk Assessment which provides criteria for referrals as: "Immediate", "Within 3 Months", "Within 6 Months", or "Within 12 Months" (refer to Glossary).

Descriptive statistics were calculated for each demographic, consent and screening indicator as well as cross-tabulation rates among screening indicators and demographics. A Pearson chi-square test was used to determine statistically significant associations between screening indicators and demographics. Relationships with p-values greater than 0.05 are not statistically significant and are noted in the corresponding table in Appendix G. Additionally, statistical difference was calculated using log-binomial regression models in SAS-callable SUDAAN to assure rates between categories are statistically significant (i.e. decay rates in rural counties and metropolitan counties).

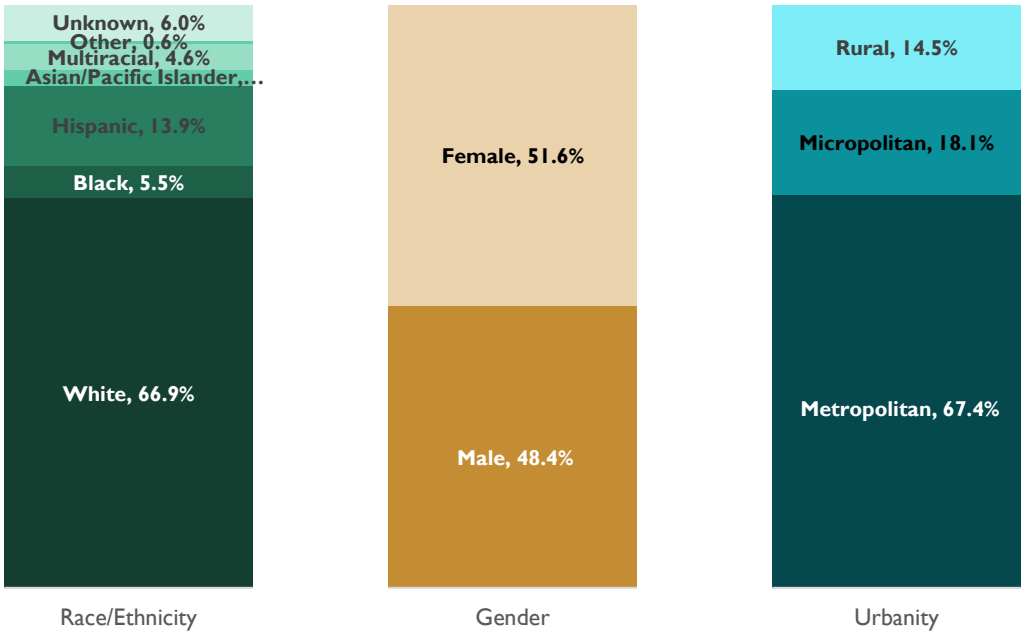
Results

Overall

The sample of children screened is diverse across gender, race and ethnicity, and geographical classification. Sixty-seven percent of third graders are reported as White, 14% reported as Hispanic, 5% as Black, 5% reported as more than one race ("Multiracial"), 3% reported as Asian or Pacific Islander, 0.6% reported as another ("Other") race, and 6% did not report their race and/or ethnicity (refer to figure 1).

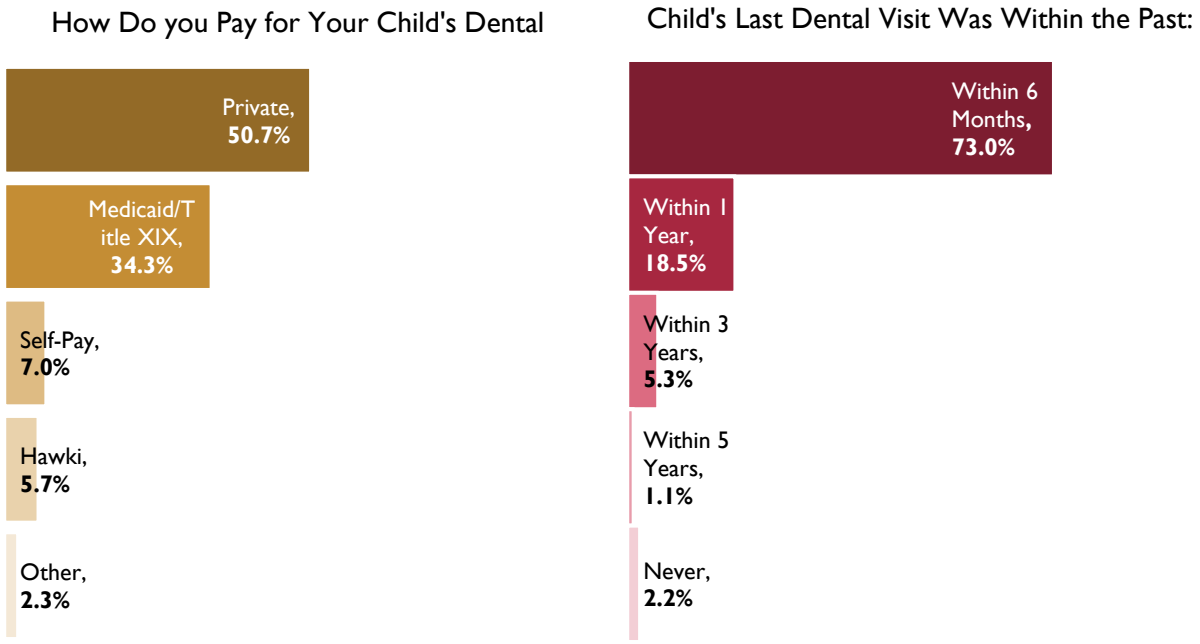
Males and females were equally represented, with 48% male and 52% female. Finally, geographical classification was represented with 67% of children receiving the screening in metropolitan counties, 18% in micropolitan counties, and 15% in rural counties (refer to Figure 1; refer to Appendix G, Table 2).

Figure 1: Sample is Diverse across Demographics (%)



Consent form indicators include "My child's most recent dental visit was within the past… 6 months/1 year/3 years/5 years/Never" and "How do you pay for your child's routine dental care?." Half of third graders (51%) use private dental insurance to pay for their regular dental care, followed by Medicaid or Pre-Ambulatory Health Plan (Medicaid/Title XIX, 34%), out-of-pocket (self-pay, 7%), Hawki – Iowa's children's health insurance program (6%), and other source (2%). Seventy-three percent reported a previous dental visit within the past 6 months, and an additional 18% within the past 1 year, 5% within the past 3 years, 1% within the last 5 years, and 2% reporting they never had a dental visit (refer to Figure 2).

Figure 2: More than 9 in 10 Third Graders have been to a Dentist in the Past Year



Screening indicators include decay, filled teeth, sealed permanent molars, history of decay and referral need. Seventeen percent of third graders had untreated decay, with an average of 2.3 teeth decayed per child with decay. Forty-two percent of children had filled teeth, with an average of 3.7 filled teeth per child with filled teeth. Sealed permanent molars were present in 43% of children. A history of decay (decay and/or fillings) was present in 51% of participants, and 5% had an immediate referral need (due to pain, abscess, extensive decay, or swelling), 13% within 3 months, 79% within 6 months, and 3% within 12 months (refer to Table 1; refer to Appendix G, Table 4).

Table 1: Screening Indicators

Decay	Filled	Sealed Perm Molar	History of Decay	Referral Need
17.0%	42.0%	42.8%	51.2%	5.5% Immediate 12.6% Within 3 Months 79.0% Within 6 Months 2.9% Within 12 Months

Decay

Disparities exist across school location, race and ethnicity, payment source for dental care, and timing of their last dental visit in Iowa third graders. Children attending third grade in a rural county have 1.66 times the prevalence of decay compared to children attending third grade in a metropolitan county (24% and 14%, respectively) (refer to Figure 3). Children reported with a non-white race or ethnicity, including black, Hispanic, Asian or Pacific Islander, Native American or American Indian, or other race have 1.69 times the prevalence of decay than those reported as white (24% and 14%, respectively). Decay rates also differed by how a third grader pays for regular dental care. Third graders with Medicaid as their regular payment source for dental care have 2.52 times the prevalence of decay than those reported using private dental insurance (26% and 10%, respectively). Lastly, decay rates differed if a child

had a dental visit in the past year. Third graders without a dental visit in the past year have 3.45 times the prevalence of decay compared to children with a dental visit in the past year (47% and 13%, respectively). These relationships are statistically significant at the 0.05 level (refer to Appendix G, Table 5).

Filled

Disparities exist across school location among Iowa third graders. Children attending third grade in a rural county have 1.23 times the prevalence of filled teeth compared to children attending third grade in a metropolitan county (49% and 40%, respectively) (refer to Figure 3). These relationships are statistically significant at the 0.05 level (refer to Appendix G, Table 6).

Sealed Permanent Molar

Disparities exist across school location, gender, if the school served by I-Smile™ @ School, and the child's reported last dental visit among presence of sealed permanent molars in Iowa third graders. Children attending third grade in a rural county have 1.58 times the prevalence of sealed permanent molars than children attending third grade in a metropolitan county (60% and 38%, respectively) (refer to Figure 3). Gender also plays a noteworthy role in predicting sealed permanent molars. Children reported as female have 1.33 times the prevalence of sealed permanent molars than children reported as male (49% and 37%, respectively). Additionally, the presence of the I-Smile™ @ School program at a school with third grade has a positive relationship with sealed permanent molars. Third gradersat a school served by I-Smile™ @ School have 1.60 times the prevalence of sealed permanent molars than children in third grade at a school that is not served by I-Smile™ @ School (55% and 35%, respectively). Lastly, third graders with a dental visit in the past year have 1.50 times the prevalence of sealed permanent molars than third graders without a dental visit in the past year (45% and 18%, respectively). These relationships are statistically significant at the 0.05 level. It is worth noting there is no difference in sealed permanent molars among payment source for regular dental care (43% among those reported to use Medicaid, 41% among those reported to use private dental insurance) (refer to Appendix G, Table 7). These relationships are statistically significant at the 0.05 level.

History of Decay

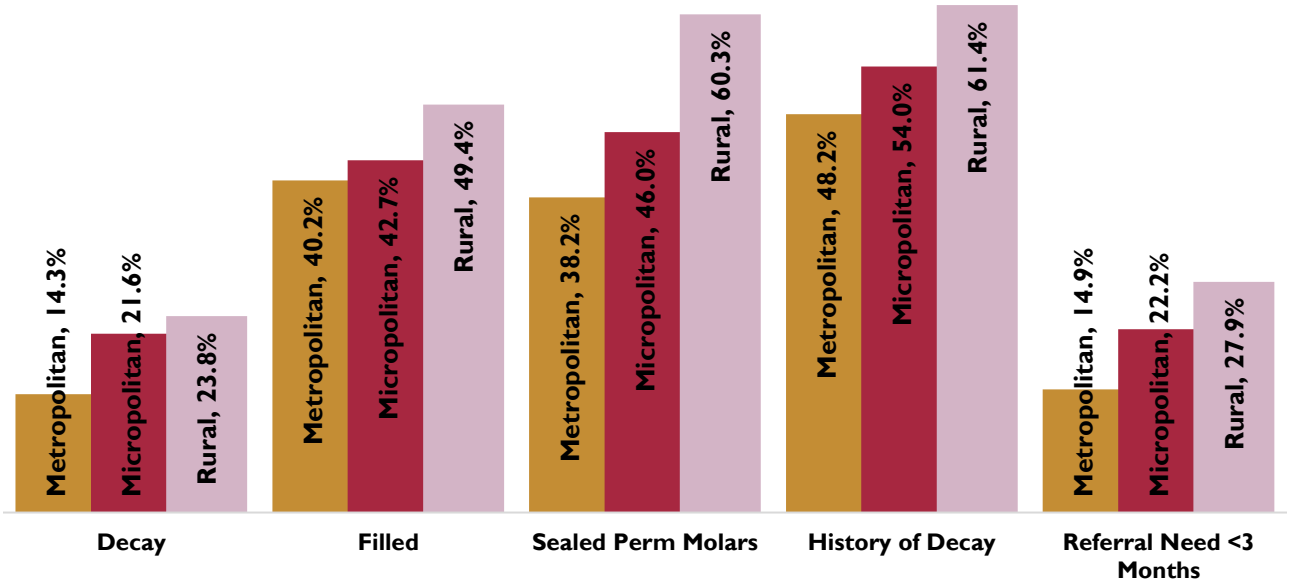
A child is considered to have a history of decay if they have at least one filled tooth or at least one tooth with decay. Disparities exist in history of decay across school location and payment source for regular dental care among Iowa third graders. Children attending third grade in a rural county 1.27 times the prevalence of a history of decay than children attending third grade in a metropolitan county (61% and 48%, respectively) (refer to Figure 3). Additionally, Medicaid-enrolled third graders have 1.31 times the prevalence of a history of decay than third graders reported to pay with private dental insurance for regular dental care (59% and 45%) (refer to Appendix G, Table 8). These relationships are statistically significant at the 0.05 level.

Referral Need

The referral need of the child is based upon multiple factors, including oral health status, oral health access, behaviors, and social determinants of health. Of Iowa third graders, 18% had a referral need to a dentist within 3 months or sooner, and 82% had a referral need of 6 months or later. Disparities exist in early referral need across school location, race and ethnicity, participation in the I-Smile™ @ School program, and how the third graders pay for regular dental care. Children attending third grade in a rural

county have 1.87 times the prevalence of needing an early referral (within 3 months or sooner) than children attending third grade in a metropolitan county (28% and 15%, respectively) (refer to Figure 3). Children reported with a non-white race or ethnicity, including black, Hispanic, Asian or Pacific Islander, Native American or American Indian, or other race have 1.81 times the prevalence to have decay than those reported as white (26% and 15%, respectively). Children who attend third grade in a school that participates in I-Smile™ @ School have 1.74 times the prevalence of needing an early referral than children attending third grade in a school that does not participate in I-Smile™ @ School (24% and 14%, respectively). Lastly, third graders reported to use Medicaid to pay for regular dental care have 2.63 times the prevalence of needing an early referral than third graders reported to use private dental insurance to pay for regular dental care (27% and 10%, respectively). These relationships are statistically significant at the 0.05 level (refer to Appendix G, Table 9).

Figure 3: Children Attending Third Grade in Rural Counties have Higher Rates of Poor Oral Health Outcomes And Higher Rates of Prevention than Third Graders in Metropolitan Counties



Comparison to 2016 Survey

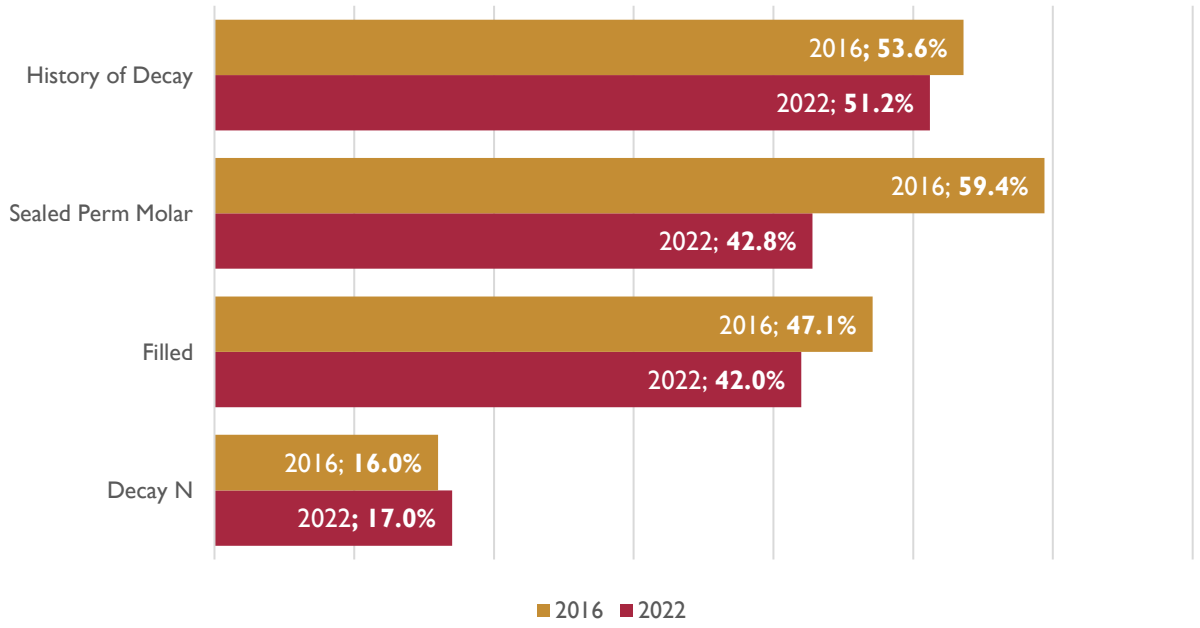
Differences in definition from 2016 to 2022 could have caused decay rates to be artificially higher. The definition of 'decay' in 2022 is 'dark pits and fissures on baby teeth or a cavitated lesion'. In 2016, decay only was defined as a cavitated lesion.

- Even with the expanded definition of decay, decay rates remain steady from 2016, with 17% of Iowa third graders having decay in 2022 and 16% in 2016.
- The prevalence of having filled teeth has decreased, where 47% of Iowa third graders were found to have filled teeth in 2016 compared to 42% in 2022, an 11% decrease. This may be considered an improvement, assuming less need for restorations due to decay. It may also indicate a reduced availability to restorative care. It should also be noted a larger decrease in restoration rates was evident in third graders enrolled in a school participating in I-Smile™ @

School (52% in 2016 to 46% in 2022) than in third graders enrolled in a non-participating school (42% in 2016 to 39% in 2022).

- The presence of a sealant on a permanent molar decreased from 2016, from 59% to 43%. However, a substantial decline in sealed permanent molars is seen among third graders enrolled in a school that does *not* participate in I-Smile™ @ School, with 59% having a sealed permanent molar in 2016 down to just 35% in 2022. The number of children able to receive dental sealants, either through I-Smile™ @ School or their regular dentist, may have been affected in the previous two years by the COVID-19 pandemic hiatus in the I-Smile™ @ School program and temporary dental office closures.
- Finally, the prevalence of having a history of decay has remained stable from 54% among Iowa third graders in 2016 to 51% in 2021. (refer to Figure 4).

Figure 4: Filled Teeth and History of Decay Improved Among Iowa Third Graders Since 2016



[N] The 2016 survey limited its definition of 'decay' to 'cavitated lesion' rather than additionally including 'dark pits and fissures of primary molars', likely causing rates to be artificially lower than more recent years.

Discussion

While multiple oral health status indicators for Iowa third graders improved or remained stable since 2016, disparities are evident among school county classification, socioeconomic status, payment source for regular dental care, dental visit within the past 1 year and gender. Additionally, more must be done to help get third graders to a dentist, as rates of dental sealants worsened overall since 2016 but particularly worsened among third graders attending schools not participating in the I-Smile™ @ School program by 42%.

The statewide infrastructure of the I-Smile™ @ School program, which expanded from 27 counties to 92 counties in 2013, is likely related to improvements. In 2022, presence of decay remained steady while the presence of restorations or filled teeth decreased by more than 10% (47.1% to 42.0%) from 2016.

Much of this may be due, in part, to dental sealants and other preventive services (e.g., fluoride varnish applications) and oral health education provided to children and parents/guardians through I-Smile™ @ School. The follow-up care coordination provided through I-Smile™ @ School also helps families make dental appointments and access regular and restorative care.

The overall rate of decay is stable from the 2016 survey. Considering the newly expanded definition to include 'dark pits and fissures of primary teeth', as well as a hiatus in in-school services through the COVID-19 pandemic, this is a victory for I-Smile™ @ School and Iowa third graders. We will continue its work with school administrators, principals, nurses, and teachers to determine "best practice" strategies to help reach more children in rural counties and children of a non-white race or ethnicity with early preventive care and education to reduce incidence of dental decay and a need for restorative care. Additionally, encouraging children and their families to return I-Smile™ @ School consent forms to receive preventive oral health services may help not only reduce decay, but their overall health.

While the rates of children with a sealed permanent molar decreased from 59% in 2016 to 43% in 2022, children of high socioeconomic status (attending third grade in a school that does not participate in I-Smile™ @ School) saw the most substantial decrease, from 59% in 2016 down to just 35% in 2022, a 41% decrease. Comparatively, rates also declined among children of low socioeconomic status (attending third grade in a school that participates in I-Smile™ @ School), although only by 10% (61% in 2016 to 55% in 2022). Interruptions to dental services in the past two years are likely due to the COVID-19 pandemic. Moving forward, I-Smile™ and I-Smile™ @ School will continue to strengthen partnerships with dentists to encourage them to take referrals and apply dental sealants in their offices. This is particularly important in areas with schools that have lower free and reduced lunch rates that are not served by I-Smile™ @ School.

There are great differences regarding oral health between Iowa third graders in rural counties and those in urban counties. Third graders in rural counties have higher rates of decay, filled teeth, having a history of decay, and needing early referral due to abscess, pain or decay than those in metropolitan counties, potentially leading to poorer oral health outcomes. Based on a survey completed every six months by I-Smile™ Coordinators, 49 of Iowa's 99 counties do not have a dentist taking new Medicaid referrals, 40 of which are rural - creating significant barriers to dental care through lack of a provider, cost, and transportation.[6]

Based on this survey evaluation, providing preventive dental services through I-Smile™ @ School is successful in improving oral health outcomes of Iowa third graders. Continuing the partnerships between I-Smile™ @ School and school districts is important to continue to improve the health of Iowa children at risk of dental disease, and thus support the overall health of Iowans by strengthening opportunities for oral health access.

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[3]Jackson, S. L., Vann, W. F., Jr, Kotch, J. B., Pahel, B. T., & Lee, J. Y. (2011). Impact of poor oral health on children's school attendance and performance. American journal of public health, 101(10), 1900–1906. doi:10.2105/AJPH.2010.200915

[4]Iowa Department of Public Health, Oral Health Bureau. *2016 Third Grade Oral Health Survey Report.*

[5]State Library of Iowa (2020). *Metropolitan, Micropolitan, and Combined Statistical Areas.* Institute of Museum and Library Services: The U.S. Office of Management and Budget. https://www2.census.gov/geo/maps/metroarea/us_wall/Mar2020/CBSA_WallMap_Mar2020.pdf

[6]Iowa Department of Public Health, Bureau of Oral and Health Delivery Systems. I-Smile™ *Coordinator Bi-annual Dental Referral Survey.* June 2022.

Appendix A – I-Smile™ Consent Form (Parent NOT Present)

Consent and Release of Information

Template Screening and 'Other' Service – Parent NOT Present

Child's Name:	Age:	Date of Birth:
Address:	Cell Phone: Other Phone:	

☐ Male ☐ Female	Race: ☐ White ☐ Black/African American	☐ Asian/Pacific Islander ☐ Native American	☐ Other	Ethnicity: ☐ Not Hispanic/Latino ☐ Hispanic/Latino

Child's Physician:	Child's Dentist:
If applicable, child's Medicaid ID number:	

☐ **YES**, I give permission for my child to receive a dental screening and fluoride varnish application.
If ~~anesthesia~~ will be provided, more detailed medical history questions must be added to evaluate a client's risk for bacterial endocarditis or other conditions.

☐ **NO**, I do not give permission for my child to receive a dental screening and fluoride varnish application.

Please answer the following questions:

1. How do you pay for your child's dental care? (please check one)
   ☐ Self ☐ Medicaid/Title XIX ☐ Hawki ☐ Private dental insurance ☐ Other
2. My child's most recent dental visit was within the past: (please check one)
   ☐ 6 months ☐ 1 year ☐ 3 years ☐ 5 years ☐ has never seen a dentist ☐ Unknown
3. Does your child have medical insurance? ☐ Yes ☐ No
4. My child's most recent medical visit for a well-child/adolescent exam was within the past:
   ☐ 3 months ☐ 6 months ☐ 12 months ☐ more than 1 year ☐ unknown
5. Are your child's immunizations up to date? ☐ Yes ☐ No Explain:
6. Is your child currently taking any medications? ☐ Yes ☐ No Explain:
7. Does your child have any allergies? ☐ Yes ☐ No Explain:
8. List any concerns you have about your child's mouth or teeth:

I consent to insert agency name use of email and texting to send me scheduling and child health services information.
☐ Yes ☐ No Email address:

- I was offered a Notice of Privacy Practices.
- I understand that this consent for services is valid for one (1) year unless withdrawn in writing by parent, guardian or client (if of legal age).
- I understand that the services that will be received do not take the place of regular dental checkups at a dental office.
- I understand that these services are provided under the Iowa Department of Public Health, Maternal and Child & Adolescent Health Program.
- I understand records created and maintained as part of this program are the property of the Iowa Department of Public Health.
- I understand that the information from these records may be shared with the Iowa Department of Public Health and its agents and Title V contractors, Iowa Medicaid Enterprise, or designee for audit and quality improvement purposes or other legally authorized purposes.

Parent/Guardian Signature Date

I voluntarily authorize Insert your agency name to release, obtain, or exchange information manually and/or via an electronic platform maintained by signifycommunity™ with the following: Title V MCAH agencies, list possibilities here – physicians, dentists, Head Start. This release does not authorize disclosure of material protected by federal and/or state law applicable to substance abuse, mental health and/or AIDS-related information.

Parent/Guardian Signature Date

Rev 5/2020

Appendix B – I-Smile™ @ School Consent Form

Consent and Release of Information

Template Screening, Varnish +Sealant – Parent NOT Present

Child's Name:			Age:	Date of Birth:
Address:			Cell Phone: Other Phone:	
☐ Male ☐ Female	Race: ☐ White ☐ Black/African American	☐ Asian/Pacific Islander ☐ Native American	☐ Other	Ethnicity: ☐ Not Hispanic/Latino ☐ Hispanic/Latino
School:	Teacher's Name:			Grade:
Child's Physician:		Child's Dentist:		
If applicable, child's Medicaid or Hawki ID number:				

☐ **YES**, I give permission for my child to receive a dental screening, fluoride varnish application and sealants.
If xxxxxx will be provided, more detailed medical history questions must be added to evaluate a client's risk for bacterial endocarditis or other conditions.

☐ **NO**, I do not give permission for my child to receive a dental screening, fluoride varnish application and sealants.

Please answer the following questions:

1. How do you pay for your child's dental care? (please check one)
☐ Self ☐ Medicaid/Dental Wellness Plan Kids ☐ Hawki ☐ Private dental insurance ☐ Other

2. My child's most recent dental visit was within the past: (please check one)
☐ 6 months ☐ 1 year ☐ 3 years ☐ 5 years ☐ has never seen a dentist ☐ Unknown

3. Is your child eligible for the free/reduced lunch program at school? ☐ Yes ☐ No

4. Does your child have a source of medical care? ☐ Yes ☐ No ☐ Unknown

5. Does your child have medical insurance? ☐ Yes ☐ No ☐ Unknown

6. My child's most recent medical visit for a well-child/adolescent exam was within the past:
☐ 3 months ☐ 6 months ☐ 12 months ☐ more than 1 year ☐ Unknown

7. Are your child's immunizations up to date?	☐ Yes	☐ No	Explain:
8. Is your child currently taking any medications?	☐ Yes	☐ No	Explain:
9. Does your child have any allergies?	☐ Yes	☐ No	Explain:

10. List any concerns you have about your child's mouth or teeth:

I consent to insert agency name use of email and texting to send me scheduling and child health services information.
☐ Yes ☐ No Email address:

- I was offered a Notice of Privacy Practices.
- I understand that this consent for services is valid for one (1) year unless withdrawn in writing by parent, guardian or client (if of legal age).
- I understand that the services that will be received do not take the place of regular dental checkups at a dental office.
- I understand that these services are provided under the Iowa Department of Public Health, Maternal and Child & Adolescent Health Program.
- I understand records created and maintained as part of this program are the property of the Iowa Department of Public Health.
- I understand that the information from these records may be shared with the Iowa Department of Public Health and its agents and Title V contractors, Iowa Medicaid Enterprise, or designee for audit and quality improvement purposes or other legally authorized purposes.

Parent/Guardian Signature | Date

I voluntarily authorize | Insert your agency name | to release, obtain, or exchange information manually and/or via an electronic platform maintained by **signify**community™ with the following: Title V MCAH agencies, list possibilities here – physicians, dentists, Head Start. | This release does not authorize disclosure of material protected by federal and/or state law applicable to substance abuse, mental health and/or AIDS-related information.

Parent/Guardian Signature | Date

Rev. 5.21

Appendix C – I-Smile™ Screening Form (Parent NOT Present)

I-Smile Child Oral Health Services Screening and 'Other' Services Parent NOT Present	Risk Level	Low D0601	Moderate D0602	High D0603
		Duration: ___ min		

Decay:	yes	no	# ___
Filled:	yes	no	# ___
Sealed:	yes	no	
Demin:	yes	no	

Client Name:				Medicaid/Client ID:			
DOB:		Age:		Service Site:		Date of Service:	
Medical history reviewed	☐Yes ☐No	Notes:					
Translator needed	☐Yes ☐No						
Oral Screening	☐D0190CC (Initial)	☐D0190 (Periodic)	☐D0145 (Oral Eval)	☐TD Modifier (Nurse provided)	Duration:		min

Condition of hard tissue	*Documentation*	*Condition of soft tissue*	*Documentation*
Obvious decay or demineralization		Gum redness, bleeding (e.g. when brushing)	
Decay history (fillings, crowns)		Swelling or lumps	
Visible plaque		Trauma or injury	
Stained fissures, enamel defects, trauma or injury		Other	
Sealed teeth		Findings of Parent Concern as noted on Consent	

Topic(s) of oral health education provided:	☐teething/eruption	☐non-nutritive sucking	☐home care	☐dietary habits	
	☐fluoride	☐regular dental visits	☐sealants	☐injury prevention	☐bottle/sippy cup use
Notes:					

Products recommended or dispensed:	☐Toothbrush	☐Floss	☐Fluoride Rinse	☐Anti-Microbial Rinse
	☐Salt water rinse	☐None	☐Other:	

Service	*Documentation/Notes*		*Duration:*	
Fluoride Varnish	Type: ☐Not provided	Concentration:		min
Sealants	Tooth number(s) and surface(s): ☐Not provided	Product used:		min
Prophylaxis	☐Not provided			min
Oral Hygiene Instruction	☐Not provided		Time In:	Time Out:
Nutritional Counseling	☐Not provided		Time In:	Time Out:

Dental Referral / Care Coordination				
Parent letter with screening results and post-op instructions for varnish given	☐Yes	☐No		
Dentist referred to:				
Notes:				
Referral need (based on risk assessment):	☐Immediate	☐Within 3 months	☐Within 6 months	☐Within 12 months
Provider Name and Credentials:		**Provider Signature:**	**Date:**	

	Service(s) documented in TAV		Barrier(s) documented in TAV

Rev 4/18

Appendix D – I-Smile™ @ School Screening Form

I-Smile @ School Screening Form TEMPLATE	Risk Level	Low D0601	Moderate D0602	High D0603		Decay:	yes	no	#	
		Duration:		min		Filled:	yes	no	#	
						Sealed:	yes	no		
						Demin:	yes	no		

ID#	Name	County #	DOB	Age
Sex ☐M ☐F	School District	School		Grade
Date of Service	Race	Translator needed? ☐Yes ☐No		Medicaid ID#
Has a dentist? ☐Yes ☐No	Free/Reduced Lunch? ☐Yes ☐No	Most recent visit? ☐6m ☐12m ☐3y ☐5y ☐N ☐U	Payment source? ☐Self ☐XIX ☐Hawki ☐Ins ☐Other	
Medical history reviewed from consent: ☐Yes ☐No	Notes:			

Oral Screening D0190 Duration ____ min

Visible plaque: ☐none ☐light ☐moderate ☐heavy

Soft Tissues:

☐no problems ☐gingivitis: localized____/generalized____

☐trauma ☐lesions ☐swelling

Describe:

Hard Tissues:

☐no problems ☐chip ☐stained pits/fissures

☐decay ☐demineralized ☐other:

Describe:

D1351 Sealant Application: ☐Yes ☐No Duration ____ min Date: ____

Products used: (ex: 40% Phosphoric Acid Etch Gel & Clinpro Sealant)

D106 Fluoride Varnish Application ☐Yes ☐No Duration ____ min

Product used: (ex: Varnish America 0.25mL)

Fluoride concentration: (ex: 5% NaFl2 varnish)

Education Given: ☐Yes ☐No

☐ Dietary ☐ Home Care ☐ Fluoride ☐ Other

D1330 Oral Hygiene Instruction ☐Yes ☐No Duration ____ min

Notes:

Referral to:

Referral need (based on risk assessment):

HIGH ☐ Immediate ☐ Within 3 months **MODERATE** ☐ Within 6 months **LOW** ☐ Within 12 months

Parent letter with post-op instructions given for: ☐ varnish ☐ sealants

Provider Name/Credentials:

Provider Signature:

	Tooth		Exam	Seal
Upper Right	1			
	2			
	3			
	4	A		
	5	B		
	6	C		
	7	D		
	8	E		
Upper Left	9	F		
	10	G		
	11	H		
	12	I		
	13	J		
	14			
	15			
	16			
Lower Left	17			
	18			
	19			
	20	K		
	21	L		
	22	M		
	23	N		
	24	O		
Lower Right	25	P		
	26	Q		
	27	R		
	28	S		
	29	T		
	30			
	31			
	32			

Recording Key

RACE			COUNTY CODE (enter service area counties)	
1	White		01	County A
2	Black		02	County B
3	Hispanic		03	County C
4	Asian/Pacific Islander		04	County D
5	Native American			
6	Other			
7	Undetermined			

CARIES PREVALENCE	
0	Unerupted / congenitally missing permanent tooth
1	Sound permanent tooth
2	Filled permanent tooth
3	Questionable permanent tooth
4	Decayed permanent tooth
5	Crowned permanent tooth
a	Sound primary tooth
b	Filled primary tooth
c	Questionable primary tooth
d	Decayed primary tooth
e	Crowned primary tooth
S	Sealed permanent or primary tooth

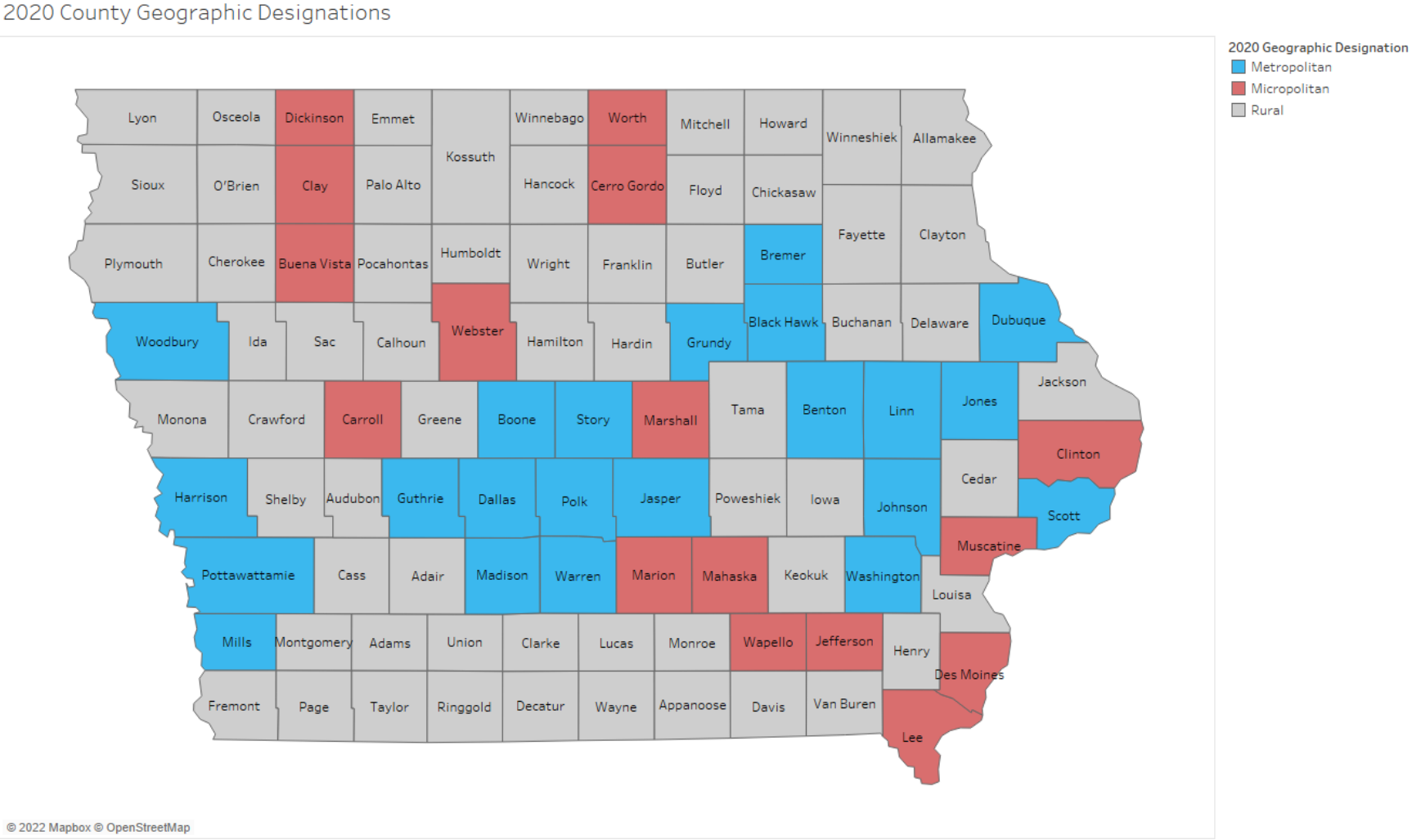
Appendix E – I-Smile™ Decay Risk Assessment

I-SMILE™ DECAY RISK ASSESSMENT FORM

Oral Screening Indicator	Risk Level	Dental Referral	I-Smile™ Follow Up
Abscess, pain, or large decay	High	Immediate	Care coordination Follow up with parent/guardian within 3 months to confirm completion of treatment from a dentist
Untreated decay	High	Within 3 months	
Dark pits/fissures on primary molars	High		
Demineralization (white spot lesions)	Moderate	Within 6 months	Care coordination
Poor oral hygiene	Moderate		
Deep pits/fissures	Moderate		
Restorations	Moderate		
Orthodontia	Moderate		
Dry mouth	Moderate		
Qualify for Medicaid, WIC, or free and reduced lunch	Moderate		
Dental visits – less than annual	Moderate		
Frequent exposure to juice or sugar/carbohydrates	Moderate		
Shallow grooves, fluorosis, and/or no history of decay	Low	Within 12 months	Care coordination, as needed

Assign risk level according to the highest oral screening indicator identified (high→low).

Appendix F – Iowa County Geographic Designations (2020)



Appendix G – Survey Frequencies

Table 2: Demographics

Variable	N	Weighted %	Weighted CI
Race/Ethnicity			
White	1396	66.86	59.73-73.99
Black	77	5.47	3.41-7.53
Hispanic	294	13.91	7.32-20.51
Asian/Pacific Islander	53	2.56	1.14-3.98
Multi-racial	73	4.59	3.07-6.12
Other	15	0.59	0.096-1.09
Unknown/Missing	106	6.01	4.24-7.78
Gender			
Male	967	48.37	44.80-51.95
Female	1047	51.63	48.05-55.20
Geographical Classification			
Metropolitan	1010	67.38	62.10-72.67
Micropolitan	362	18.11	13.14-23.09
Rural	642	14.50	8.69-20.31
I-Smile™ @ School Participant			
Yes	995	60.19	51.67-68.71
No	1019	39.81	31.29-48.33

Table 3: Consent Indicators

Variable	N	Weighted %	Weighted CI
Last Dental Visit			
Within 6 Months	1390	72.98	67.00-78.96
Within 1 Year	364	18.50	13.14-23.85
Within 3 Years	110	5.26	3.57-6.95
Within 5 Years	18	1.11	0.23-1.99
Never	31	2.15	1.02-3.29
Payment Source for Regular Dental Care?			
Self-Pay	172	6.97	5.49-8.44
Medicaid/Title XIX	701	34.29	26.55-42.02
Hawki	138	5.67	4.39-6.96
Private Insurance	901	50.74	43.16-58.33
Other	42	2.33	1.10-3.56

Table 4: Screening Indicators

Variable	N	Weighted %/Mean	Weighted CI
Decay			
Yes	454	17.04	80.16-85.77
No	1560	82.96	14.23-19.84
Average Number of Decayed Teeth		2.26	
Filled			
Yes	879	41.99	39.65-44.33
No	1135	58.01	55.67-60.35
Average Number of Filled Teeth		3.67	
Sealed Permanent Molar			
Yes	1025	42.80	38.48-47.13
No	989	57.20	52.87-61.52
History of Decay			
Yes	1113	51.19	47.87-54.52
No	901	48.81	45.48-52.13
Referral Need			
Immediate	142	5.47	3.93-7.01
Within 3 Months	340	12.65	10.29-15.01
Within 6 Months	1438	79.00	76.12-81.88
Within 12 Months	94	2.88	1.89-3.87

Table 5: Decay by Demographics

Variable	N	Weighted %	Weighted CI	P-Value[T]
Race/Ethnicity				0.0051
White	267	14.04	11.54-16.55	
Non-White	162	23.77	16.33-31.22	
Gender				0.8376*
Male	219	17.28	13.39-21.18	
Female	235	16.80	13.38-20.22	
School County Classification				0.0065
Metropolitan	210	14.34	10.79-17.90	
Micropolitan	86	21.64	14.48-28.81	
Rural	158	23.79	19.12-28.46	
I-Smile™ @ School Participant				0.0070
Yes	268	22.10	16.88-27.31	
No	186	13.69	10.31-17.07	
Dental Visit Within Last 1 Year				<0.0001
Yes	346	13.66	11.25-16.07	
No	71	47.18*	32.94-61.41*	
Payment Source for Regular Dental Care?				<0.0001
Self-Pay	43	17.07	10.05-24.10	
Medicaid/Title XIX	207	25.67	19.06-32.28	
Hawki	26	17.26	7.31-27.21	
Private Insurance	146	10.19	7.78-12.59	
Other	17	31.13*	16.41-45.86*	

*Interpret with caution (p-value > 0.05 OR CI > 20)

[T]P-value calculated from a chi-square test

Table 6: Filled Teeth by Demographics

Variable	N	Weighted %	Weighted CI	P-Value[T]
Race/Ethnicity				0.4104*
White	603	41.77	38.86-44.69	
Non-White	240	44.51	38.96-50.07	
Gender				0.9443*
Male	426	42.17	36.31-48.02	
Female	453	41.83	36.99-46.67	
School County Classification				0.0130
Metropolitan	410	40.22	37.11-43.32	
Micropolitan	153	42.66	37.33-47.99	
Rural	316	49.40	44.72-54.09	
I-Smile™ @ School Participant				0.0133
Yes	496	46.31	42.34-50.28	
No	383	39.13	35.67-42.60	
Dental Visit Within Last 1 Year				0.0102
Yes	798	43.64	40.57-46.71	
No	43	25.55*	14.73-36.37*	
Payment Source for Regular Dental Care?				0.5818*
Self-Pay	63	35.83*	25.13-46.52*	
Medicaid/Title XIX	337	44.17	40.47-47.87	
Hawki	68	44.75*	33.45-56.06*	
Private Insurance	369	41.22	37.02-45.43	
Other	21	48.32*	28.53-68.11*	

*Interpret with caution (p-value > 0.05 OR CI > 20)

[T]P-value calculated from a chi-square test

Table 7: Sealed Permanent Molars by Demographics

Variable	N	Weighted %	Weighted CI	P-Value[T]
Race/Ethnicity				0.7279*
White	721	43.42	37.42-49.41	
Non-White	261	42.04	36.84-47.24	
Gender				<0.0001
Male	459	36.57	32.11-41.04	
Female	566	48.64	43.14-54.14	
School County Classification				0.0003
Metropolitan	441	38.16	32.17-44.14	
Micropolitan	157	46.07	39.42-53.67	
Rural	427	60.33	50.10-70.57*	
I-Smile™ @ School Participant				<0.0001
Yes	617	55.23	49.19-61.28	
No	408	34.58	28.17-40.99	
Dental Visit Within Last 1 Year				<0.0001
Yes	944	45.30	40.31-50.28	
No	42	18.14	11.89-24.39	
Payment Source for Regular Dental Care?				0.1551*
Self-Pay	88	50.47*	38.49-62.46*	
Medicaid/Title XIX	355	42.80	37.11-48.50	
Hawki	86	53.63*	41.02-66.24*	
Private Insurance	458	40.88	35.21-46.56	
Other	15	32.40*	15.27-46.52*	

*Interpret with caution (p-value > 0.05 OR CI > 20)

[T]P-value calculated from a chi-square test

Table 8: History of Decay by Demographics

Variable	N	Weighted %	Weighted CI	P-Value[T]
Race/Ethnicity				0.0603*
White	738	48.90	45.24-52.56	
Non-White	321	57.55	49.34-65.77	
Gender				0.7378*
Male	541	52.07	45.13-59.12	
Female	572	50.37	45.27-55.47	
School County Classification				0.0027
Metropolitan	519	48.24	43.72-52.75	
Micropolitan	198	53.99	47.09-60.90	
Rural	396	61.44	56.45-66.44	
I-Smile™ @ School Participant				0.0133
Yes	624	56.77	51.73-61.82	
No	489	47.50	42.67-52.34	
Dental Visit Within Last 1 Year				0.0122
Yes	953	49.72	46.44-53.00	
No	97	62.73*	52.54-72.93*	
Payment Source for Regular Dental Care?				0.0012
Self-Pay	86	46.17*	34.58-57.76*	
Medicaid/Title XIX	446	59.49	52.98-66.00	
Hawki	82	55.45*	43.60-67.31*	
Private Insurance	440	45.41	41.02-49.80	
Other	27	60.70*	42.55-78.85*	

*Interpret with caution (p-value > 0.05 OR CI > 20)

[T]P-value calculated from a chi-square test

Table 9: Referral Need Immediate or Within 3 Months by Demographics

Variable	N	Weighted %	Weighted CI	P-Value[T]
Race/Ethnicity				0.0013
White	276	14.59	12.02-17.16	
Non-White	181	26.43	18.69-34.16	
Gender				0.9064*
Male	229	17.97	14.03-21.91	
Female	253	18.26	14.73-21.80	
School County Classification				0.0005
Metropolitan	220	14.91	11.37-18.46	
Micropolitan	88	22.20	14.91-29.49	
Rural	174	27.94	23.38-32.49	
I-Smile™ @ School Participant				0.0011
Yes	291	24.38	19.05-29.71	
No	191	13.98	10.63-17.34	
Dental Visit Within Last 1 Year				<0.0001
Yes	355	52.45	11.59-16.46	
No	82	14.02*	38.54-66.35*	
Payment Source for Regular Dental Care?				<0.0001
Self-Pay	47	19.15	12.16-26.14	
Medicaid/Title XIX	221	27.43	20.56-34.29	
Hawki	28	18.98*	8.65-29.32*	
Private Insurance	150	10.44	8.01-12.87	
Other	18	32.47*	18.08-46.86*	

*Interpret with caution (p-value > 0.05 OR CI > 20)

[T]P-value calculated from a chi-square test