

COLORADO ORAL HEALTH SURVEY 2006-2007 SCHOOL YEAR

**PRELIMINARY RESULTS
OCTOBER 12, 2007**

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SUMMARY

During the 2006-2007 school year, the Colorado Department of Public Health and Environment conducted a statewide oral health survey of kindergarten and third grade children enrolled in Colorado's public elementary schools. Fifty-six public schools were included in the probability sample and 49 agreed to participate. Seventeen volunteer dental hygienists screened those children who did not return a negative consent form. Within the 49 participating schools, the response rate was 84 percent for kindergarten and 79 percent for third grade children. During the past three years, since the previous survey in the 2003-2004 school year, there has been improvement in some of the indicators of oral health.

Key Findings

- ⇒ Dental decay in 06-07 is still a significant public health problem for Colorado's children.
 - 45 percent of the kindergarten and 57 percent of the third grade children had cavities and/or fillings (decay experience), compared to 46 percent and 57 percent in 03-04
 - 23 percent of the kindergarten and 24.5 percent of the third grade children had untreated dental decay (cavities), compared to 27 percent and 26 percent, respectively, in 03-04
- ⇒ While dental sealants are a proven method for preventing decay, most of Colorado's children still do not have access to this preventive service.
 - 37 percent of the third grade children had dental sealants, compared to 35 percent in 03-04
- ⇒ Children from low-income schools still have poorer oral health.
 - Compared to children from higher income schools (<25% eligible for free or reduced price meals), children in low-income schools (\geq 75% eligible for free or reduced price meals) have a significantly higher prevalence of both decay experience and untreated decay. Third grade children from low-income schools also have a significantly lower prevalence of protective dental sealants, however, the gap in sealant disparities has reduced in the past three years.
- ⇒ Hispanic children still have poorer oral health.
 - Compared to white non-Hispanic children, a significantly higher proportion of Hispanic children had decay experience and untreated decay, while a lower proportion had dental sealants. In the past three years, however, the disparity gaps in untreated decay and sealants have reduced.
- ⇒ Improvements in the oral health of Colorado's children still must be made in order to meet the Healthy People 2010 objectives for caries experience, untreated decay, and dental sealants.

Methods

Sampling: The 2005-2006 electronic list of all public elementary schools in Colorado with third grade children was obtained from the Department of Education (967 schools and 57,199 third grade students). All schools with at least 10 children in third grade were included in the sampling frame (922 schools and 56,948 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, 56 elementary schools were selected. 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 56 stratum, data is available for 49.

Data Management and Analysis: Data entry and analysis was completed using SAS Version 9.2. SAS is a statistical software program based out of Cary, North Carolina. To account for differences in response rates between schools, and for different probabilities of school selection, the data were adjusted for non-response. The number of children enrolled in each school was divided by the number of children screened. To obtain the non-response sampling weight for each school, the probability of child selection was multiplied by the probability of school selection.

Screening Methods: All children in both kindergarten and third grade were screened, if they did not return a negative consent form. Seventeen volunteer dental hygienists completed the screenings using gloves, flashlights, and disposable mouth mirrors supplied by the Department of Health. The diagnostic criteria outlined in *Basic Screening Surveys: An Approach to Monitoring Community Oral Health* were used. The volunteer hygienists had previously participated in the BSS, and attended a training session and watched the Basic Screening Survey training video.

In 2006-2007 there were five methodological advances that reduced sampling error compared to the 2003-2004 survey methodological design. (1) Passive consent increased the response rates for kindergarten and third grade children. (2) Sample size increased by 50%. (3) The non-response weights accounted for both the probabilities of child and school selection, compared to just child selection in 03-04. (4) The inter-rater error rate decreased by reducing the total number of screeners. (5) Children's age was obtained from date-of-birth data on school rosters rather than from parental self-report.

Results

Of the 56 selected schools, 49 agreed to participate in the oral health survey. In terms of eligibility for the free and/or reduced price meal program, the participating schools did not differ substantially from either the 56 schools in the original sample or the 922 schools in the sampling frame.

Comparison of Participating Schools to All Colorado Schools			
	Participating Schools (n=49)	Schools in Sample (n=56)	All Schools with \geq 10 3 rd Grade Students (n=922)
% Eligible for F/R Lunch	39.7	40.9	40.7

Kindergarten Children (Table 1): The 49 participating schools had a kindergarten enrollment of 3,598; of which 3,023 completed a dental screening (84% response rate). The children ranged in age from 5-10 years with a mean of 5.96 years. About half of the children were male (50.6%) and slightly more than half were white non-Hispanic (51%).

Forty-five percent of the children screened had decay experience (untreated decay or fillings) in their primary and/or permanent teeth while 23 percent had untreated decay at the time of the screening.¹ About 23 percent of the children needed dental treatment including five percent in need of urgent dental care because of pain or infection.

Third Grade Children (Table 3): The 49 participating schools had a third grade enrollment of 3,821; of which 3,012 completed a dental screening (79% response rate). The children ranged in age from 5-14 years with a mean of 9.0 years. About half of the children were male (52%) and slightly more than half were white non-Hispanic (53%).

Fifty-seven percent of the children screened had decay experience (untreated decay or fillings) in their primary and/or permanent teeth while 24.5 percent had untreated decay at the time of the screening.¹ About 25 percent of the children needed dental treatment including six percent in need of urgent dental care because of pain or infection.

Thirty-seven percent of the children had a dental sealant on at least one permanent molar. 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 cavity-causing bacteria cannot reach areas that are difficult to clean and for fluoride to penetrate.

Impact of Socioeconomic Status (Tables 5B and 6B): Eligibility for the free and/or reduced price lunch (FRL) program is often used as an indicator of overall socioeconomic status. To be eligible for the FRL program during the 2006-2007 school year, annual family income for a family of four could not exceed \$37,000.² While information on eligibility for the FRL program is not available at the student level it is available at the school level. The schools taking part in the oral health survey were categorized into four income levels based on the percentage of children eligible for the FRL program.

- High income: Less than 25% of students eligible.
- Moderate income: 25% - 49.9% of students eligible.
- Middle-low income: 50% - 74.9% of the students eligible.
- Low income: 75% or more of the students eligible.

For both kindergarten and third grade, children at low-income schools had a significantly higher prevalence of both caries experience and untreated decay compared to children at high-income

¹ The percent of children with untreated decay is assumed to be an under estimation because radiographs (x-rays) were not taken.

² U.S. Department of Agriculture, Child Nutrition Programs, School Lunch Program, Income Eligibility Guidelines SY 2006-2007, www.fns.usda.gov/cnd/governance/notices/iegs/IEGs06-07.pdf (10/9/07).

schools. For third grade children, the prevalence of dental sealants was significantly lower in low-income schools compared to higher-income schools.

Impact of Race and Ethnicity (Tables 7 and 8): Tables 7 and 8 compare the oral health of white non-Hispanic children with Hispanic children. For both kindergarten and third grade children, Hispanic children, compared to white children, have a significantly higher prevalence of caries experience and untreated decay. The prevalence of dental sealants is significantly lower in Hispanic third grade children compared to similar white non-Hispanic children. NOTE: The racial/ethnic disparities noted may be associated with differences in socioeconomic status.

Healthy People 2010 Objectives (Table 9): The National Oral Health Objectives for the Year 2010 (Healthy People 2010) outline several oral health status objectives for young children. For six- to eight-year-old children there are three primary oral health status objectives:

- To decrease the proportion of children who have experienced dental caries in permanent or primary teeth to 42 percent.
- To decrease the proportion of children with untreated dental caries in permanent or primary teeth to 21 percent.
- To increase the proportion of eight-year-olds receiving protective sealing of the occlusal surfaces of permanent molar teeth to 50 percent.

While the Colorado Oral Health Survey was not designed to be representative of 6-8 year old children in Colorado, it does provide some information that can be compared to the Healthy People 2010 objectives. Of the kindergarten and third grade children screened, 2,919 were between 6-8 years of age (with the majority of these being age 6). Based on information from these 2,919 children, the State of Colorado needs to make progress if the Healthy People 2010 objectives are to be met. Almost 47 percent of the 6-8 year old children screened in Colorado had experienced dental caries – higher than the HP2010 objective of 42 percent. Twenty-two percent of the Colorado 6-8 year old children had untreated caries compared to the HP2010 objective of 21 percent. Twenty-nine percent of eight-year-old children screened (n=653) had dental sealants compared to the HP2010 objective of 50 percent.

Table 1
 Oral Health of Colorado's Kindergarten Children
Adjusted for Non-Response

Variable	Number with Data	Estimate	95% Confidence Interval
Number Screened	3,023		
Age			
Mean age (years)	2,928	5.96 (SE 0.01)	
Age range		5-10 years	
Gender			
% Male	3,007	50.6	48.8-52.4
% Female		49.4	47.6-51.2
Race/Ethnicity			
% White		51.1	49.3-52.9
% African-American		6.9	5.9-7.8
% Hispanic		35.7	33.9-37.4
% Asian		2.8	2.2-3.4
% Native American	3,022	0.8	0.5-1.2
% Pacific Islander		0.1	0.0-0.2
% Multi-racial		0.9	0.5-1.2
% Other		0.2	0.0-0.3
% Unknown		1.5	1.0-1.9
Caries Experience			
% with caries experience	3,019	45.4	43.6-47.2
% caries free		54.6	52.8-56.4
Untreated Decay			
% with untreated decay	3,018	22.9	21.4-24.4
Treatment Urgency			
% with no obvious problem	3,021	77.0	75.5-78.5
% needing early care		18.4	17.0-19.8
% needing urgent care		4.6	3.8-5.3

Table 2
 Oral Health of Colorado's Kindergarten Children
Not Adjusted for Non-Response

Variable	Number with Data	Estimate	95% Confidence Interval
Number Screened	3,023		
Age			
Mean age (years)	2,928	5.99 (SD 0.67)	
Age range		5-10 years	
Gender			
% Male	3,007	50.1	48.3-51.9
% Female		49.9	48.8-51.3
Race/Ethnicity			
% White		51.5	49.7-53.2
% African-American		6.8	5.9-7.7
% Hispanic		35.6	33.9-37.3
% Asian		2.8	2.2-3.4
% Native American	3,022	0.7	0.4-1.0
% Pacific Islander		0.1	0.0-0.2
% Multi-racial		0.8	0.5-1.2
% Other		0.2	0.0-0.4
% Unknown		1.4	1.0-1.8
Caries Experience			
% with caries experience	3,019	45.3	43.5-47.1
% caries free		54.7	52.9-56.5
Untreated Decay			
% with untreated decay	3,018	22.5	21.0-24.0
Treatment Urgency			
% with no obvious problem	3,021	77.4	75.9-78.9
% needing early care		17.9	16.5-19.2
% needing urgent care		4.7	3.9-5.4

Table 3
 Oral Health of Colorado's Third Grade Children
Adjusted for Non-Response

Variable	Number with Data	Estimate	95% Confidence Interval
Number Screened	3,012		
Age			
Mean age (years)	2,922	9.0 (SE 0.01)	
Age range		5-14 years	
Gender			
% Male	2,995	52.2	50.4-53.9
% Female		47.8	46.0-49.6
Race/Ethnicity			
% White		53.4	51.6-55.2
% African-American		6.9	6.0-7.8
% Hispanic		32.2	30.5-33.9
% Asian		3.5	2.8-4.1
% Native American	3,009	1.6	1.1-2.0
% Pacific Islander		0.1	0.0-0.2
% Multi-racial		0.7	0.4-1.0
% Other		0.2	0.0-0.3
% Unknown		1.4	1.0-1.8
Caries Experience			
% with caries experience	3,011	57.2	55.4-58.9
% caries free		42.8	41.0-44.6
Untreated Decay			
% with untreated decay	3,012	24.5	23.0-26.1
Treatment Urgency			
% with no obvious problem		74.7	73.2-76.3
% needing early care	3,011	19.1	17.8-20.6
% needing urgent care		6.1	5.2-6.9
Dental Sealants			
% with dental sealants	3,012	37.1	35.3-38.8

Table 4
 Oral Health of Colorado's Third Grade Children
Not Adjusted for Non-Response

Variable	Number with Data	Estimate	95% Confidence Interval
Number Screened	3,012		
Age			
Mean age (years)	2,920	9.0 (SD 0.71)	
Age range		5-14 years	
Gender			
% Male	2,998	52.0	50.2-53.8
% Female		47.9	46.1-49.7
Race/Ethnicity			
% White		53.4	51.6-55.2
% African-American		7.4	6.4-8.3
% Hispanic		31.6	29.9-33.2
% Asian		3.9	3.2-4.6
% Native American	3,009	1.6	1.1-2.0
% Pacific Islander		0.1	0.0-0.3
% Multi-racial		0.5	0.3-0.8
% Other		0.2	0.0-0.3
% Unknown		1.3	0.9-1.7
Caries Experience			
% with caries experience	3,011	57.1	55.3-58.9
% caries free		42.9	41.2-44.7
Untreated Decay			
% with untreated decay	3,012	24.4	22.9-25.9
Treatment Urgency			
% with no obvious problem		74.3	72.7-75.8
% needing early care	3,011	19.4	17.9-20.8
% needing urgent care		6.4	5.5-7.3
Dental Sealants			
% with dental sealants	3,012	36.8	35.1-38.5

Table 5A
 Oral Health of Colorado's Kindergarten Children Stratified by
 Free and Reduced Price Meal Status of School (3 Levels)
Adjusted for Non-Response

Variable	Percent of Children on F/R Lunch		
	< 25% (n=1,011)	25-49% (n=931)	≥ 50% (n=1,077)
Caries experience (%) (95% CI)	34.4 (31.4-37.3)	42.3 (39.1-45.5)	57.5 (54.6-60.5)
Untreated decay (%) (95% CI)	16.9 (14.6-19.3)	22.7 (20.0-25.4)	28.2 (25.5-30.9)
Treatment Urgency			
No obvious problem (%) (95% CI)	83.4 (81.1-85.7)	76.8 (74.1-79.5)	71.6 (68.9-74.3)
Early care (%) (95% CI)	14.3 (12.1-16.4)	16.5 (14.1-18.9)	23.5 (20.9-26.1)
Urgent care (%) (95% CI)	2.4 (1.4-3.3)	6.6 (4.9-8.2)	4.9 (3.6-6.2)

Table 5B
 Oral Health of Colorado's Kindergarten Children Stratified by
 Free and Reduced Price Meal Status of School (4 Levels)
Adjusted for Non-Response

Variable	Percent of Children on F/R Lunch			
	< 25% (n=1,011)	25-49.9% (n=931)	50-74.9% (n=518)	≥ 75% (n=559)
Caries experience (%) (95% CI)	34.4 (31.4-37.3)	42.3 (39.1-45.5)	50.1 (45.7-54.4)	64.4 (60.1-68.4)
Untreated decay (%) (95% CI)	16.9 (14.6-19.3)	22.7 (20.0-25.4)	24.4 (20.7-28.1)	31.7 (27.9-35.6)
Treatment Urgency				
No obvious problem (%) (95% CI)	83.4 (81.1-85.7)	76.8 (74.1-79.5)	76.2 (72.3-79.8)	67.4 (63.5-71.3)
Early care (%) (95% CI)	14.3 (12.1-16.4)	16.5 (14.1-18.9)	20.7 (17.2-24.2)	26.1 (22.4-29.8)
Urgent care (%) (95% CI)	2.4 (1.4-3.3)	6.6 (4.9-8.2)	3.1 (1.6-4.6)	6.5 (4.5-8.6)

Table 6A
 Oral Health of Colorado's Third Grade Children Stratified by
 Free and Reduced Price Meal Status of School (3 Levels)
Adjusted for Non-Response

Variable	Percent of Children on F/R Lunch		
	High SES < 25% F/R Lunch (n=1115)	Middle SES 25-49% F/R Lunch (n=903)	Low SES ≥ 50% F/R Lunch (n=994)
Caries experience (%) (95% CI)	46.7 (43.8-49.6)	51.9 (48.7-55.2)	72.2 (69.4-75.0)
Untreated decay (%) (95% CI)	16.6 (14.4-18.8)	21.2 (18.5-23.9)	35.4 (32.4-38.4)
Dental Sealants (%) (95% CI)	47.2 (44.3-50.2)	29.9 (26.9-32.9)	32.4 (29.4-35.3)
Treatment Urgency			
No obvious problem (%) (95% CI)	81.9 (79.7-84.2)	79.1 (76.4-81.7)	63.9 (60.9-66.9)
Early care (%) (95% CI)	15.3 (13.2-17.4)	14.9 (12.6-17.3)	26.6 (23.8-29.4)
Urgent care (%) (95% CI)	2.7 (1.8-3.7)	6.0 (4.5-7.6)	9.5 (7.7-11.4)

Table 6B
 Oral Health of Colorado's Third Grade Children Stratified by
 Free and Reduced Price Meal Status of School (4 Levels)
Adjusted for Non-Response

Variable	Percent of Children on F/R Lunch			
	< 25% (n=1115)	25-49% (n=903)	50-74.9% (n=564)	> 75% (n=430)
Caries experience (%) (95% CI)	46.7 (43.8-49.6)	51.9 (48.7-55.2)	71.7 (67.9-75.4)	72.9 (68.7-77.1)
Untreated decay (%) (95% CI)	16.6 (14.4-18.8)	21.2 (18.5-23.9)	33.9 (30.0-37.8)	37.1 (32.6-41.7)
Dental Sealants (%) (95% CI)	47.2 (44.3-50.2)	29.9 (26.9-32.9)	35.9 (31.9-39.9)	28.1 (23.8-32.3)
Treatment Urgency				
No obvious problem (%) (95% CI)	81.9 (79.7-84.2)	79.1 (76.4-81.7)	64.9 (60.9-68.9)	62.6 (58.0-67.2)
Early care (%) (95% CI)	15.3 (13.2-17.4)	14.9 (12.6-17.3)	26.3 (22.7-29.9)	26.9 (22.7-31.2)
Urgent care (%) (95% CI)	2.7 (1.8-3.7)	6.0 (4.5-7.6)	8.8 (6.4-11.1)	10.5 (7.6-13.4)

Table 7
 Oral Health of Colorado's Kindergarten Children Stratified by Race/Ethnicity
Adjusted for Non-Response

Variable	Race/Ethnicity	
	White (1,554)	Hispanic (1,074)
Caries experience (%) (95% CI)	34.2 (31.9-36.6)	59.8 (56.9-62.8)
Untreated decay (%) (95% CI)	17.6 (15.7-19.5)	28.6 (25.9-31.3)
Treatment Urgency		
No obvious problem (%) (95% CI)	82.8 (80.9-84.7)	70.6 (67.9-73.3)
Early care (%) (95% CI)	14.1 (12.3-15.8)	23.6 (21.1-26.2)
Urgent care (%) (95% CI)	3.1 (2.2-3.9)	5.8 (4.4-7.2)

Table 8
 Oral Health of Colorado's Third Grade Children Stratified by Race/Ethnicity
Adjusted for Non-Response

Variable	Race/Ethnicity	
	White (n=1,607)	Hispanic (n=950)
Caries experience (%) (95% CI)	47.8 (45.4-50.3)	70.5 (67.6-73.4)
Untreated decay (%) (95% CI)	18.5 (16.6-20.4)	31.1 (28.1-34.0)
Dental Sealants (%) (95% CI)	42.4 (40.0-44.8)	30.8 (27.9-33.8)
Treatment Urgency		
No obvious problem (%) (95% CI)	80.6 (78.6-82.5)	69.5 (66.5-72.4)
Early care (%) (95% CI)	16.0 (14.3-17.8)	20.8 (18.2-23.4)
Urgent care (%) (95% CI)	3.4 (2.5-4.3)	9.7 (7.8-11.6)

Table 9
Prevalence of Caries Experience and Untreated Decay in 6-8 Year Old and
Dental Sealants in 8-Year-Old Children
Compared to the Healthy People 2010 Objectives

Variable	Number of Children	Estimate	95% CI	HP 2010 Objective
Age				
6 years	1,653			
7 years	613			
8 years	653			
Caries experience	2,919	46.7	44.9-48.6	42
Untreated decay	2,919	21.8	20.3-23.3	21
Dental sealants	653	29.3	25.8-32.7	50

37% of nine-year-olds had sealants

43% of ten-year-olds had sealants