

THE BASIC SCREENING SURVEY

CHILDREN'S ORAL HEALTH SCREENING COLORADO, 2011–2012

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A LETTER FROM THE COLORADO ORAL HEALTH DIRECTOR

A healthy mouth is essential to overall health. But for too many Coloradans, a healthy smile is a goal they might never reach. Cavities are still the most common chronic disease of childhood, and preventable oral disease costs Colorado more than an estimated \$1 billion per year. Public health must redouble its efforts to combat poor dental health and eliminate oral health inequities to improve Coloradans' overall health.

Cavities disproportionately affect our poorest children and their families, often requiring urgent treatment, higher dental bills and valuable time away from work and school. About one of every five children (19 percent) in kindergarten in our poorest schools has untreated cavities – more than double the proportion as among students in high-income schools (7 percent). By third grade, about three out of four (73 percent) children in our poorest schools have had a cavity – much more than their peers in high-income schools (41 percent). Too many children miss school or suffer in classrooms because of toothaches, unable to concentrate on academics.

Children in our poorest schools are also more likely to be obese. Disparities can lead to poor health and life outcomes for vulnerable populations and create economic burdens on individuals and taxpayers. Chronic oral disease impacts a person's ability to eat, drink and smile. Untreated cavities can lead to additional health risks throughout life and higher medical costs for the families least able to afford them. The Centers for Disease Control and Prevention estimates that as a nation, we spent \$108 billion in 2010 on mostly preventable dental care.

Because of these risks and the disproportionate burden on Coloradans with low incomes, Governor John Hickenlooper named oral health one of the top three of Colorado's ten Winnable Battles – key public health and environmental issues where progress can be made in the next five years. We have evidence-based preventive interventions to reduce oral health disparities that need to be fully implemented across Colorado. The Oral Health Winnable Battle focuses on giving equal access to water fluoridation, providing school sealant programs, and having dental homes by age one year.

Robust oral health screening and sealant programs are serving more high-risk schools. More Coloradans are using Medicaid and Child Health Plan Plus (CHP+) dental benefits. Almost 73 percent of Coloradans on community water supplies have access to fluoridated water and, therefore, have 20–40 percent fewer cavities. These and other oral health interventions seem to be making substantial progress. This report shows that, in Colorado, approximately 48 percent fewer children in kindergarten and 46 percent fewer children in third grade have untreated decay and nearly 29 percent more children in third grade have dental sealants since 2003–2004.

Further progress must be made. Colorado has built a network of dedicated and innovative partners across the state who stand ready to improve oral health and eliminate oral health inequities. Collaborative efforts to establish culturally competent dental homes for high-risk children and provide preventive oral health resources to families and health care providers are clearly working. We can and shall move forward, giving every Colorado child an equal chance to succeed in school and in life.

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EXECUTIVE SUMMARY

The Colorado Department of Public Health and Environment conducted a statewide oral health screening of kindergarten and third grade children enrolled in Colorado’s public elementary schools in 2011–2012. A total of 60 public schools were selected for the sample, and 58 schools agreed to participate. Within the participating schools, the response rate was 78.4% for children in kindergarten and 75.4% for children in third grade. Volunteer dental hygienists screened 3,139 children in kindergarten and 2,908 children in third grade, and results were statistically weighted to be representative of the general population of children in kindergarten or third grade in Colorado.

Key Findings for 2011–2012

Figure ES1. Prevalence of caries experience, untreated decay, and obesity among children in kindergarten overall and by percent of students in the school who were eligible for free or reduced price meal program (FRL) — Colorado Children’s Oral Health Screening, 2011–2012

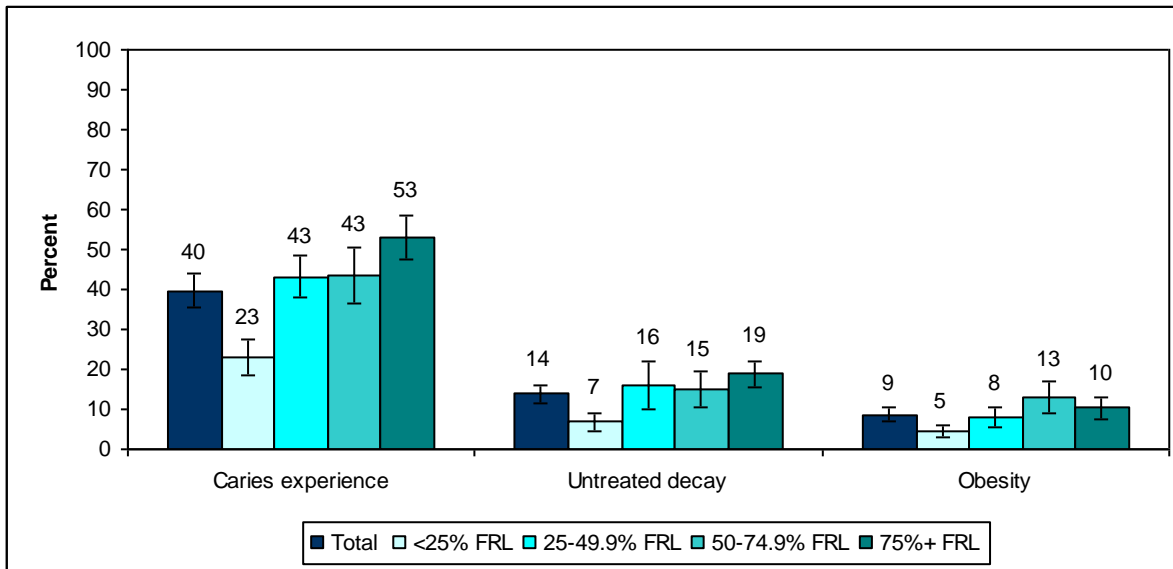
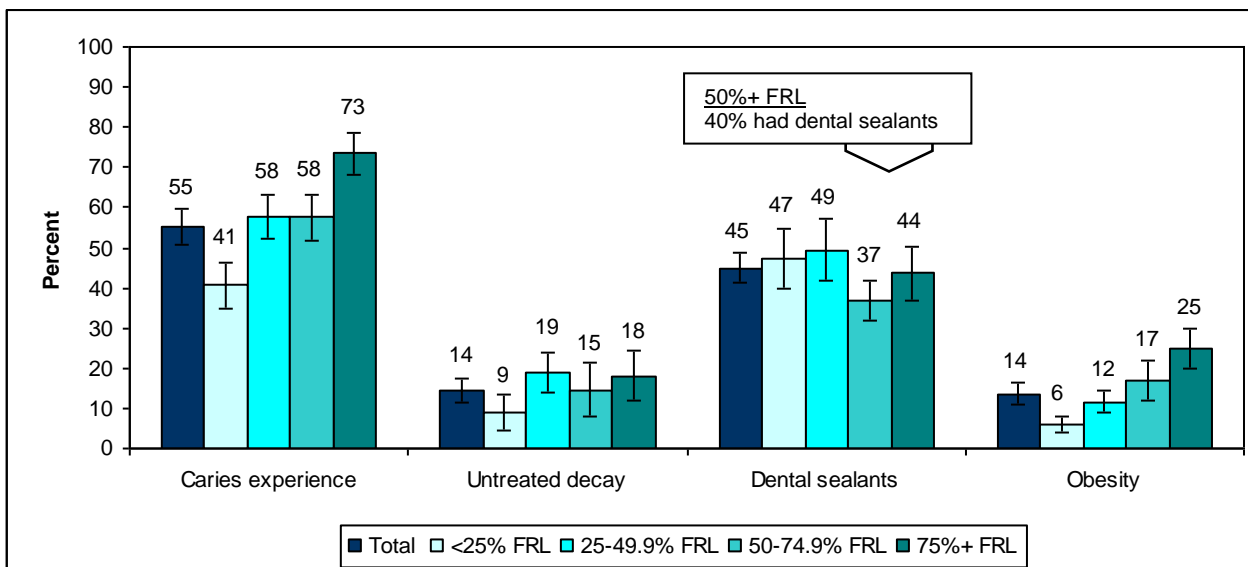


Figure ES2. Prevalence of caries experience, untreated decay, dental sealants, and obesity among children in third grade overall and by percent of students in the school who were eligible for free or reduced price meal program (FRL) — Colorado Children’s Oral Health Screening, 2011–2012



- ⇒ Dental decay is a significant public health problem for Colorado’s children.
 - 40% of children in kindergarten and 55% of children in third grade had untreated dental decay and/or fillings (caries experience).
 - 14% of children in kindergarten and 14% of children in third grade had untreated dental decay (untreated caries).
- ⇒ Dental sealants¹ are a proven method for preventing decay, but most of Colorado’s children still had not used this preventive service.
 - 55% of children in third grade did not have dental sealants on their permanent molars.
- ⇒ Too many children in Colorado are overweight or obese.
 - 9% of children in kindergarten and 14% of children in third grade were obese, and 21% of children in kindergarten and 27% of children in third grade were either overweight or obese.

❖ HEALTH DISPARITIES

- ⇒ Children from schools with a higher proportion of students eligible for free or reduced price meal program had a high prevalence of caries experience.
 - Children in schools with $\geq 75\%$ of students eligible for free or reduced price meal program had a significantly higher prevalence of caries experience compared with children from schools with $< 25\%$ of students eligible for free or reduced price meals (53 % vs. 23%, respectively, for children in kindergarten and 73% vs. 41%, respectively, for children in third grade)
 - Among children in kindergarten, children in schools with $\geq 75\%$ of students eligible for free or reduced price meals had a significantly higher prevalence of untreated caries compared with children from schools with $< 25\%$ of students eligible for free or reduced price meals (19% vs. 7%, respectively).
- ⇒ Hispanic children had higher prevalence of caries experience than White children.
 - Hispanic children had a significantly higher prevalence of caries experience compared with White children (55% vs. 32%, respectively, for children in kindergarten and 70% vs. 48%, respectively, for children in third grade).
 - Among children in kindergarten, Hispanic children had a significantly higher prevalence of untreated caries compared with White children (19% vs. 11%, respectively).
- ⇒ Obesity prevalence varied by school eligibility for free or reduced price meal program and children’s race/ethnicity, with Hispanic children having the highest prevalence.
 - Among children in kindergarten, children in schools with $\geq 75\%$ of students eligible for free or reduced price meals had a significantly higher prevalence of obesity compared with children from schools with $< 25\%$ of students eligible for free or reduced price meals (10% vs. 5%, respectively).
 - Among children in third grade, children in schools with $\geq 75\%$ of students eligible for free or reduced price meals had a significantly higher prevalence of obesity compared with children from schools with $< 25\%$ of students eligible for free or reduced price meals (25% vs. 6%, respectively).

¹ Dental sealants provide an effective way to prevent decay on the chewing surfaces of molars (back teeth), which are most vulnerable to caries. A clear resin is used to cover the “pits and fissures” on the top of the teeth so that caries-causing bacteria cannot reach areas that are difficult to clean and for fluoride to penetrate.

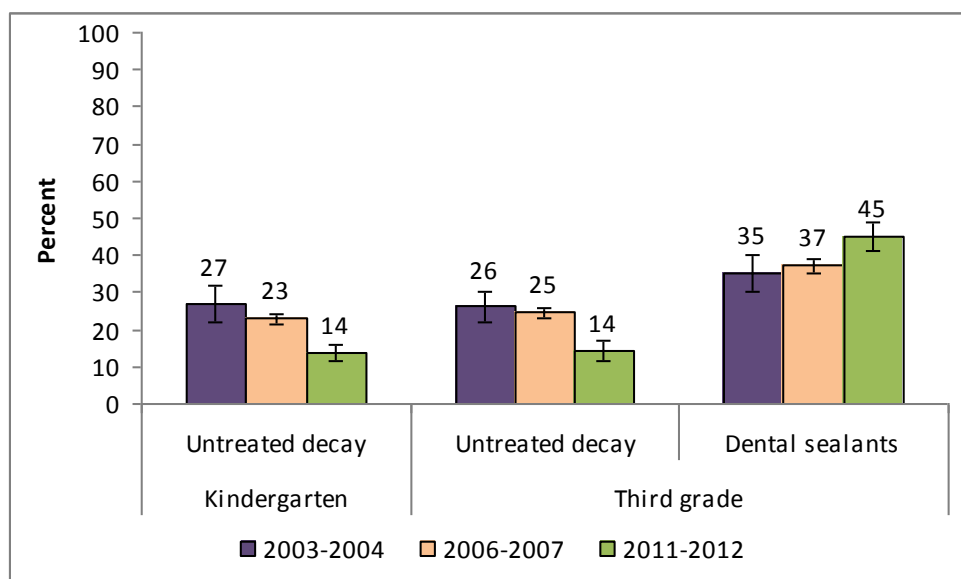
- Among children in kindergarten, Hispanic children had a significantly higher prevalence of obesity compared with White children (12% vs. 7%, respectively).
- Among children in third grade, Hispanic children had a significantly higher prevalence of obesity compared with White or Black children (24% vs. 9% and 10%, respectively).

❖ TRENDS IN ORAL DISEASE BURDEN & PREVENTIVE DENTAL SEALANTS

⇒ Since the previous screenings in the 2003–2004 and 2006–2007 school years:

- The prevalence of caries experience remained stable, but the prevalence of untreated decay decreased significantly among both children in kindergarten and children in third grade. During the same period, the prevalence of dental sealants increased significantly among children in third grade.
- The prevalence of caries experience decreased significantly among children in kindergarten at schools with <25% and ≥75% of children eligible for the free or reduced price meals program.
- The prevalence of untreated decay decreased significantly among children at schools with <25% and ≥75% of children eligible for the free or reduced price meals program, White children, and Hispanic children (kindergarten and third grade).
- The prevalence of dental sealants increased significantly among children in third grade at schools with ≥50% of children eligible for the free or reduced price meals program and Hispanic children.

Figure ES3. Results of dental screening among children in kindergarten and third grade — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012



- ❖ Improvements in the oral health of Colorado’s children still must be made in order to meet the Healthy People 2020 objectives for caries experience. Improvements must also be made to work toward the Healthy People 2020 overarching goal to achieve health equity, eliminate disparities, and improve the health of all groups, as significant disparities exist in the prevalence of caries experience, untreated decay, and dental sealants by school socioeconomic status and child’s race/ethnicity.

Methods

Sampling: The 2009–2010 electronic list of all public elementary schools in Colorado with third grade children was obtained from the Department of Education (1,019 schools and 63,558 third grade students). All schools with at least 10 children in third grade were included in the sampling frame (960 schools and 62,660 students). Using probability proportional to size sampling along with implicit stratification by percent of children eligible for the free and/or reduced price meal program, 60 elementary schools were selected based on third grade enrollment. If a school refused to participate, a replacement school within the same sampling strata was selected. If the sample school plus three replacement schools refused to participate, no data were collected in that sampling stratum. Of the 60 schools sampled, 58 schools agreed to participate. Three elementary schools that agreed to participate had kindergarten classes housed in a separate primary school building of a different name, thus screenings were conducted in a total of 61 unique schools. Data are available for 58 schools with kindergarten. Data are available for 57 schools with third grade, because one school from the original sample no longer had third grade students at the time of the screenings and, thus, only kindergarteners were screened at this school. Body mass index (BMI) data was not collected from three schools that declined collection of these data. BMI data are available for 55 schools with kindergarten and 54 schools with third grade.

Data Management and Analysis: Data entry was completed using Microsoft Access, and data analyses were completed using SAS Version 9.3. To account for differences in response rates between schools, and for different probabilities of school selection, the data were adjusted for non-response so that weighted estimates are representative of the Colorado population. First, the probability of child selection was calculated as the number of children enrolled in each school divided by the number of children screened. Second, the probability of school selection was calculated as the total number of students in Colorado divided by the individual school population multiplied by the number of schools selected. To obtain the final non-response sampling weight, the probability of child selection was multiplied by the probability of school selection. The Rao-Scott likelihood ratio chi-square test was used to test for statistical association between screening results variables and demographic variables, with $p < 0.05$ considered statistically significant.

For the body mass index (BMI) analyses, outliers of the BMI-for-age percentile were flagged by the CDC-provided SAS program and are based on World Health Organization fixed-exclusion ranges. Outliers were defined as a BMI-for-age percentile z score of less than -4 or greater than 5 , and these were considered biologically implausible values and were set to missing for the BMI analyses.

Screening Methods: Active and passive consent forms were used for student participation. Of the 58 participating schools with kindergarten, 11 (19%) schools used active consent, while the remaining 37 (81%) schools used passive consent. Of the 57 participating schools with third grade, 11 (19%) schools used active consent, while the remaining 36 (81%) schools used passive consent. Schools that used active consent had lower student participation compared with schools that used passive consent. Average response rates for active consent schools were 55.0% for schools with kindergarten and 46.9% for schools with third grade, while average response rates for passive consent schools were 84.2% for schools with kindergarten and 82.7% for schools with third grade.

Dental hygienists who volunteered to participate in the screenings received a manual called *Basic Screening Surveys: An Approach to Monitoring Community Oral Health*. Trainings on how to complete the data collection forms were held for the volunteers. Using the diagnostic criteria outlined in the manual, 19 hygienists completed the screenings with gloves, flashlights, and disposable mouth

mirrors. Upon screening completion, each child was given a toothbrush, a notification of current oral health status, and a timeline for recommended dental treatment. For urgent dental care needs, the school nurse was asked to follow up with the family.

Children’s age was obtained from date-of-birth data on school rosters, and only month and year of birth were collected. Child’s weight was measured with a digital calibrated scale after the child removed shoes and any hat or heavy clothing. Weight was recorded to the nearest 0.25 pound. Child’s height was measured with a stadiometer with heels together against the base of the stadiometer, feet flat on floor, and back straight. Height was recorded to the nearest 0.125 inch.

Eligibility for the free or reduced price meal (FRL) program can be used as an indicator of overall socioeconomic status. To be eligible for the FRL program during the 2009–2010 school year, annual family income for a family of four could not exceed \$40,793.² While information on eligibility for the FRL program is not available at the student level, it is available at the school level. The schools that participated in the oral health screenings were categorized into four socioeconomic status levels based on the percent of children eligible for the FRL program: less than 25.0% of students eligible, 25.0%–49.9% of students eligible, 50.0%–74.9% of the students eligible, and 75.0% or more of the students eligible. Because school-based sealant programs in Colorado require participating schools to have a minimum of 50% of students eligible for a FRL program, analyses were also conducted collapsing the two highest categories of eligibility for the FRL program into 50.0% or more of the students eligible.

Results

Of the 59 schools with third grade sampled, 57 schools agreed to participate in the oral health screening. In terms of eligibility for the free or reduced price meal (FRL) program, the participating schools did not differ substantially from either the 59 schools in the original sample or the 959 schools in the sampling frame (Table 1).

Table 1. Average percent of students eligible for the free or reduced price meal (FRL) program among schools with third grade

	Participating Schools (n=57)	Schools in Sample (n=59)	All Schools with ≥ 10 3 rd Grade Students (n=959)
Percent of students eligible for the FRL program	43.0%	43.3%	45.2%

Burden among Kindergarten Children (Table 2): The total enrollment in the 58 participating kindergarten schools was 4,005. Of these children, 3,139 completed a dental screening (78.4% response rate). The children ranged in age from 4–7 years with a mean of 6.1 years. About half of the children were male (51.0%) and half were female (49.0%). By race/ethnicity, 59.3% were White, 29.3% were Hispanic, 3.2% were Black, 2.8% were Asian, and 2.8% were multi-racial. Less than 1% were either American Indian/Alaska Native or Native Hawaiian/Pacific Islander.

About forty percent (39.7%) of the children screened had caries experience, defined as untreated decay or fillings in their primary and/or permanent teeth, while 13.8% had untreated decay at the time of the screening (10.7% had untreated decay in 1–2 quadrants, and 3.1% had untreated decay in 3–4

² U.S. Department of Agriculture, Food and Nutrition Service, Child Nutrition Programs - Income Eligibility Guidelines SY 2009-2010, <http://www.fns.usda.gov/cnd/governance/notices/iegs/IEGs09-10.pdf> (7-2-2012).

quadrants).³ About two percent (1.5%) of the children needed urgent dental care because of pain or infection.

Most kindergarten children were of healthy weight (74.8%), but 3.8% were underweight, 12.6% were overweight, and 8.7% were obese. More than one in five kindergarten children (21.3%) were either overweight or obese.

Among about 66,000 children in kindergarten, an estimated:

- ~26,300 children had caries experience (untreated decay and/or fillings)
- ~9,200 children had untreated decay
- ~1,000 children had urgent care needs due to pain and/or infection
- ~5,800 children were obese
- ~14,100 children were overweight or obese

Burden among Third Grade Children (Table 3): The total enrollment in the 57 participating third grade schools was 3,858. Of these children, 2,908 completed a dental screening (75.4% response rate). The children ranged in age from 6–11 years with a mean of 9.1 years. About half of the children were male (50.0%) and half were female (50.0%). By race/ethnicity, 59.6% were White, 29.7% were Hispanic, 3.0% were Black, 2.9% were Asian, and 2.9% were multi-racial. Another 1.1% of children were either American Indian/Alaska Native or Native Hawaiian/Pacific Islander.

Fifty-five percent (55.2%) of the children screened had caries experience, defined as untreated decay or fillings in their primary and/or permanent teeth, while 14.4% had untreated decay at the time of the screening (12.0% had untreated decay in 1–2 quadrants, and 2.4% had untreated decay in 3–4 quadrants).³ About two percent (1.5%) of the children needed urgent dental care because of pain or infection. Forty-five percent (44.9%) of the children had a dental sealant on at least one permanent molar. The prevalence of untreated decay was significantly higher among children without sealants (20.4% (95% confidence interval: 16.5%–24.3%)) compared with children with sealants (7.1% (95% confidence interval: 4.8%–9.3%)) (data not shown in table).

Most third grade children were of healthy weight (70.5%), but 2.8% were underweight, 13.1% were overweight, and 13.6% were obese. More than one in four third grade children (26.7%) were either overweight or obese.

Among about 66,000 children in third grade, an estimated:

- ~36,400 children had caries experience (untreated decay and/or fillings)
- ~9,500 children had untreated decay
- ~1,000 children had urgent care needs due to pain and/or infection
- ~36,300 children did not have dental sealants
- ~9,000 children were obese
- ~17,600 children were overweight or obese

Burden by Age (Figure 1): In general, children in third grade had a higher burden of caries experience and untreated decay compared with children in kindergarten (Tables 2 and 3). Looking specifically at caries experience, the prevalence increased by age from 34.8% among children aged 5 years to 62.6% among children aged 10 years.

³ The percent of children with untreated decay is assumed to be an under estimation because radiographs (x-rays) were not taken.

Burden by School Socioeconomic Status (Tables 4 and 5): For both kindergarten and third grade, children at schools with the highest percent of children eligible for the FRL program had a higher prevalence of caries experience compared with children at schools with a lower percent of children eligible for the FRL program. More than half of kindergarten children (53.1%) and nearly three-quarters of third grade children (73.4%) in schools with $\geq 75\%$ of children eligible for the FRL program had caries experience.

The prevalence of untreated decay was also higher among children at schools with $\geq 75\%$ of children eligible for the FRL program compared with children at schools with $< 25\%$ of children eligible for the FRL program (18.9% vs. 6.8% for kindergarten and 18.1% vs. 8.9% for third grade).

The prevalence of dental sealants was not significantly different across schools by FRL program eligibility.

Similar to the prevalence of caries experience and untreated decay, there were differences in obesity prevalence by school FRL program eligibility. About one in ten kindergarten children (10.3%) and nearly one in five third grade children (24.7%) in schools with $\geq 75\%$ of children eligible for the FRL program were obese.

Because school-based sealant programs in Colorado require participating schools to have a minimum of 50% of the students eligible for a FRL program, results are also presented for children at schools with greater than or equal to 50% of children eligible for the FRL program. Among these children, the prevalence of caries experience was 48.5% and the prevalence of untreated decay was 17.0% for children in kindergarten. Among these children, the prevalence of caries experience was 65.7%, the prevalence of untreated decay was 16.4%, and the prevalence of dental sealants was 40.3% for children in third grade. The oral disease burden was higher and the prevalence of preventive dental sealants was lower among these children than their peers at schools with $< 25\%$ of students eligible for the FRL program.

Burden by Race and Ethnicity (Tables 6 and 7): Among both kindergarten and third grade children, Hispanic children had a higher prevalence of caries experience compared with Black or White children. Among children in kindergarten, the prevalence of caries experience was 55.0% among Hispanic children, 38.0% among Black children, and 31.9% among White children. Among children in third grade, the prevalence of caries experience was 69.5% among Hispanic children, 56.4% among Black children, and 48.1% among White children. Among children in kindergarten, the prevalence of untreated decay was higher among Hispanic children (18.5%) compared with Black (16.8%) or White (11.4%) children.

Differences in obesity prevalence were found by race/ethnicity. The prevalence of obesity was higher among Hispanic children (12.4%) compared with White children (6.9%) in kindergarten. The prevalence of obesity was higher among Hispanic children (23.6%) compared with Black (10.2%) or White (9.0%) children in third grade.

Burden by Sex (Tables 8 and 9): For both children in kindergarten and children in third grade, no differences were found for dental screening results or weight status between males and females.

Trends in Results of Dental Screening (Figures 2 and 3): For both children in kindergarten and children in third grade, the overall prevalence of caries experience did not significantly change since the 2003–2004 screening, but the prevalence of untreated decay and the prevalence of urgent need for dental care decreased significantly. The prevalence of untreated decay decreased from 27% in 2003–2004 to 14% in 2011–2012 and the prevalence of urgent need for dental care decreased from 6% in 2003–2004 to 2% in 2011–2012 among children in kindergarten. The prevalence of untreated decay decreased from 26% in 2003–2004 to 14% in 2011–2012 and the prevalence of urgent need for dental care decreased from 6% in 2003–2004 to 2% in 2011–2012 among children in third grade. These trends are similar to national trends in untreated decay.⁴ Among children in third grade, the prevalence of dental sealants increased from 35% in 2003–2004 to 45% in 2011–2012.

Significant trends by the percent of students in the school eligible for the FRL program included the following (Figures 4 and 5):

- The prevalence of caries experience decreased among children in kindergarten at schools with <25% of children eligible for the FRL program (from 35% in 2003–2004 to 23% in 2011–2012) and among children in kindergarten at schools with ≥75% of children eligible for the FRL program (from 73% in 2003–2004 to 53% in 2011–2012).
- Among children in kindergarten, the prevalence of untreated decay decreased among both children at schools with <25% and ≥75% of children eligible for the FRL program (from 20% in 2003–2004 to 7% in 2011–2012 and from 48% in 2003–2004 to 19% in 2011–2012, respectively).
- Among children in third grade, the prevalence of untreated decay decreased from 2003–2004 to 2011–2012 among children at schools with <25% of children eligible for the FRL program (from 18% to 9%) and ≥75% of children eligible for the FRL program (from 41% to 18%).
- The prevalence of dental sealants increased among children in third grade at schools with ≥75% of children eligible for the FRL program (22% in 2003–2004 and 44% in 2011–2012). Similarly, when looking at schools with ≥50% of children eligible for the FRL program, prevalence of dental sealants increased from 24% in 2003–2004 to 40% in 2011–2012 among children in third grade.

The 2003–2004 to 2011–2012 trends by child’s race/ethnicity, comparing White and Hispanic children only due to small sample sizes for other race/ethnicities, showed some significant changes (Figures 6 and 7), the prevalence of caries experience did not change significantly among White or Hispanic children. The prevalence of untreated decay decreased among both White and Hispanic children (from 39% to 19% for Hispanic children and from 22% to 11% for White children in kindergarten; from 37% to 18% for Hispanic children and from 22% to 13% for White children in third grade). Among children in third grade, the prevalence of dental sealants increased among Hispanic children (from 26% to 42%) but not White children.

⁴ http://www.cdc.gov/nchs/data/hpdata2010/hp2010_final_review_focus_area_21.pdf and <http://www.cdc.gov/nchs/data/databriefs/db104.pdf>

Healthy People 2020 Objectives: The National Oral Health Objectives for the Year 2020 (Healthy People 2020) outline several oral health status objectives for young children aged 3–5 years and 6–9 years.⁵ The data source to measure progress on these national objectives is the National Health and Nutrition Examination Survey (NHANES). NHANES data are not available specific to Colorado. Although the Colorado Children’s Oral Health Screening was not designed to be representative of children aged 3–5 years or 6–9 years in Colorado, these screening data do provide some comparison to the Healthy People 2020 objectives. Of the kindergarten and third grade children screened, 1,327 were aged 4–5 years (few were aged 4 years and none were aged 3 years) and 4,609 were aged 6–9 years (few were aged 7 years).

Note that for the Healthy People 2020 objectives, the age group includes children aged 3 years whereas the Colorado Children’s Oral Health Screening did not include children aged 3 years. In comparing prevalence estimates among children aged 3–5 years (United States data) with children aged 4–5 years (Colorado data), it might be expected that caries experience and untreated decay might be somewhat more prevalent among the older group of children aged 4–5 years (Colorado data).

- OH-1: Reduce the proportion of children and adolescents who have dental caries experience in their primary or permanent teeth
 - OH 1.1: [Reduce the proportion of young children aged 3 to 5 years with dental caries experience in their primary teeth](#)
 - United States (children aged 3–5 years)
 - 1999–2004 prevalence from NHANES: 33.3% (baseline)
 - 2020 target: **30.0%** (10% improvement from baseline)
 - Colorado (children in kindergarten aged 4–5 years)
 - 2011–2012 prevalence from CO BSS: **35.3%** (30.3%–40.3%)
 - OH 1.2: [Reduce the proportion of children aged 6 to 9 years with dental caries experience in their primary and permanent teeth](#)
 - United States (children aged 6–9 years)
 - 1999–2004 prevalence from NHANES: 54.4% (baseline)
 - 2020 target: **49.0%** (10% improvement from baseline)
 - Colorado (children in kindergarten or third grade aged 6–9 years)
 - 2011–2012 prevalence from CO BSS: **50.7%** (46.7%–54.7%)
- OH-2: Reduce the proportion of children and adolescents with untreated dental decay
 - OH 2.1: [Reduce the proportion of young children aged 3 to 5 years with untreated dental decay in their primary teeth](#)
 - United States (children aged 3–5 years)
 - 1999–2004 prevalence from NHANES: 23.8% (baseline)
 - 2020 target: **21.4%** (10% improvement from baseline)
 - Colorado (children in kindergarten aged 4–5 years)
 - 2011–2012 prevalence from CO BSS: **13.3%** (10.6%–16.0%)

⁵ <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=32>

- OH2.2: [Reduce the proportion of children aged 6 to 9 years with untreated dental decay in their primary and permanent teeth](#)
 - United States (children aged 6–9 years)
 - 1999–2004 prevalence from NHANES: 28.8% (baseline)
 - 2020 target: **25.9%** (10% improvement from baseline)
 - Colorado (children in kindergarten or third grade aged 6–9 years)
 - 2011–2012 prevalence from CO BSS: **14.2%** (11.7%–16.7%)

- OH-12: Increase the proportion of children and adolescents who have received dental sealants on their molar teeth
 - OH12.1: [Increase the proportion of children aged 3 to 5 years who have received dental sealants on one or more of their primary molar teeth](#)
 - United States (children aged 3–5 years)
 - 1999–2004 prevalence from NHANES: 1.4% (baseline)
 - 2020 target: **1.5%** (10% improvement from baseline)
 - Colorado (children in kindergarten aged 4–5 years)
 - Data not available

 - OH12.2: [Increase the proportion of children aged 6 to 9 years who have received dental sealants on one or more of their permanent first molar teeth](#)
 - United States (children aged 6–9 years)
 - 1999–2004 prevalence from NHANES: 25.5% (baseline)
 - 2020 target: **28.1%** (10% improvement from baseline)
 - Colorado (children in kindergarten or third grade aged 6–9 years)
 - 2011–2012 prevalence from CO BSS: **31.4%** (28.3%–34.5%)

Table 2. Demographic characteristics and oral health and body mass index screening results among children in kindergarten (n=3,139) — Colorado Children’s Oral Health Screening, 2011–2012

	Unweighted Number with Data	Weighted Estimate	95% Confidence Interval
Age (years)			
Mean age	3,109	6.1 (SE 0.03)	
Age range		4–7	
Sex			
% Male	3,117	51.0	48.9–53.0
% Female		49.0	47.0–51.1
Race/Ethnicity			
% White		59.3	51.5–67.1
% Black/African-American		3.2	1.8–4.6
% Hispanic/Latino		29.3	21.9–36.6
% Asian	3,104	2.8	1.6–4.0
% American Indian/Alaska Native		0.9	0.2–1.6
% Native Hawaiian/Pacific Islander		0.3	0.0–0.5
% Multi-racial		2.8	1.6–4.0
% Other		0.4	0.0–0.9
% Unknown		1.0	0.2–1.8
Caries Experience			
% With caries experience	3,132	39.7	35.5–43.9
% Caries free		60.3	56.1–64.5
Untreated Decay			
% With untreated decay	3,133	13.8	11.4–16.1
Untreated Decay (Number of Quadrants)			
% With no untreated decay		86.2	83.9–88.6
% With untreated decay in 1 quadrant	3,133	6.7	5.5–7.8
% With untreated decay in 2 quadrants		4.0	3.1–4.9
% With untreated decay in 3 quadrants		1.8	1.1–2.4
% With untreated decay in 4 quadrants		1.3	0.7–2.0
Treatment Urgency			
% With no obvious problem	3,125	86.4	84.0–88.7
% Needing early care		12.1	10.1–14.1
% Needing urgent care		1.5	0.7–2.3
Body Mass Index (BMI)			
% Underweight		3.8	2.8–4.8
% Healthy weight	2,963	74.8	71.5–78.2
% Overweight		12.6	9.8–15.4
% Obese		8.7	7.1–10.3

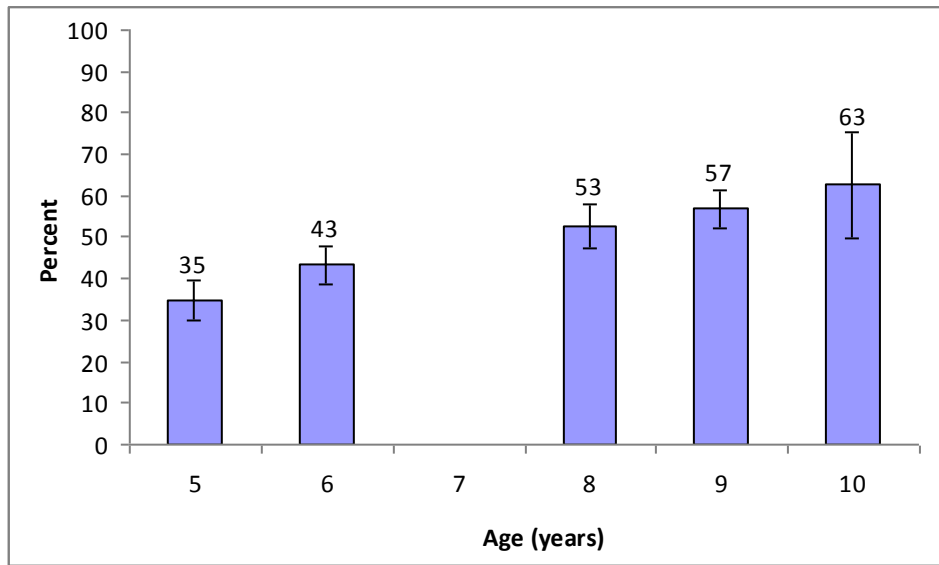
SE: standard error

Table 3. Demographic characteristics and oral health screening results among children in third grade (n=2,908) — Colorado Children’s Oral Health Screening, 2011–2012

	Unweighted Number with Data	Weighted Estimate	95% Confidence Interval
Age (years)			
Mean age	2,897	9.1 (SE 0.03)	
Age range		6–11	
Sex			
% Male	2,892	50.0	48.0–51.9
% Female		50.0	48.1–52.0
Race/Ethnicity			
% White		59.6	52.0–67.2
% Black/African-American		3.0	1.5–4.6
% Hispanic/Latino		29.7	22.4–37.0
% Asian		2.9	1.9–3.9
% American Indian/Alaska Native	2,889	1.0	0.4–1.5
% Native Hawaiian/Pacific Islander		0.1	0.0–0.3
% Multi-racial		2.9	1.4–4.4
% Other		0.1	0.0–0.2
% Unknown		0.7	0.1–1.3
Caries Experience			
% With caries experience		55.2	50.8–59.5
% Caries free	2,901	44.8	40.5–49.2
Untreated Decay			
% With untreated decay	2,901	14.4	11.5–17.2
Untreated Decay (Number of Quadrants)			
% With no untreated decay		85.6	82.8–88.5
% With untreated decay in 1 quadrant	2,901	7.7	6.1–9.3
% With untreated decay in 2 quadrants		4.3	3.1–5.6
% With untreated decay in 3 quadrants		1.4	0.8–1.9
% With untreated decay in 4 quadrants		1.0	0.5–1.5
Treatment Urgency			
% With no obvious problem		85.6	82.7–88.5
% Needing early care	2,893	12.9	10.4–15.4
% Needing urgent care		1.5	0.5–2.6
Dental Sealants			
% With dental sealants	2,894	44.9	41.1–48.6
Body Mass Index (BMI)			
% Underweight		2.8	2.0–3.7
% Healthy weight	2,801	70.5	67.2–73.8
% Overweight		13.1	11.4–14.7
% Obese		13.6	11.1–16.2

SE: standard error

Figure 1. Caries experience among children in kindergarten and third grade by age —Colorado Children’s Oral Health Screening, 2011–2012



Note: Data suppressed for children aged 7 years due to reliability concerns.

Table 4. Oral health screening results among children in kindergarten by percent of students in the school who were eligible for free or reduced price meal program (FRL) — Colorado Children’s Oral Health Screening, 2011–2012

	Percent of students in the school eligible for FRL					Rao-Scott Chi- Square Test (p) [†]
	< 25% (n=1,070)	25–49.9% (n=694)	50–74.9% (n=517)	≥ 75% (n=496)	≥ 50%* (n=1,013)	
Caries experience (%) (95% CI)	23.1 (18.6–27.6)	43.2 (38.0–48.4)	43.4 (36.3–50.5)	53.1 (47.5–58.7)	48.5 (43.6–53.3)	<0.001
Untreated decay (%) (95% CI)	6.8 (4.7–9.0)	16.0 (10.2–21.8)	14.9 (10.3–19.5)	18.9 (15.8–22.1)	17.0 (14.1–19.9)	<0.001
Treatment urgency						
No obvious problem (%) (95% CI)	93.4 (91.3–95.6)	84.4 (78.6–90.1)	84.8 (80.3–89.4)	81.0 (77.8–84.2)	82.8 (80.0–85.7)	<0.001
Early care (%) (95% CI)	6.4 (4.1–8.6)	13.6 (9.5–17.7)	14.1 (9.6–18.6)	15.9 (12.9–18.9)	15.1 (12.4–17.7)	
Urgent care (%) (95% CI)	0.2 (0.0–0.5)	2.0 (0.0–4.1)	1.0 (0.3–1.7)	3.1 (0.6–5.6)	2.1 (0.7–3.5)	
Body mass index						
Underweight (%) (95% CI)	3.6 (2.1–5.1)	5.0 (2.2–7.7)	4.2 (2.5–5.9)	2.5 (1.1–3.9)	3.5 (2.3–4.8)	0.007
Healthy weight (%) (95% CI)	81.4 (76.8–86.0)	73.9 (65.9–81.9)	71.8 (68.4–75.2)	73.1 (66.4–79.9)	72.4 (68.9–75.8)	
Overweight (%) (95% CI)	10.4 (6.4–14.4)	13.2 (5.6–20.9)	10.8 (7.9–13.8)	14.0 (9.7–18.3)	12.2 (9.6–14.8)	
Obese (%) (95% CI)	4.6 (2.9–6.2)	7.9 (5.5–10.3)	13.1 (9.2–17.0)	10.3 (7.7–12.9)	11.9 (9.4–14.5)	

* Because school-based sealant programs in Colorado require participating schools to have a minimum of 50% of the students eligible for the FRL program, results are also presented for children at schools with ≥ 50% of children eligible for the FRL program.

† The Rao-Scott Chi-Square Test tested for an association between the oral health screening results and percent of students eligible for FRL in four categories (< 25%, 25–49.9%, 50–74.9%, and ≥ 75%).

Table 5. Oral health screening results among children in third grade by percent of students in the school who were eligible for free or reduced price meal program (FRL)
— Colorado Children’s Oral Health Screening, 2011–2012

	Percent of students in the school eligible for FRL					Rao-Scott Chi-Square Test (p) [†]
	< 25% (n=989)	25–49% (n=661)	50–74.9% (n=593)	≥ 75% (n=665)	≥ 50%* (n=1,258)	
Caries experience (%) (95% CI)	40.7 (35.0–46.5)	57.6 (52.2–63.0)	57.5 (51.6–63.4)	73.4 (68.1–78.7)	65.7 (60.6–70.9)	<0.001
Untreated decay (%) (95% CI)	8.9 (5.6–12.3)	18.9 (13.7–24.1)	14.5 (7.9–21.2)	18.1 (12.0–24.2)	16.4 (11.8–21.0)	0.009
Treatment urgency						
No obvious problem (%) (95% CI)	91.3 (88.0–94.6)	81.0 (75.8–86.2)	85.2 (78.5–92.0)	81.9 (75.8–88.0)	83.5 (78.9–88.1)	<0.001
Early care (%) (95% CI)	8.5 (5.3–11.7)	15.3 (10.8–19.8)	14.1 (7.9–20.2)	16.1 (10.5–21.6)	15.1 (10.9–19.2)	
Urgent care (%) (95% CI)	0.3 (0.0–0.5)	3.7 (0.2–7.2)	0.7 (0.0–1.6)	2.0 (0.1–4.0)	1.4 (0.2–2.5)	
Dental sealants (%) (95% CI)	47.4 (40.3–54.6)	49.3 (41.6–57.1)	36.8 (31.6–41.9)	43.7 (37.0–50.3)	40.3 (35.9–44.7)	0.058
Body mass index						
Underweight (%) (95% CI)	4.2 (2.5–5.9)	2.4 (0.7–4.0)	1.7 (0.6–2.7)	2.4 (0.8–4.0)	2.0 (1.1–3.0)	<0.001
Healthy weight (%) (95% CI)	80.7 (77.9–83.5)	73.2 (69.7–76.6)	65.7 (59.3–72.1)	56.1 (51.4–60.8)	61.2 (56.6–65.8)	
Overweight (%) (95% CI)	9.0 (7.0–11.0)	12.9 (10.5–15.3)	15.7 (12.2–19.3)	16.8 (12.9–20.8)	16.2 (13.6–18.9)	
Obese (%) (95% CI)	6.1 (4.0–8.1)	11.6 (8.8–14.4)	16.9 (12.1–21.7)	24.7 (19.7–29.7)	20.5 (16.7–24.3)	

* Because school-based sealant programs in Colorado require participating schools to have a minimum of 50% of the students eligible for the FRL program, results are also presented for children at schools with ≥ 50% of children eligible for the FRL program.

† The Rao-Scott Chi-Square Test tested for an association between the oral health screening results and percent of students eligible for FRL in four categories (< 25%, 25–49.9%, 50–74.9%, and ≥ 75%).

Table 6. Oral health screening results among children in kindergarten by race/ethnicity
 — Colorado Children’s Oral Health Screening, 2011–2012

	Race/Ethnicity					Rao- Scott Chi- Square Test (<i>p</i>)
	White (n=1,784)	Hispanic (n=979)	Black (n=94)	Asian (n=93)	Multi-racial (n=85)	
Caries experience (%) (95% CI)	31.9 (28.0–35.8)	55.0 (50.9–59.1)	38.0 (27.1–48.9)	39.7 (23.1–56.3)	40.6 (31.6–49.6)	<0.001
Untreated decay (%) (95% CI)	11.4 (8.9–14.0)	18.5 (15.0–21.9)	16.8 (8.1–25.5)	7.2 (0.7–13.6)	15.2 (8.8–21.7)	<0.001
Treatment Urgency						
No obvious problem (%) (95% CI)	88.6 (86.1–91.2)	81.9 (78.5–85.3)	83.2 (74.5–91.9)	92.8 (86.4–99.3)	84.8 (78.3–91.2)	<0.001
Early care (%) (95% CI)	10.6 (8.2–12.9)	15.4 (12.2–18.6)	13.6 (3.9–23.2)	5.6 (0.8–10.5)	13.2 (6.9–19.4)	
Urgent care (%) (95% CI)	0.8 (0.3–1.3)	2.7 (1.1–4.3)	3.2 (0.0–8.0)	1.5 (0.0–4.0)	2.1 (0.0–6.2)	
Body mass index						
Underweight (%) (95% CI)	4.1 (2.7–5.4)	3.4 (1.6–5.2)	4.7 (0.0–9.6)	3.6 (0.0–8.1)	3.9 (0.0–9.3)	0.014
Healthy weight (%) (95% CI)	76.3 (72.1–80.6)	71.5 (67.1–75.8)	72.6 (62.4–82.7)	83.9 (76.0–91.8)	69.1 (58.4–79.8)	
Overweight (%) (95% CI)	12.7 (9.0–16.5)	12.7 (9.3–16.1)	16.9 (6.3–27.5)	3.9 (1.0–6.8)	14.2 (7.2–21.2)	
Obese (%) (95% CI)	6.9 (5.2–8.6)	12.4 (9.9–14.9)	5.8 (0.0–11.9)	8.5 (2.1–15.0)	12.8 (4.0–21.5)	

Table 7. Oral health screening results among children in third grade by race/ethnicity — Colorado
 Children’s Oral Health Screening, 2011–2012

	Race/Ethnicity					Rao-Scott Chi-Square Test (p)
	White (n=1,662)	Hispanic (n=920)	Black (n=84)	Asian (n=96)	Multi-racial (n=74)	
Caries experience (%) (95% CI)	48.1 (43.3–52.8)	69.5 (65.4–73.6)	56.4 (48.0–64.7)	57.4 (44.2–70.6)	53.4 (39.5–67.3)	<0.001
Untreated decay (%) (95% CI)	12.5 (9.6–15.5)	17.7 (13.5–21.9)	15.8 (6.6–25.0)	20.0 (12.8–27.3)	8.8 (0.0–18.0)	0.021
Treatment Urgency						
No obvious problem (%) (95% CI)	87.4 (84.4–90.4)	82.4 (78.3–86.5)	84.2 (75.0–93.4)	80.0 (72.7–87.2)	91.2 (82.0–100.0)	0.015*
Early care (%) (95% CI)	11.4 (8.7–14.2)	15.0 (11.2–18.7)	15.8 (6.6–25.0)	19.4 (12.4–26.4)	8.8 (0.0–18.0)	
Urgent care (%) (95% CI)	1.2 (0.2–2.2)	2.6 (0.6–4.6)	0.0 NA	0.6 (0.0–1.8)	0.0 NA	
Dental Sealants (%) (95% CI)	46.3 (41.6–50.9)	41.8 (37.5–46.1)	43.0 (30.8–55.1)	41.6 (27.4–55.8)	63.9 (46.5–81.4)	0.051
Body mass index						
Underweight (%) (95% CI)	3.0 (2.0–3.9)	1.8 (0.5–3.0)	2.1 (0.0–5.2)	2.4 (0.0–5.3)	10.1 (0.0–20.4)	<0.001
Healthy weight (%) (95% CI)	77.5 (74.9–80.1)	57.8 (53.8–61.8)	74.9 (64.4–85.4)	70.0 (54.6–85.5)	58.2 (42.5–73.8)	
Overweight (%) (95% CI)	10.6 (8.6–12.6)	16.8 (13.8–19.8)	12.8 (6.1–19.5)	11.0 (2.7–19.4)	23.2 (12.3–34.1)	
Obese (%) (95% CI)	9.0 (7.1–10.8)	23.6 (19.6–27.6)	10.2 (2.2–18.2)	16.5 (4.0–29.0)	8.5 (1.0–16.0)	

* Rao-Scott Chi-square test comparing White children with Hispanic children

Table 8. Oral health screening results among children in kindergarten by sex — Colorado Children’s Oral Health Screening, 2011–2012

	Sex		Rao-Scott Chi- Square Test (<i>p</i>)
	Male (n=1,586)	Female (n=1,531)	
Caries experience (%) (95% CI)	40.2 (35.4–45.0)	39.5 (34.9–44.1)	0.740
Untreated decay (%) (95% CI)	13.5 (10.9–16.0)	14.3 (11.6–17.0)	0.506
Treatment urgency			
No obvious problem (%) (95% CI)	86.7 (84.1–89.2)	85.9 (83.2–88.6)	0.811
Early care (%) (95% CI)	11.9 (9.8–14.0)	12.5 (9.9–15.1)	
Urgent care (%) (95% CI)	1.4 (0.5–2.3)	1.6 (0.7–2.6)	
Body mass index			
Underweight (%) (95% CI)	3.9 (2.7–5.0)	3.8 (2.6–4.9)	0.149
Healthy weight (%) (95% CI)	72.9 (68.7–77.1)	76.9 (73.3–80.4)	
Overweight (%) (95% CI)	13.7 (10.3–17.0)	11.5 (8.6–14.4)	
Obese (%) (95% CI)	9.6 (7.4–11.7)	7.9 (6.0–9.7)	

Table 9. Oral health screening results among children in third grade by sex — Colorado Children’s Oral Health Screening, 2011–2012

	Sex		Rao-Scott Chi- Square Test (<i>p</i>)
	Male (n=1,480)	Female (n=1,412)	
Caries experience (%) (95% CI)	55.7 (50.8–60.5)	54.6 (49.5–59.7)	0.662
Untreated decay (%) (95% CI)	15.5 (12.4–18.5)	13.3 (10.1–16.4)	0.081
Treatment urgency			
No obvious problem (%) (95% CI)	84.3 (81.2–87.4)	87.0 (83.9–90.1)	0.018
Early care (%) (95% CI)	14.5 (11.6–17.3)	11.3 (8.6–13.9)	
Urgent care (%) (95% CI)	1.2 (0.3–2.1)	1.8 (0.3–3.2)	
Dental sealants (%) (95% CI)	42.6 (38.5–46.7)	47.3 (42.7–51.9)	0.039
Body mass index			
Underweight (%) (95% CI)	2.6 (1.7–3.4)	3.1 (2.0–4.2)	0.251
Healthy weight (%) (95% CI)	69.6 (65.4–73.8)	71.4 (67.9–74.8)	
Overweight (%) (95% CI)	12.8 (10.4–15.2)	13.3 (11.5–15.1)	
Obese (%) (95% CI)	15.0 (11.8–18.2)	12.3 (9.2–15.4)	

Figure 2. Results of dental screening among children in kindergarten — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

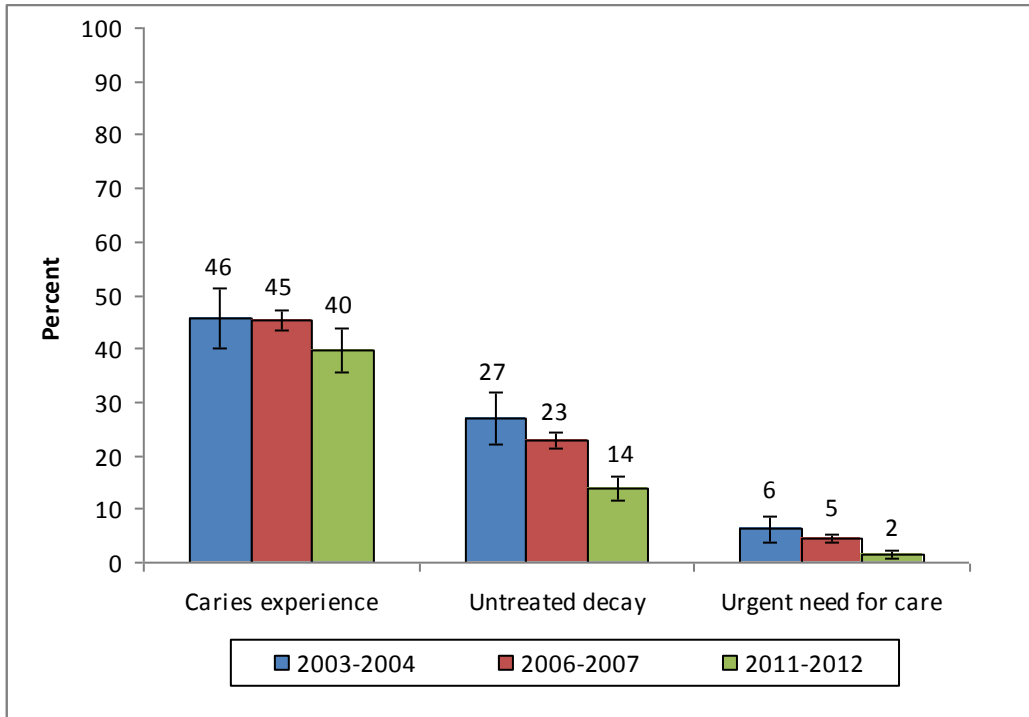


Figure 3. Results of dental screening among children in third grade — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

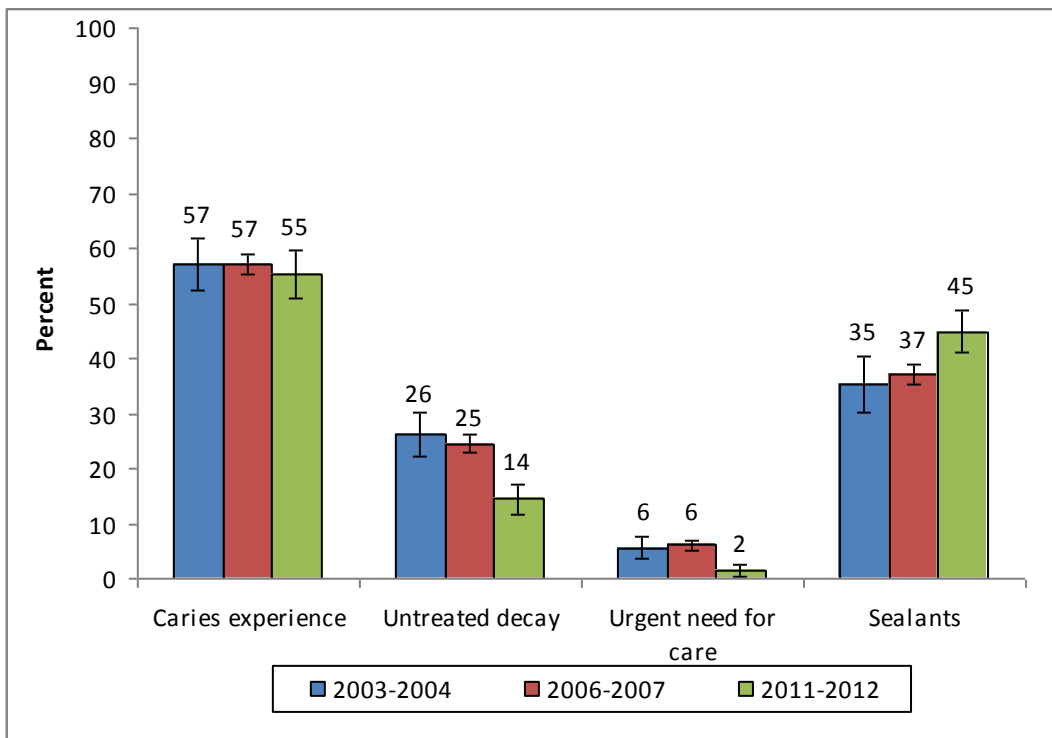


Figure 4. Results of dental screening among children in kindergarten by percent of students in the school who were eligible for free or reduced price meal program (FRL) — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

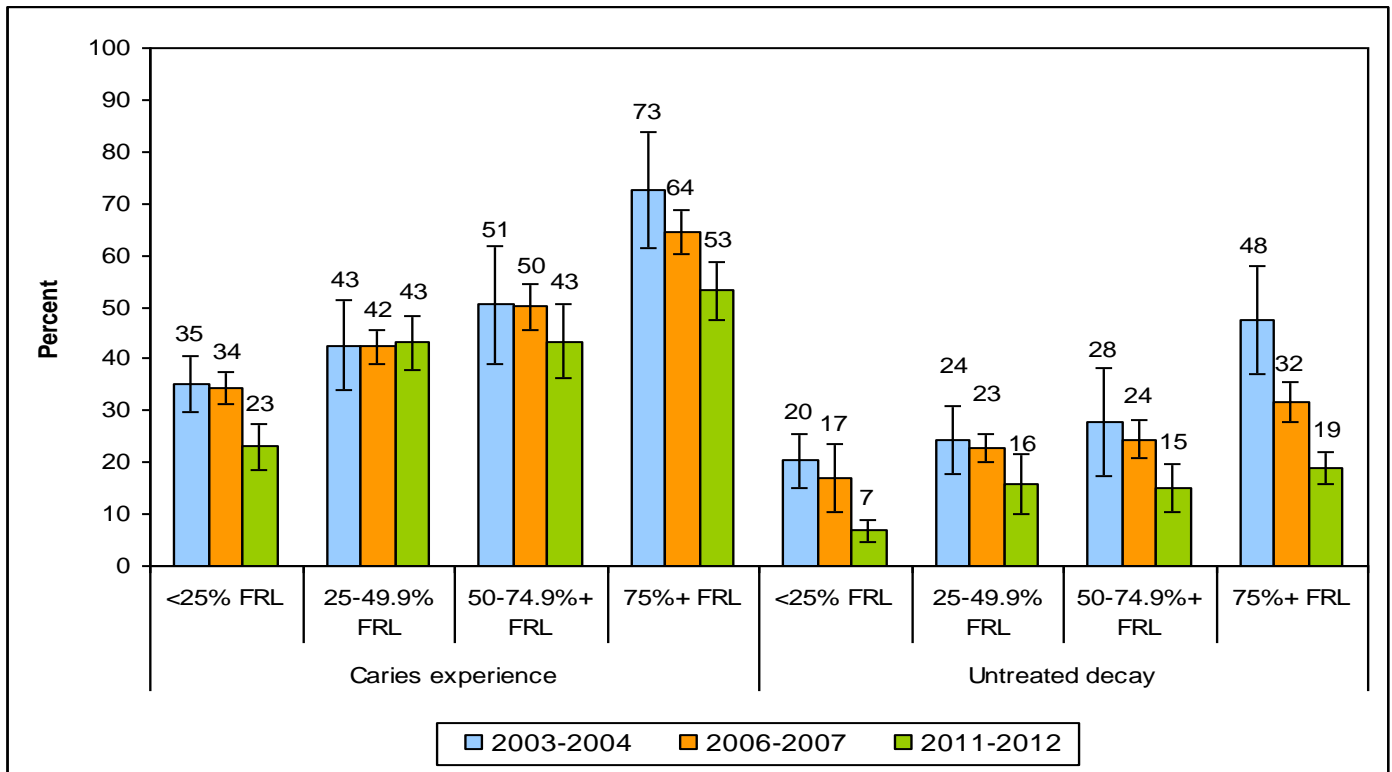


Figure 5. Results of dental screening among children in third grade by percent of students in the school who were eligible for free or reduced price meal program (FRL) — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

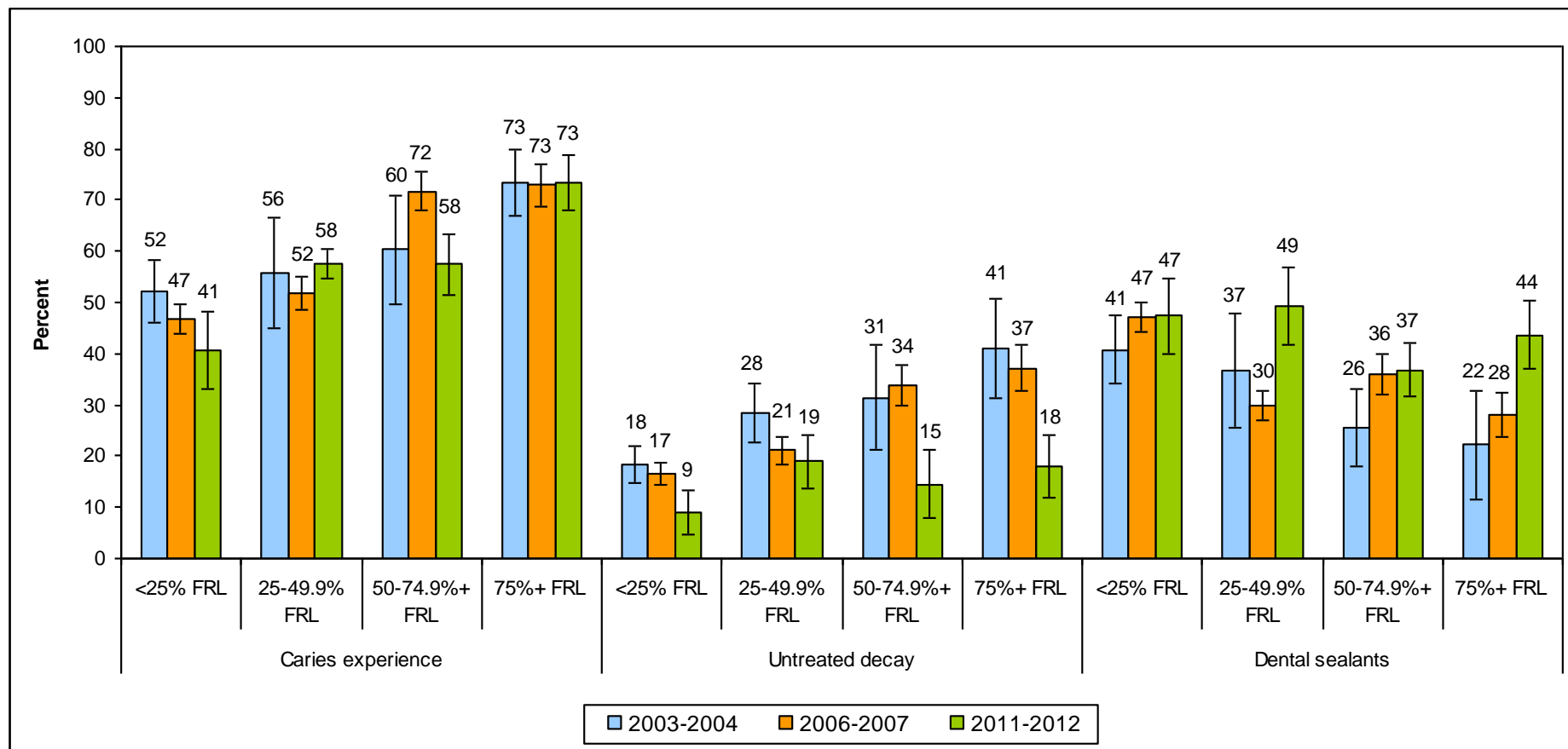


Figure 6. Results of dental screening among children in kindergarten by race/ethnicity — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

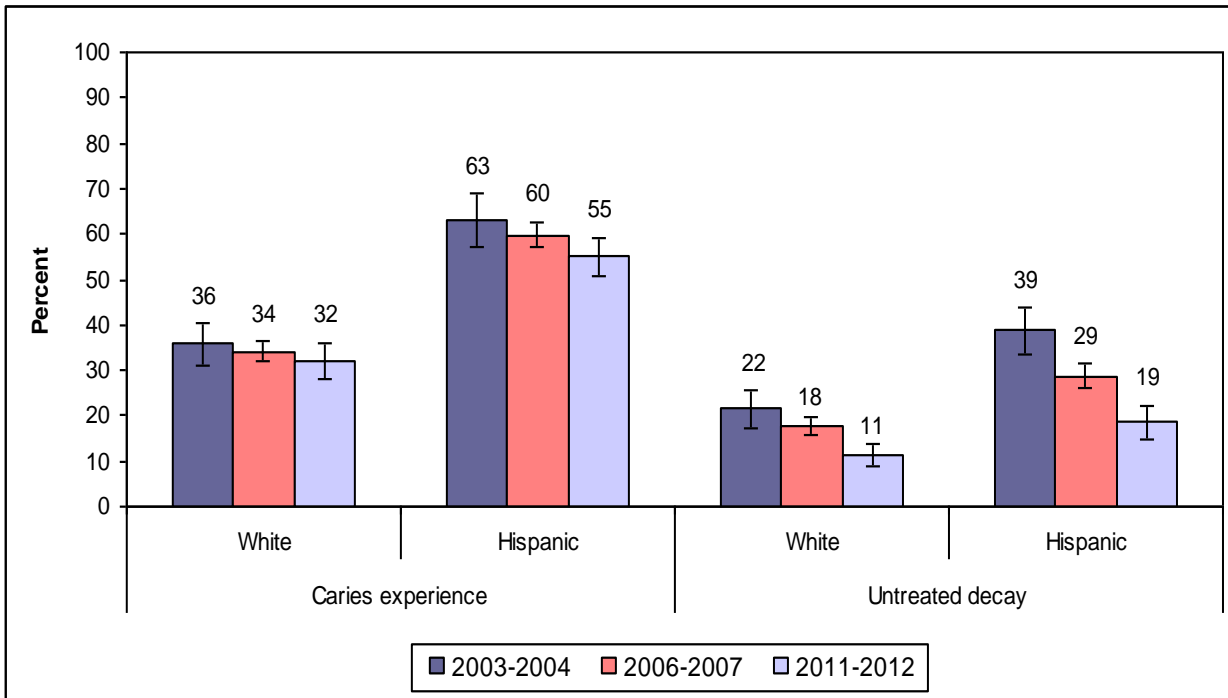


Figure 7. Results of dental screening among children in third grade by race/ethnicity — Colorado Children’s Oral Health Screening, 2003–2004, 2006–2007, and 2011–2012

