

# **Oklahoma Oral Health Needs Assessment 2013**

**Third Grade Children**



**Oklahoma State Department of Health  
Dental Health Service**

## **Oklahoma Oral Health Needs Assessment**

### **Background and Purpose**

The University of Oklahoma Colleges of Public Health and Dentistry, in collaboration with the Oklahoma State Department of Health, conducted an oral health needs assessment among third grade children in the state of Oklahoma. A similar needs assessment has been conducted for seven of the last ten years. The purpose of this needs assessment was to produce statewide estimates of dental health status indicators. The oral screening included an assessment of the prevalence of protective sealants, untreated cavities, other caries experience, missing teeth, and need for dental treatment.

A number of major surveys have been performed to determine the prevalence of oral disease in the United States. However, prior to 2003, data specific to Oklahoma third grade children had not been previously available. Data on the percentage of Oklahoma children with sealants and caries are needed to make decisions guiding dental public health policy in this state. In addition, these data are needed for reporting purposes to federal agencies, specifically the Title V Maternal and Child Health Block Grant.

One of the national performance measures required for federal reporting is the percentage of third grade children who have received protective sealants on at least one permanent molar tooth. Tooth decay affects nearly two-thirds of children by the time they are 15 years old. Dental sealants protect vulnerable sites on the tooth. Targeting dental sealants to those children at greatest risk for decay has been shown to be cost-effective. Although dental sealants in conjunction with water fluoridation have the potential to significantly prevent decay among children, sealants have been shown to be underutilized.

## **Research Design**

This cross-sectional design included a random sample of third grade students in Oklahoma and direct observation of dental caries and sealants by Oklahoma licensed dentists. The protocol for data collection followed the recommendations of the Association of State and Territorial Dental Directors in their publication "Basic Screening Surveys: An Approach to Monitoring Community Oral Health." The oral health needs assessment was conducted during the 2012-2013 school year.

This study was submitted to and approved by both the University of Oklahoma Health Sciences Center Institutional Review Board (IRB #2274) and the Oklahoma State Department of Health IRB (#02-15).

## **Sample**

A large spreadsheet of both accredited and non-accredited Oklahoma public and private schools was acquired from the Oklahoma State Department of Education (OSDE) in August of 2012. All schools in the spreadsheet with one or more third grade classrooms and at least five third grade students were retained for this study. Approximately 900 public and private schools with at least one third-grade classroom were included in the sampling frame.

In order to derive statewide and regional estimates, Oklahoma was divided into six regions: Northeast (NE), Northwest (NW), Southeast (SE), Southwest (SW), Oklahoma County, and Tulsa County. The numerical breakdown for each region consisted of 21 counties in the NE region, 18 counties in the NW region, 23 counties in the SE region, 13 counties in the SW region, and one county each for both Oklahoma and Tulsa counties, representing the two metropolitan areas.

Based on power analyses, approximately 600 students were needed statewide, 100 in each region, to produce estimates with reasonable precision. To accommodate this sample size, six schools from each region

were selected to participate, for a total of 36 schools statewide. The sampling frame of all schools was stratified by region, and a 6-school-per-region random sample was selected using SAS SurveySelect. Each school had an equal probability of being included in the sample.

The six schools sampled from each region were asked to participate in the study. A descriptive letter about the study was mailed to the school, along with a return postcard signifying agreement to participate (Appendix A). If a school did not respond to this initial request, multiple other attempts were made to obtain school consent. These included, but were not limited to, at least three follow-up calls, another letter, and e-mails. If a school refused to participate or did not respond within a reasonable time period, a replacement school was selected that matched the original school by region, county, class size, and/or percent of students eligible for free and reduced priced meals. By using the sample replacement strategy described, a final sample of 33 participating schools was obtained.

Special issues arose in the sampling for the Tulsa County Region during this year's screening as two of the largest school districts in the region did not participate in the screenings. One of these school districts encompasses the majority of metropolitan and urban school sites in the Tulsa County Region, leaving little opportunity for this population to be incorporated into the screening. The sampling for this region required additional replacement school samples to obtain a 6-school sample that did not include any schools from the non-participating districts. Due to difficulty in obtaining permission to screen, only three of the 6 schools from Tulsa County were included in the sample. Due to the small number of responses collected and the inability to properly sample, estimates for Tulsa County are neither precise nor representative of the region.

After a school consented to the screenings, a list of all third grade teachers was made for each school. Screenings were done for all third grade classrooms at participating schools.

The following map describes the regions sampled, and the county location of each school included in the needs assessment.



## **Consent**

Active parental consent and student assent were obtained for this needs assessment (Appendix B). IRB-approved parental consent forms were sent to the schools at least a week before the arrival of the dentists, in order for parents and students alike to have access to the information needed to make an informed decision about the screenings. These parental consent forms included why the study was being done; how many students were taking part in the study; a description of the study; how long the child would be in the study; the risks, benefits, and options of the study; confidentiality of the study; the child's rights as a participant of the study; and pertinent contact information. Voluntary student participation was also emphasized on this form.

## **Data Collection**

An oral health screening form was created to record all data (Appendix C). Teachers were asked to complete the information regarding school and student demographics, including each child's age, gender, race, and ethnicity. Gender was coded as M or F, according to either male or female, respectively. Race was coded as W for whites, B for blacks or African-Americans, NA for Native Americans, A for Asians, and O for any other race. Ethnicity was coded as H for Hispanic origin, N for not Hispanic origin and U for unknown ethnic origin. Although name was collected to facilitate the screening process, names were separated from the data immediately following the screening so that all results would remain confidential.

The screenings were performed primarily by one dentist (KSC). The dental screenings usually took place within the classroom setting, with the dentists checking one child at a time. The screenings were conducted with non-latex dental exam gloves, artificial light, and disposable dental mirrors.

Additionally, the dentists were responsible for filling in all the oral health results for each participating student, according to preset and

calibrated criteria established by the dentists. For decayed teeth, these criteria consisted of all cavitations, occlusal discolorations, and interproximal shadows. For missing teeth, these criteria weighed the following variables simultaneously: age of the child, normal exfoliation ages for primary teeth, and normal eruption ages for permanent teeth. For filled teeth, all amalgams, composites, and stainless steel crowns were classified as "filled." For sealants, any clear or tooth-colored, non-composite resin on occlusal surfaces of permanent teeth was counted, resulting in a range of 0 to 8 sealants. Additionally, primary teeth were distinguished from permanent teeth by distinct anatomical differences, and were noted accordingly. For each student, the total number of decayed, missing, or filled teeth, or teeth with sealants was recorded.

Results for each child were sent home on a form filled in by the dentist who visited the school (Appendix D). Results consisted of a checked box for the appropriate outcome, indicating whether the child had no dental problems observed, had some dental problems that needed attention soon, or the child had problems that needed attention immediately. All participating and non-participating children in the classroom received a toothbrush and a tube of toothpaste. A short oral health educational program about the importance of oral hygiene, healthy diets, and regular dental visits was delivered to each classroom.

### **Data Entry and Analysis**

All data were entered in Microsoft Access. After validation of data entry for accuracy, data were summarized and analyzed, and reports were prepared using SAS version 9.3. The reports included total number of sampled students per region; total estimated third graders in the state and per region (based on the data obtained from the Oklahoma State Department of Education); total schools in the state and per region; total students with at least one tooth with caries per region; total number of teeth



with caries per region; caries percentages per region; sealant percentages for the state and per region; percentage of each region that was sampled; and the percentage of the total state population that was sampled. Frequency and means procedures were used to generate statewide and regional estimates.

### **Weighted Analyses**

The results were weighted to account for the variation in the number of schools per region. These weights were the inverse of the probability of a school selection within region such that each school represented a specific number of schools in their region. In the Tulsa region only 3 schools, due to difficulty in obtaining permission to screen, were included in the sample. This resulted in sampling coverage of 93% of the schools in the population. Estimation of the weighted state population values was performed using the SAS survey analysis method PROC SurveyMeans. Weighted proportions and means plus 95% confidence intervals were produced.

### **Confidentiality**

All data were stored in a password protected computer file. Signed parental consent forms, assent forms, and de-identified data entry forms were stored in locking file cabinets, accessible only to project staff. Only group data were analyzed, and no names will be used in any publication resulting from this needs assessment.

### **Results**

A total of 788 third-grade students participated in the oral needs assessment from across Oklahoma. The overall participation rate was 42.3%. Both the number of students screened and participation rates varied by region (Table 2). Schools in the SW region of the state had the highest

participation rates (63.3%) while Tulsa County had the lowest rate of participation (30.2%). The Tulsa region, with 38 students from 3 schools, had the fewest number of students screened.

**Table 2. Participating schools, by region**

<i>Region</i>	<i>School</i>	<i>County</i>	<i># Parental Consents</i>	<i># Screened</i>	<i>Participation Rate<sup>◊</sup></i>
NE	A (N=58*)	Mayes	18	18	31.0%
	B (N=72*)	Muskogee	24	24	33.3%
	C (N=75*)	Osage	20	17	26.7%
	D (N=85*)	Okmulgee	47	47	55.3%
	E (N=33*)	Lincoln	11	10	33.3%
	F (N=125*)	Creek	50	49	40.0%
	<i>Total (N=448*)</i>		170	165	37.9%
NW	A (N=80*)	Canadian	32	29	40.0%
	B (N=24*)	Canadian	13	13	54.2%
	C (N=20*)	Alfalfa	9	9	45.0%
	D (N=52*)	Texas	17	17	32.7%
	E (N=29*)	Dewey	13	11	44.8%
	F (N=37*)	Custer	13	13	35.1%
	<i>Total (N=242*)</i>		97	92	40.1%
SE	A (N=126*)	McClain	33	33	26.2%
	B (N=192*)	Pontotoc	90	88	46.9%
	C (N=28*)	Carter	17	16	60.7%
	D (N=15*)	Seminole	12	11	80.0%
	E (N=22)	Pittsburg	17	17	77.3%
	F (N=26*)	Pittsburg	17	17	65.4%
	<i>Total (N=409*)</i>		186	182	45.5%
SW	A (N=41*)	Stephens	31	30	75.6%
	B (N=57*)	Comanche	27	27	47.4%
	C (N=22)	Comanche	15	15	68.2%
	D (N=74)	Tillman	46	46	62.2%
	E (N=14*)	Jackson	10	10	71.4%
	F (N=18*)	Grady	14	14	77.8%
	<i>Total (N=226*)</i>		143	142	63.3%
OKC	A (N=141*)	Oklahoma	31	30	22.0%
	B (N=56*)	Oklahoma	11	10	19.6%
	C (N=100*)	Oklahoma	52	51	52.0%
	D (N=45*)	Oklahoma	14	13	31.1%
	E (N=45*)	Oklahoma	25	25	55.6%
	F (N=66*)	Oklahoma	40	40	60.6%
	<i>Total (N=453*)</i>		173	169	38.2%
Tulsa	A (N=90*)	Tulsa	24	20	26.7%
	B (N=40*)	Tulsa	13	13	32.5%
	C (N=9)	Tulsa	5	5	55.6%
	<i>Total (N=139*)</i>		42	38	30.2%

\*Number is estimated by school, but is not a direct count of students.

◊Participation rate is based on the number of parental consents returned divided by the total number of third grade students in the school.

Overall, the mean age for the population screened was 8.9 years, with a minimum age of eight years and a maximum age of eleven years. The standard deviation for the group age was 0.6 years. When stratified by region, all showed a relatively similar mean age and standard deviation for the students participating in the screenings. The minimum age of students in all regions was eight years of age. The maximum age of students in five of the six regions was 10 years of age. Table 3 describes the demographic characteristics of participating students. A table of overall participant characteristics including the percentage with missing information is in Appendix F.

Of the non-missing demographic data, the study sample suggests an approximately equal proportion of males and females represented in the study (Males=46% and Females=54%). Racial make-up for the sample seemed to follow Oklahoma population trends, but with slightly lower percentage of whites and slightly higher percentage of blacks. The percentage of Whites in the sample was 69% (vs. 75.8% in Oklahoma population), Blacks equaling 14% (vs. 7.7% in Oklahoma population), Others (including Hispanics) equaling 6.5%, Native Americans equaling 9%, and Asian Americans equaling 1% of the sample population (U.S. Census Bureau, Oklahoma QuickFacts, 2011).

There were some regional differences in the race/ethnicity of participants. Approximately 17% of participants in the SE region were Native American, 30% of participants in the SW region were Hispanic, and 30% of participants in Oklahoma County were Black. Oklahoma County had the lowest percentage of White participants, with only 41% of students. In the NW and Tulsa regions, over 90% of participants were White.

**Table 3. Overall participant characteristics, among non-missing data**

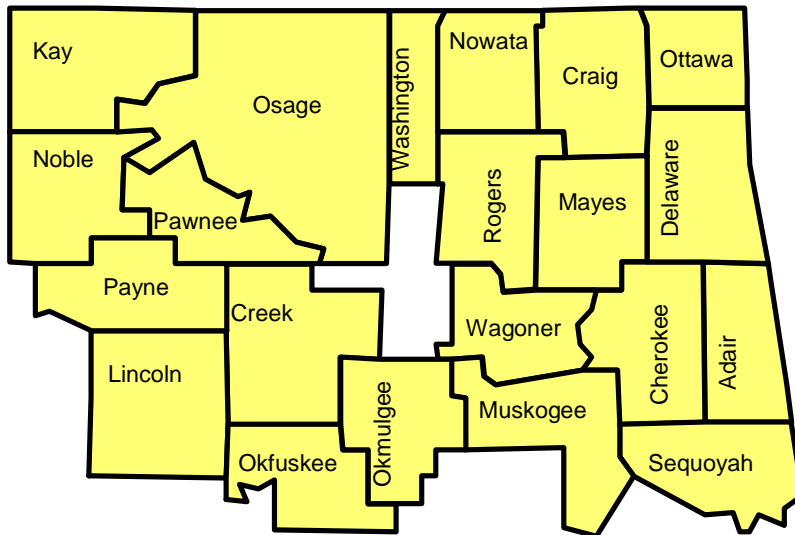
		<i>No.</i>	<i>Percent</i>			<i>No.</i>	<i>Percent</i>
<b>Age</b>	8	173	22.0%	<b>Gender</b>	Female	422	53.6%
	9	534	67.9%		Male	366	46.4%
	10	78	9.9%	<b>Race</b>	Asian	8	1.0%
	11	1	0.1%		Black	113	14.4%
<b>Ethnicity</b>	Hispanic	119	16.0%		Native American	71	9.0%
	Non-Hispanic	548	73.8%		Other	51	6.5%
	Unknown	76	10.2%	White	543	69.1%	

\*All percentages are rounded to one decimal place; therefore, total may not add to 100%

## Participant characteristics, by region

\*All percentages are rounded to one decimal place; therefore, total may not add to 100%

### Northeast Region



#### Participant Characteristics (n=165)

##### Age (years)

	Number	Percent
8	14	8.5%
9	133	80.6%
10	17	10.3%
11	N/A	N/A
Missing	1	0.6%

##### Gender

	Number	Percent
Female	87	52.7%
Male	78	47.3%
Missing	N/A	N/A

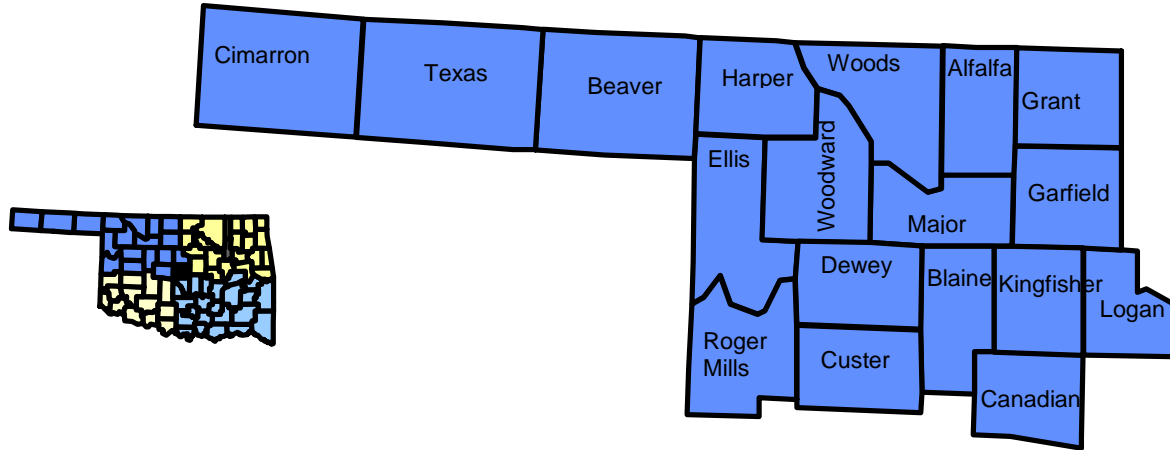
##### Ethnicity

	Number	Percent
Hispanic	7	4.2%
Non-Hispanic	141	85.5%
Unknown	10	6.1%
Missing	7	4.2%

##### Race

	Number	Percent
Asian	N/A	N/A
Black	25	15.2%
Native American	13	7.9%
White	123	74.5%
Other	3	1.8%
Missing	1	0.6%

# Northwest Region



## Participant Characteristics (n=92)

### Age (years)

	Number	Percentage
8	34	37.0%
9	55	59.8%
10	3	3.3%
Missing	N/A	N/A

### Ethnicity

	Number	Percentage
Hispanic	11	12.0%
Non-Hispanic	81	88.0%
Unknown	N/A	N/A
Missing	N/A	N/A

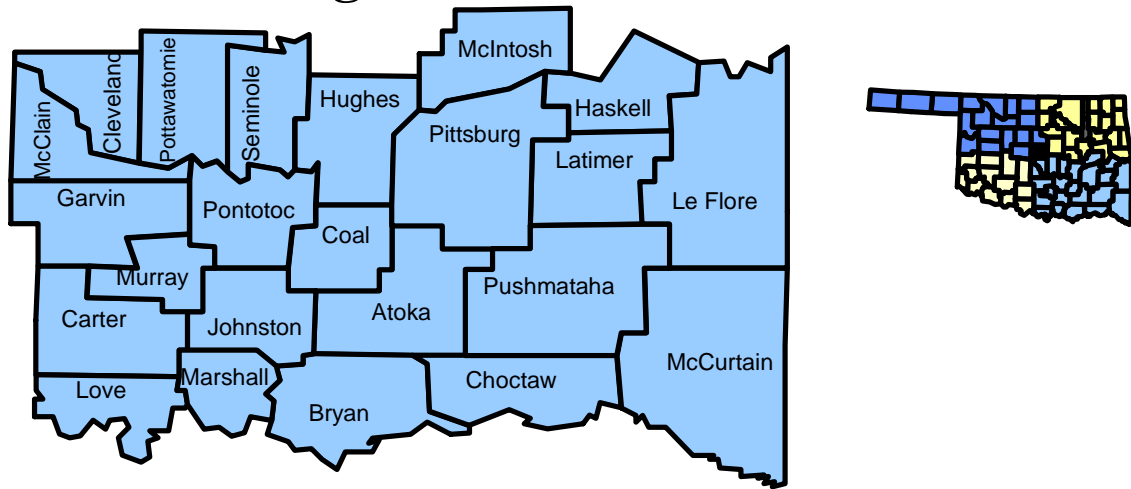
### Gender

	Number	Percentage
Female	43	46.7%
Male	49	53.3%
Missing	N/A	N/A

### Race

	Number	Percentage
Asian	2	2.2%
Black	N/A	N/A
Native American	3	3.3%
White	86	93.5%
Other	1	1.1%
Missing	N/A	N/A

# Southeast Region



## Participant Characteristics (n=182)

### Age (years)

	Number	Percentage
8	39	21.4%
9	123	67.6%
10	20	11.0%
Missing	N/A	N/A

### Gender

	Number	Percentage
Female	112	61.5%
Male	70	38.5%
Missing	N/A	N/A

### Ethnicity

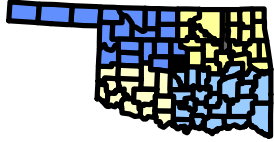
	Number	Percentage
Hispanic	22	12.1%
Non-Hispanic	134	73.6%
Unknown	25	13.7%
Missing	1	0.5%

### Race

	Number	Percentage
Asian	N/A	N/A
Black	16	8.8%
Native American	31	17.0%
White	128	70.3%
Other	7	3.8%
Missing	N/A	N/A



# Southwest Region



**Participant Characteristics (n=142)**

**Age (years)**

	Number	Percentage
8	37	26.1%
9	80	56.3%
10	24	16.9%
11	1	0.7%
Missing	N/A	N/A

**Gender**

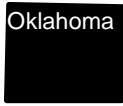
	Number	Percentage
Female	68	47.9%
Male	74	52.1%
Missing	N/A	N/A

**Ethnicity**

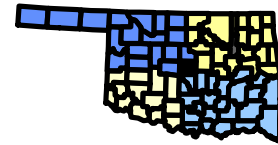
	Number	Percentage
Hispanic	42	29.6%
Non-Hispanic	86	60.6%
Unknown	13	9.2%
Missing	1	0.7%

**Race**

	Number	Percentage
Asian	N/A	N/A
Black	22	15.5%
Native American	15	10.6%
White	98	69.0%
Other	7	4.9%
Missing	N/A	N/A



# Oklahoma County Region



## Participant Characteristics (n=169)

### Age (years)

	Number	Percentage
8	45	26.6%
9	114	67.5%
10	9	5.3%
Missing	1	0.6%

### Gender

	Number	Percentage
Female	100	59.2%
Male	69	40.8%
Missing	N/A	N/A

### Ethnicity

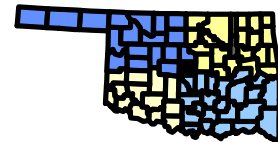
	Number	Percentage
Hispanic	34	20.1%
Non-Hispanic	86	50.9%
Unknown	16	9.5%
Missing	33	19.5%

### Race

	Number	Percentage
Asian	6	3.6%
Black	50	29.6%
Native American	9	5.3%
White	70	41.4%
Other	33	19.5%
Missing	1	0.6%



# Tulsa County Region



## Participant Characteristics (n=38)

### Age (years)

	Number	Percentage
8	4	10.5%
9	29	76.3%
10	5	13.2%
Missing	N/A	N/A

### Gender

	Number	Percentage
Female	12	31.6%
Male	26	68.4%
Missing	N/A	N/A

### Ethnicity

	Number	Percentage
Hispanic	3	7.9%
Non-Hispanic	20	52.6%
Unknown	12	31.6%
Missing	3	7.9%

### Race

	Number	Percentage
Asian	N/A	N/A
Black	N/A	N/A
Native American	N/A	N/A
White	38	100.0%
Other	N/A	N/A
Missing	N/A	N/A

The distribution of the sample by region is shown in Table 4. These numbers are the denominators for the various percentages presented. The SE region had the largest sample size, followed by the Oklahoma City and NE regions. The Tulsa and NW regions contributed the fewest children.

**Table 4. Summary of Regional and Overall Sample Size**

<i>Region</i>	<i>Sample Size (n)</i>	<i>Percent</i>
NE	165	20.9%
NW	92	11.7%
SE	182	23.1%
SW	142	18.0%
OKC	169	21.4%
Tulsa	38	4.8%
<i>Total</i>	<i>788</i>	<i>100%</i>

## **Overall Results**

The dental health status of third grade students in Oklahoma is described in Table 5, using weighted estimates. More than one-third of third grade students have one or more molar teeth with dental sealants (35.4%). The percentage of dental caries (cavities) experience is high, 59.7%. Furthermore, 19.0% of children have untreated active caries in at least one permanent or primary tooth. Active caries are observed more frequently in primary teeth (16.6%) as compared to permanent teeth (8.1%). Likewise, primary teeth are more likely to have fillings/restorations (46.0%), when compared to permanent teeth (15.3%). The prevalence of missing permanent teeth is very low (0.6%); however, 22.2% of children have one or more missing primary teeth due to decay.

**Table 5. Summary of dental health status of Oklahoma third grade students, weighted estimates and 95% confidence intervals**

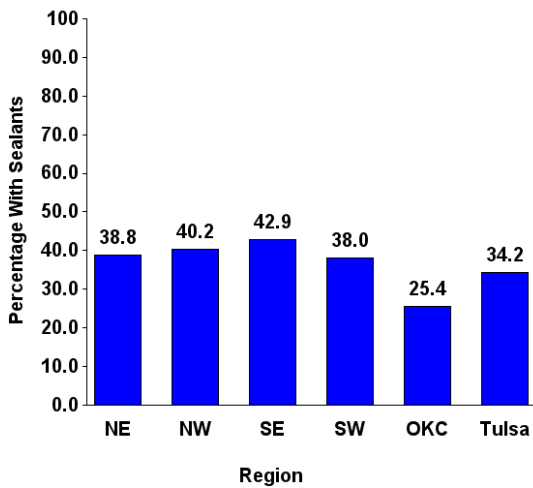
<i>Dental Health Status Indicator</i>	<i>Weighted Estimate</i>	<i>95% CI</i>
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	35.4%	30.4% - 40.4%
Percentage of third graders in Oklahoma with dental caries experience	59.7%	55.0% - 64.4%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent or primary tooth	19.0%	14.4% - 23.5%
Percentage of third graders in Oklahoma with untreated decay in at least one permanent tooth (active caries)	8.1%	4.8% - 11.4%
Percentage of third graders in Oklahoma with untreated decay in at least one primary tooth (active caries)	16.6%	12.6% - 20.6%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	0.6%	0.1% - 1.1%
Percentage of third graders in Oklahoma with at least one missing primary tooth	22.2%	18.3% - 26.1%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	15.3%	11.0% - 19.6%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	46.0%	41.2% - 50.9%

***Sealants on Permanent Molar Teeth***

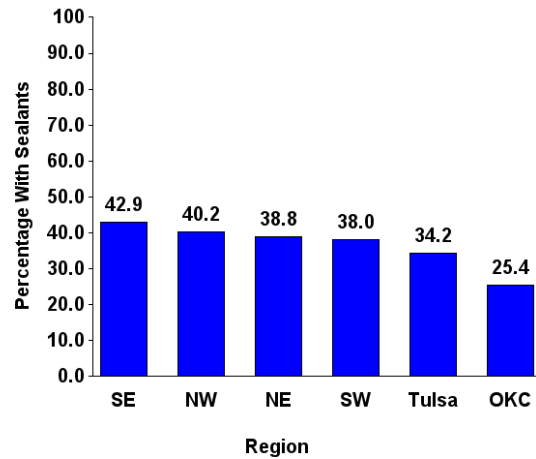
Sealants consist of a protective coating used to protect teeth from decay. In this study, the number of sealants can range from 0 to 4 because only sealants on permanent molar teeth were assessed. Although approximately 35% of third graders in Oklahoma have sealants on one or more permanent molars, results by region are highly variable. Five of the six regions have a prevalence of sealants greater than 30%. Approximately 43% of children in SE County are observed to have sealants. Of all students sampled, 15.7% have four molars with protective sealants. The mean number of sealants on permanent molar teeth for the students assessed equals 1.3 with a standard deviation of 1.8. In the eight years this needs

assessment has been conducted, the percentage of children with protective sealants remains around 35% (Figure 3).

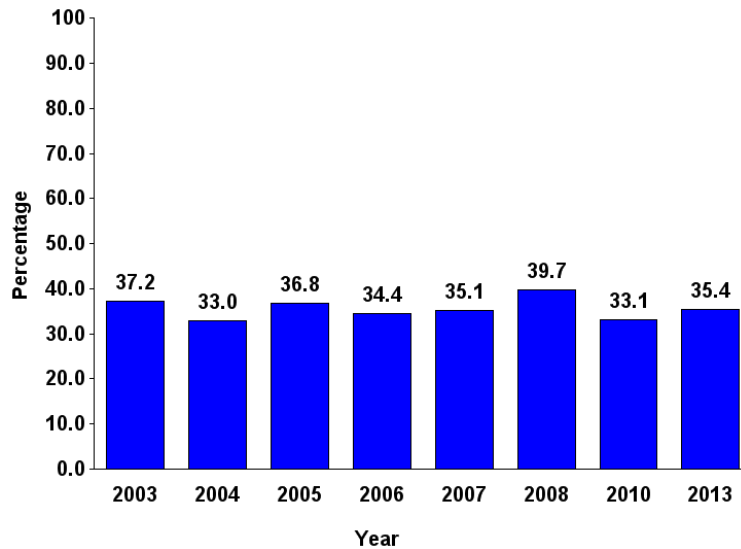
**Figure 1. Percentage of third graders with sealants on at least one permanent molar tooth**  
Oklahoma 2012-2013



**Figure 2. Percentage of third graders with sealants on at least one permanent molar tooth**  
In order from best to worst  
Oklahoma 2012-2013



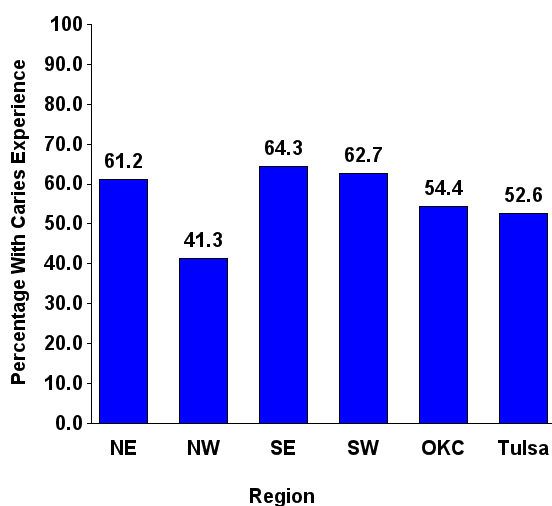
**Figure 3. Weighted estimates of percentage of third graders with sealants on at least one permanent molar tooth**



### ***Caries Experience and DMFT/dmft Score***

Total caries, defined as any caries experience, is calculated based on a child having at least one permanent or primary tooth decayed (untreated), missing (prematurely lost to decay), or filled (treated/restored). DMFT is an indicator that is composed of the combined measurement of decayed, missing or filled *permanent* teeth; while dmft indicator that is composed of the combined measurement of decayed, missing or filled *primary* teeth. These indicators are used to assess overall dental health. Of the 788 third grade children examined, 457 children, or 2,081 teeth, have been affected by decay. This results in a mean DMFT/dmft score of 2.6 teeth per child. In other words, on average, each third grade child has approximately 2.6 teeth that are decayed or were decayed and treated. Additionally, survey results show that 59.7% of third graders in the state have caries experience, which is lower than the percentages seen in 2004 and 2008. The region with the lowest prevalence of caries experience is NW County with 41.3%, while the SE region has the highest with 64.3%.

**Figure 4. Percentage of third graders with dental caries experience  
Oklahoma 2012-2013**



**Figure 5. Percentage of third graders with dental caries experience  
In order from best to worst  
Oklahoma 2012-2013**

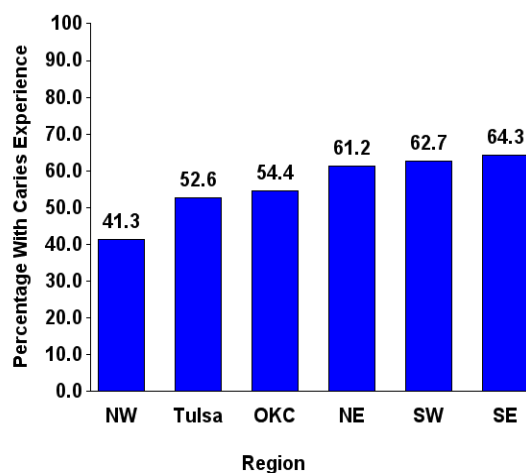
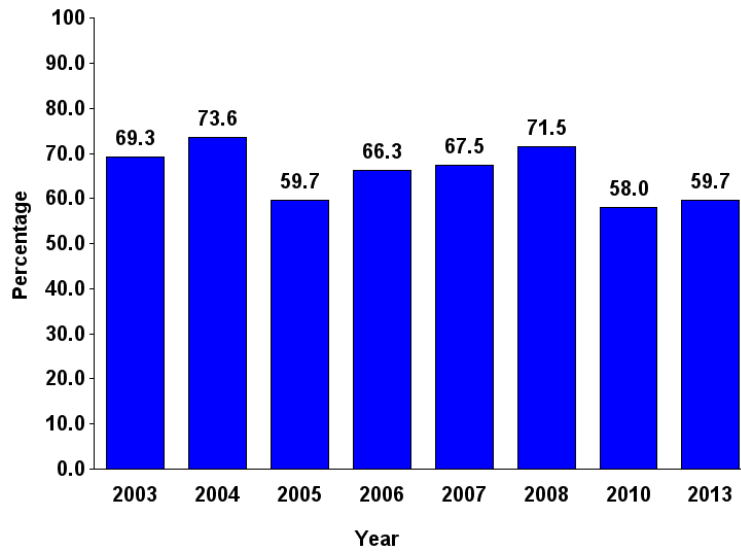


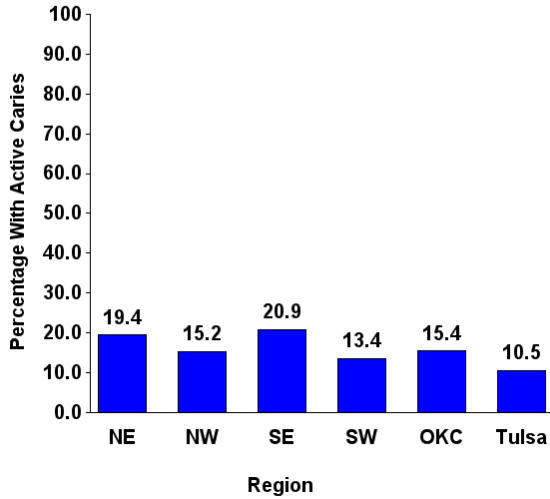
Figure 6. Weighted estimates of percentage of third graders with dental caries experience



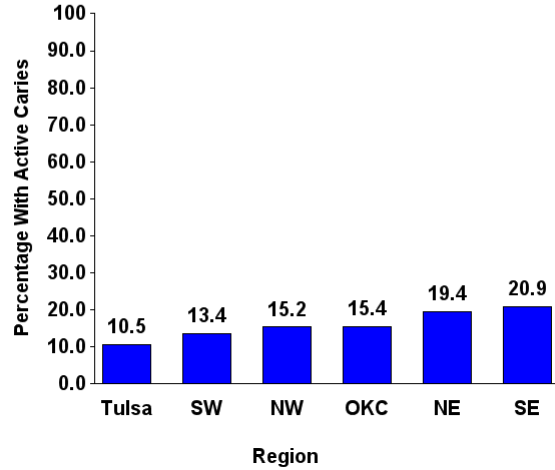
***Untreated Decay in Permanent or Primary Teeth (active caries)***

Another important dental health status indicator is active decay, defined as any untreated caries in at least one permanent or primary tooth. Nearly one-fifth (19.0%) of third grade children in Oklahoma are observed to have untreated caries. The percentage of children with untreated decay has decreased since 2003. The prevalence of untreated caries is lower in Tulsa County (10.5%) compared with any other region. The SE region has the highest prevalence of untreated caries (20.9%).

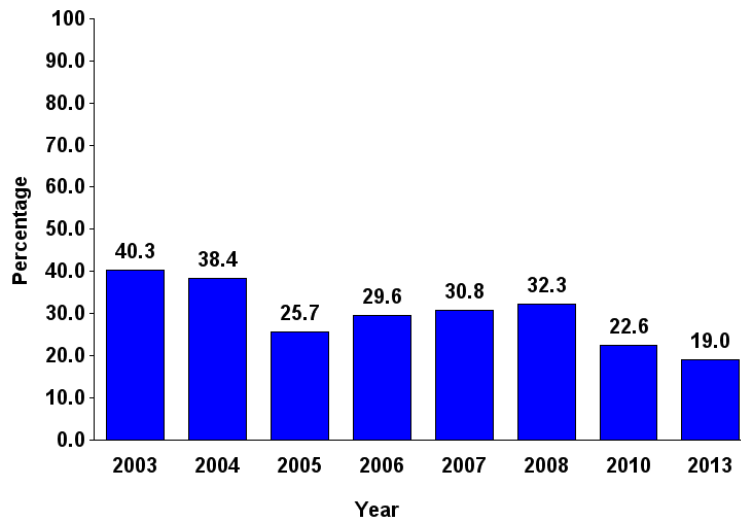
**Figure 7. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)**  
Oklahoma 2012-2013



**Figure 8. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)**  
In order from best to worst  
Oklahoma 2012-2013



**Figure 9. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent or primary tooth**



***Untreated Decay in Permanent Teeth (active caries)***

Statewide, 8.1% of third graders have decayed permanent teeth (untreated active caries). OKC region has the lowest prevalence of actively



decayed permanent teeth (3.6%) while the NE region has the highest prevalence of decay (9.7%). The mean number of decayed permanent teeth for the 788 students is 0.1 teeth with a relatively moderate standard deviation of 0.6 and a range of 0 to 6 teeth. The majority of active decay is limited to one or two permanent teeth, with only 1 student (0.1%) observed to have active decay in six teeth. Furthermore, the estimated percentage of children in Oklahoma with decayed permanent teeth has decreased since 2003 (Figure 11).

Figure 10. Percentage of third graders with at least one decayed permanent tooth (active caries) Oklahoma 2012-2013

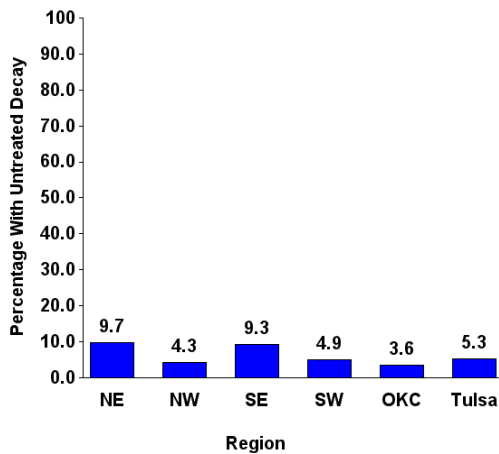
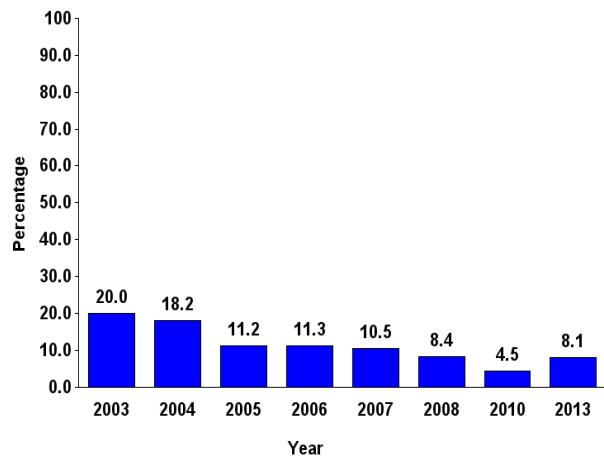


Figure 11. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent tooth

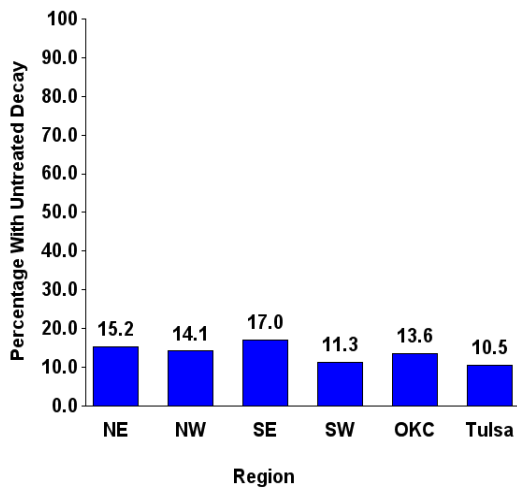


### ***Untreated Decay in Primary Teeth (active caries)***

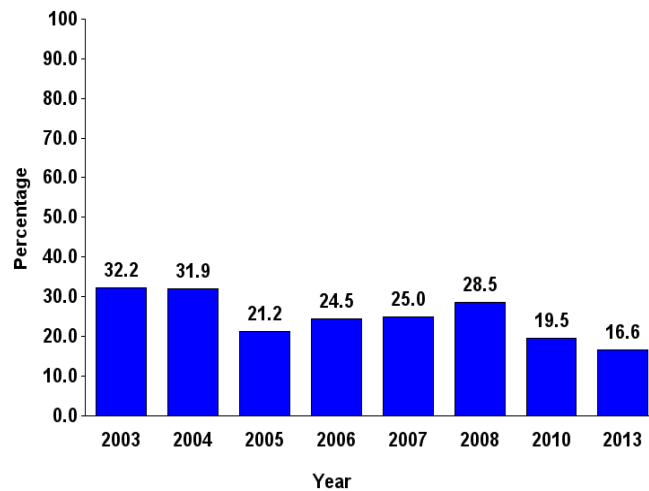
For children of this age group, the frequency of active decay in primary teeth is typically much higher than it is in permanent teeth. About one-seventh (13.9%) of third graders have active decay in one or more primary teeth. Children in Tulsa County have the lowest prevalence (10.5%), while the SE region has the highest prevalence of untreated decay in primary teeth (17.0%). In this statewide sample, the mean number of decayed primary teeth is 0.3 with a standard deviation of 0.9 and a range of 0 to 7

primary teeth with active decay. About four percent of children have active, untreated decay in 3 or more primary teeth.

**Figure 12. Percentage of third graders with at least one decayed primary tooth (active caries)**  
Oklahoma 2012-2013



**Figure 13. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one primary tooth**



### ***Missing Permanent Teeth***

Only six third grade students screened (0.6%) are missing permanent teeth with a range of 1 to 2 missing permanent teeth. One child from the SW region is missing two permanent teeth. Two children from the NE region, one child from SW region, one child from the OKC region, and one child from Tulsa region are missing one permanent tooth.

### ***Missing Primary Teeth***

As expected, significantly more children are missing primary teeth as compared to permanent teeth. For the entire state, 22.2% of third grade students are missing one or more primary teeth, showing a 76% increase from the 2010 survey data and the highest percentage since this study began (Figure 15). Regional percentages vary from 13.6% in the Oklahoma

City region to 25.8% in the SE region (Figure 14). The mean number of missing primary teeth for the sample equals 0.4 with a standard deviation of 0.9 and a range of 0 to 8 missing primary teeth. Most students with missing primary teeth are missing one or two teeth. Thirty-one students, or 3.9%, are missing three or more primary teeth.

Figure 14. Percentage of third graders with at least one missing primary tooth Oklahoma 2012-2013

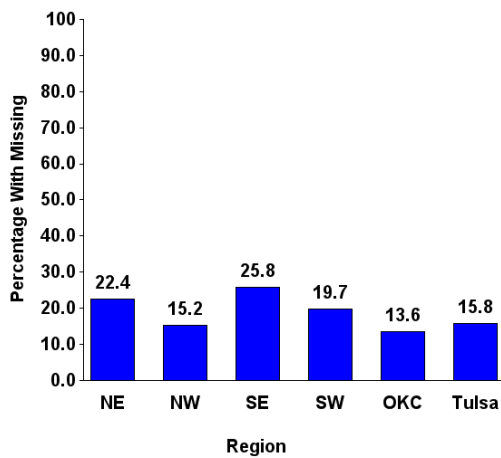
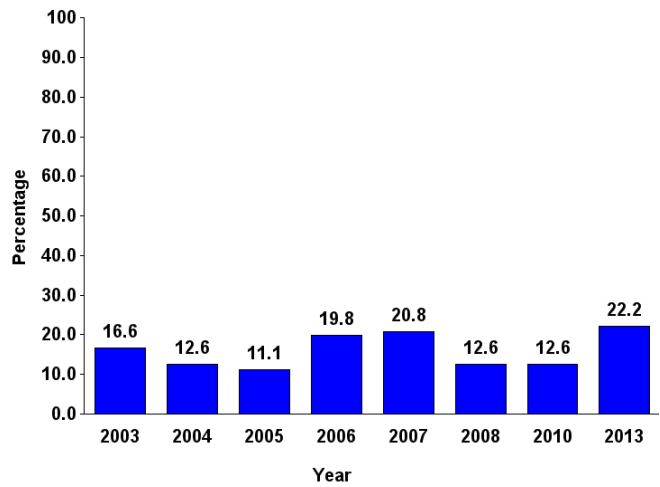


Figure 15. Weighted estimates of percentage of third graders with at least one missing primary tooth



### ***Filled (Treated/Restored) Permanent Teeth***

Approximately 15% of third graders have filled (treated/restored) cavities in one or more permanent teeth. Differences by region are observed (Figure 16). Children in OKC region have the lowest percentage of filled teeth with 8.9%. The highest percentage of filled/treated permanent teeth is observed in the SE region (17.0%), and there is approximately two-fold increase in the percentage of filled permanent teeth when the OKC region is compared to the SE region (8.9% versus 17.0%, respectively). The mean number of filled permanent teeth for the sample is 0.3 with a standard deviation of 0.8 and a range of 0 to 5 permanent teeth filled (treated/restored). The estimated percentage of children in Oklahoma with

filled permanent teeth has remained approximately 15% or less during the eight years of this needs assessment.

Figure 16. Percentage of third graders with at least one filled (treated/restored) permanent tooth  
Oklahoma 2012-2013

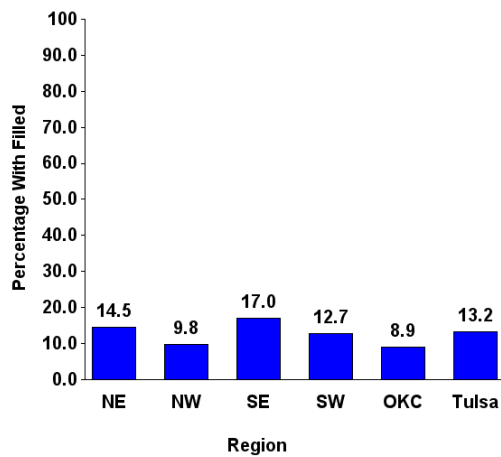
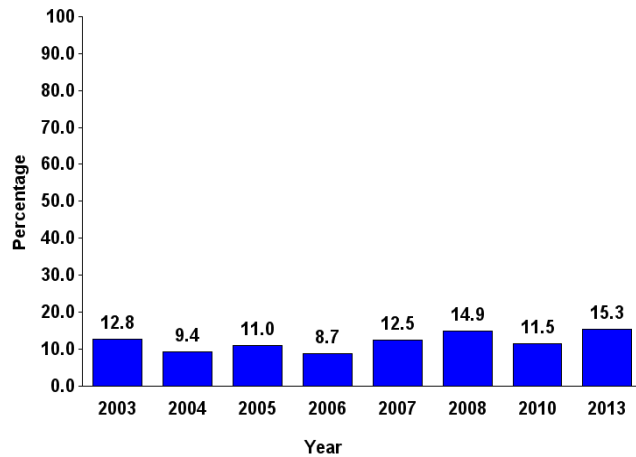


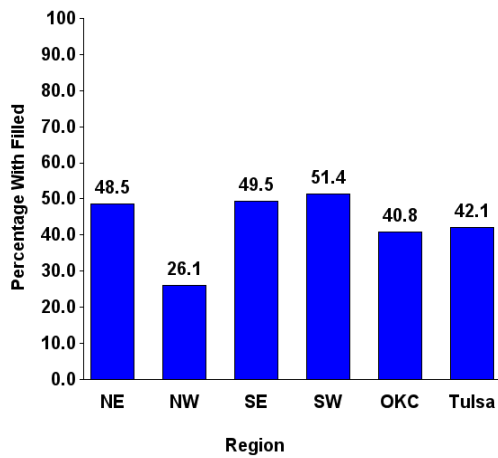
Figure 17. Weighted estimates of percentage of third graders with at least one filled (treated/restored) permanent tooth



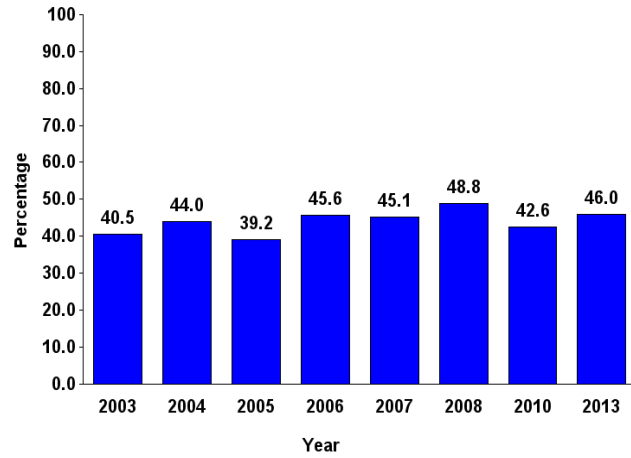
### ***Filled (Treated/Restored) Primary Teeth***

Significantly more children are observed to have filled (treated/restored) primary teeth compared to permanent teeth. Overall, 46.0% of third graders have one or more filled primary teeth. Regional proportions vary from 26.1% in NW County to 51.4% in the SW region (Figure 18). The mean number of filled primary teeth for the sample is 1.5 with a standard deviation of 2.3 teeth and a range of 0 to 11 filled primary teeth. Less than 20% (19.4%) of participants have four or more filled (treated/restored) primary teeth. The estimated percentage of children in Oklahoma with filled primary teeth has remained relatively constant during the eight years of this needs assessment (Figure 19).

**Figure 18. Percentage of third graders with at least one filled (treated/restored) primary tooth**  
Oklahoma 2012-2013



**Figure 19. Weighted estimates of percentage of third graders with at least one filled (treated/restored) primary tooth**



### ***Results of Screening as Determined by Dentist***

The visiting dentists gave each child that participated in the dental screening a form to take home indicating whether or not the child had dental problems that needed attention. The dentists' outcomes indicated that most of the participating children (83%) had no dental problems, and only 1.9% of the children had dental problems that needed immediate attention (Table 6).

**Table 6. Summary of dentists' screening outcomes among participating Oklahoma third grade students**

<b>Screening Results</b>	<b>No.</b>	<b>Percent</b>
Observed no dental problems	650	83.0%
Observed dental problems that need attention soon	118	15.1%
Observed dental problems that need attention immediately	15	1.9%
Missing	5	.

Most of the regions had similar results (Table 7). The SE region had the smallest percentage of children with no dental problems (79.7%) and

the NW region had the largest percentage of children with dental problems that needed immediate attention (5.7%). The Tulsa County region had highest percentage (89.5%) of children with no dental problems and the lowest percentage of children with dental problems that needed immediate attention, at 0%.

**Table 7. Percentage of participating Oklahoma third grade students by screening result and Region**

<b>Screening Results</b>	<b>Region</b>					
	<b>NE</b>	<b>NW</b>	<b>SE</b>	<b>SW</b>	<b>OKC</b>	<b>Tulsa</b>
Observed no dental problems	80.6%	82.8%	79.7%	86.6%	84.6%	89.5%
Observed dental problems that need attention soon	18.2%	11.5%	19.2%	9.9%	14.8%	10.5%
Observed dental problems that need attention immediately	1.2%	5.7%	1.1%	3.5%	0.6%	0.0%

## ***Discussion***

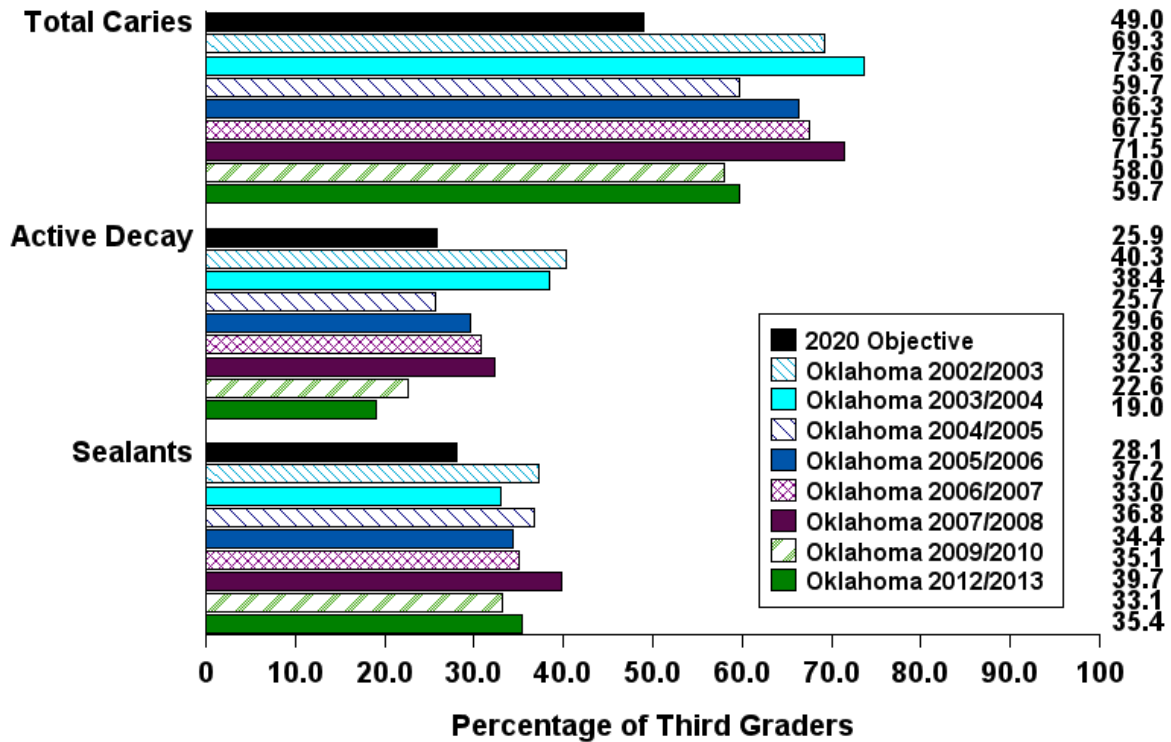
Dental caries is one of the most common chronic childhood diseases. To establish a baseline for dental health indicators in third grade children in Oklahoma, this seventh annual needs assessment was conducted by the University of Oklahoma Colleges of Public Health and Dentistry, with funding from the Oklahoma State Department of Health. In addition, this needs assessment provides valuable information on the status of Oklahoma children's dental health and the progress made to reach the goals set by the Healthy People 2020 Objectives.

Led by the U.S. Department of Health and Human Services, Healthy People 2020 is a ten-year health promotion program designed to target public health priorities to improve the health of all Americans. Progress towards the Healthy People 2020 objectives is monitored using specific, measurable objectives. The Healthy People 2020 Objectives include several measures related to oral health in children ages six to nine. These include:

- Reduce the proportion of children with dental caries experience in their primary and permanent teeth to 49%.
- Reduce the proportion of children with untreated dental decay in primary and permanent teeth to 25.9%.
- Increase the proportion of children receiving dental sealants on their molar teeth to 28.1%.

Consistent with data from the previous dental assessments, data from the 2012-2013 study of Oklahoma children indicate areas where improvements are needed to meet the 2020 Objectives (Figure 20).

**Figure 20. Oklahoma dental measures compared to Healthy People 2020 targets**



The statewide prevalence for total dental caries experience in Oklahoma third graders is 59.7%, which is higher than the Year 2020 Objective (49%). The total dental caries measure from the 2012-2013 survey has showed improvement from the earlier years of this assessment. The prevalence of active decay in Oklahoma (19.0%), defined as untreated caries in at least one permanent or primary tooth, reached the goals set by the Healthy People 2020 Objective (25.9%). Additionally, the proportion of children with protective sealants in Oklahoma (35.4%) also reached the goal set by the Healthy People 2020 Objective (28.1%).

Large regional differences are observed in the results of the oral health needs assessment. The NE and SE regions have the highest prevalence of active decay (19.4% and 20.9%). Tulsa County has the lowest proportion



(10.5%) of children with active (untreated) decay. The NW region is the only region to meet the Year 2020 Objectives for prevalence of total caries.

The participation rate in Tulsa County was the lowest among all the regions, with only about 30.2% of students in Tulsa County participating in the screenings. Selection bias could affect Tulsa County's results because of the low participation rate and because the two large school districts in the county did not participate in the screenings. Also, Blacks made up 0% of students participating from Tulsa County. This number does not represent the true racial make-up of Tulsa County [0% of the sample vs. 10.9% of Tulsa County population (U.S Census Bureau, 2011 State and County QuickFacts)]. As a result of these issues, the sample for this region was not fully representative of the county. Therefore, estimates for Tulsa County are not precise and are not representative of the region.

Although the sample in Oklahoma was selected to ensure representation from all six regions, participation rates varied, and sample sizes were affected. These findings might be affected by selection bias, as not all schools first contacted agreed to participate and the schools selected did not necessarily provide coverage of the region. Additionally, only 42.3% of selected students returned a signed parental consent form. In many schools, participation rates may be affected due to visits to these schools by dentists from other organizations.

The results of this study are strengthened by the fact that only three dentists were involved in the examinations. These dentists are all faculty members at the University of Oklahoma College of Dentistry. They worked cooperatively to define parameters, and jointly visited many schools to ensure consistency. These efforts will likely reduce or eliminate potential misclassification.

# Appendices

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# Appendix A



Oklahoma State Department of Health  
Creating a State of Health

October \_\_, 2012

Mr. Elementary Principal  
1234 Primary Street  
Your Town, OK, Zip

Dear Mr. Principal:

The Oklahoma State Department of Health, in conjunction with the University of Oklahoma Colleges of Dentistry and Public Health, has conducted a 3<sup>rd</sup> grade dental health screening for the last 10 years. Each time, 36 schools are randomly selected to participate in the program.

Benefits of participating in the process include the following:

- 1) Children learn about oral health as we utilize presentations and interactive learning. Learning materials can be provided in advance of the oral health presentation to allow children to develop inquisitive minds.
- 2) Children with parental permission are screened for dental problems and a letter is sent home with each child screened informing the parent/s of the child's current dental condition.
- 3) All children are given toothbrushes and toothpaste, even if they do not participate in the screening process.
- 4) Arrangements can be made through the Oklahoma Dental Foundation to schedule the ODF mobile unit to provide care for children needing treatment.
- 5) Information obtained through the screening process allows the state to meet national oral health benchmarks and guides programming and workforce efforts.

This year, your school has been selected for this unique opportunity. If you would be willing to have your third grade students participate in this screening, please complete the enclosed, self-addressed stamped postcard and include contact information for your lead third grade teacher or school nurse so we can follow up with details including parental permission slips and information to ensure maximum participation. If you would like to talk with me personally about the dental screening program, I can be reached at (405) 271-5502.

Sincerely,

Jana S. Winfree, DDS  
Chief, Dental Health Service

Terry L. Cline, PhD  
Commissioner  
Secretary of Health

R. Murali Krishna, MD, President  
Jenny Alexopoulos, DO  
Glenn Davis, DDS

Board of Health

Ronald Woodson, MD, Vice President  
Cris Hart-Wolfe  
Terry R. Gerard, DO

Martha A. Burger, MBA, Secretary-Treasurer  
Barry L. Smith, JD  
Timothy E. Starkey, MBA

1000 NE 10<sup>th</sup> Street  
Oklahoma City, OK 73117-1299  
www.health.ok.gov

## Return Postcard

School Name: \_\_\_\_\_

Thank you for responding. Please indicate your preference below:

Yes, I'd like for our school to participate. The person to contact  
is \_\_\_\_\_ who can best  
be reached at \_\_\_\_\_.

No, thank you. I do not wish for our school to participate.

I would like more information. Please contact me at  
\_\_\_\_\_.

## **Appendix B**

University of Oklahoma Health Sciences Center  
College of Public Health  
PARENTAL/GUARDIAN CONSENT FORM  
Dental Health Needs Assessment  
Lindsay Boeckman, MS, Principal Investigator

This is a research study at your child's school. Research studies involve only individuals who choose to take part in them. Please take your time to make your decision about your child's participation. Discuss this with your family and friends.

Your child is being asked to take part in this study because his/her school, \_\_\_\_\_, was selected to participate in a dental health needs assessment sponsored by the Oklahoma State Department of Health and directed by Lindsay Boeckman.

### **Why is this study being done?**

The purpose of this assessment is to determine the level of dental health in our state. We are interested in finding out how many children have dental sealants or cavities. This information will be used to plan dental health programs throughout the state.

### **How many people will take part in the study?**

About 1300 third grade students will take part in this study at 36 elementary schools. About 20 students will participate at your child's school.

### **What is involved in the study?**

This assessment will be carried out at your child's school. A dentist will look at your child's teeth and count the number of teeth that have cavities or fillings and see if your child has any dental sealants. If dental problems needing further attention are identified during the screening, you will be notified. This screening does not take the place of regular dental check-ups with your dentist who is able to examine your child more thoroughly. It is also important to include your child even if he or she has had a recent dental check-up. During the dental visit, your child will also participate in an educational activity promoting proper care of teeth. Your child will also be asked to give permission at the time of the screening.

### **How long will my child be in the study?**

The educational activities will last 10-15 minutes, and individual student screenings will take an additional 2 minutes each.

### **What are the risks, benefits and options of the study?**

The risks from your child participating in this study are less than minimal. Disposable mirrors and non-latex gloves will be used on each child. The results of the screening will be kept confidential, as allowed by law. You will receive the results of the dental health screening, and all students in the class will receive a toothbrush kit. You and your child may choose not to participate in this study at any time.

### **What about confidentiality?**

Efforts will be made to keep your child's information confidential. The results of your child's screening will not be linked to his/her name. Your child will not be identified by name or description in any reports or publications about this assessment.

There are organizations that may inspect and/or copy the screening records for quality assurance and data analysis. These organizations include the Oklahoma State Department of Health and the OUHSC Institutional Review Board.

**What are my child’s rights as a participant?**

Taking part in this assessment is voluntary. Your child may choose not to take part or may leave the study at any time. You may revoke your consent and withdraw your child from the study at any time without affecting, in any way, now or in the future, your relations with the University of Oklahoma Health Sciences Center, or the school that your child attends.

**Whom do I call if I have questions or problems?**

If you have any questions regarding your child’s participation in this needs assessment, you may contact Lindsay Boeckman by calling 405-271-2229. If you have any questions regarding your child’s participation as a research subject, you may call the OUHSC Director, Human Research Participant Protection at 405-271-2045, or contact Malinda Douglas, OSDH IRB Coordinator at 405-271-7637.

**Signature**

By signing this consent form, you are agreeing to allow your child to participate in this dental health needs assessment under the conditions described. You have not given up any of your legal rights or released any individual or institution from liability for negligence. You have been given an opportunity to ask questions.

\_\_\_\_\_  
Please print child’s name

\_\_\_\_\_  
Signature of Parent/Guardian (Date)

\_\_\_\_\_  
Signature of Teacher (Date)

\_\_\_\_\_  
Signature of Principal Investigator (Date)

**Child Assent Form**  
**Dental Health Needs Assessment**

You are being asked to take part in a research study about what needs to be done so children will have healthy teeth. We would like to look inside your mouth and count the number of teeth that have cavities or fillings and see if you have any dental sealants. This information will be used to plan dental health programs in Oklahoma. This study is being done by the University of Oklahoma Health Sciences Center on behalf of the Oklahoma State Department of Health.

Your parents have already said it is OK for you to take part in this study. **Taking part is voluntary.** This means you can decide for yourself whether or not to take part. If you say no, no one will be mad at you. Your grades in this class will not be affected. The information we collect will be kept private.

If you voluntarily agree to take part in this dental screening, please sign your name on the line below.

\_\_\_\_\_

Name

\_\_\_\_\_

Date

**Thank you very much for your help!**

# Appendix C

## 2012-2013 Dental Health Screening Form

County \_\_\_\_\_



\*W=White, B=Black/African American, NA=Native American, A=Asian, O=Other

\*\*H=Hispanic Origin, N=Not Hispanic Origin, U=Unknown

School:	D	M	F	d	m	f	Number Sealants on Permanent Molars	To be completed by Teacher				Outcome		
City:	Number Permanent Teeth Decayed	Number Permanent Teeth Missing	Number Permanent Teeth Filled	Number Primary Teeth Decayed	Number Primary Teeth Missing	Number Primary Teeth Filled		Age	Gender M or F	Race *(W, B, NA, A, Other)	Ethnicity **(H, N, U)	No Problems	Problems/Need Attn	Problems/Need Immediate Attn
Teacher:	Students, in alphabetical order													
1														
2														
3														
4														
5														
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## ***Appendix D***

### **Results of Oral Health Screening**

With your permission, \_\_\_\_\_ received a dental screening at school today. The purpose of the screening was to determine the number of children with dental sealants and to assess the oral health status of your community. The dentist determined that the following conditions exist:

- No dental problems were observed. See your dentist as he/she recommends
- Dental problems were observed that appear to need attention. Please contact your dentist at your earliest convenience.
- Dental problems were observed that appear to need immediate attention. Contact your dentist immediately!

**Please note:** This dental screening was not a complete dental examination (check-up). In many cases, cavities or other dental problems may not be detected by visual screening alone. For this reason, children should receive a thorough dental examination every six months, or as recommended by your dentist.

If you have questions or would like additional information about dental care for your child, please contact your local dentist. For information about Medicaid dental benefits, call the Oklahoma Health Care Authority at (405)522-7300.

## ***Appendix E***

### **Summary of dental health status of Oklahoma third grade students, un-weighted prevalence rates**

<b><i>Dental Health Status Indicator</i></b>	<b><i>Prevalence</i></b>	<b><i>95% Confidence Interval</i></b>
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	36.7%	33.3% - 40.0%
Percentage of third graders in Oklahoma with dental caries experience	58.0%	54.5% - 61.4%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary or permanent tooth	16.9%	14.3% - 19.5%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent tooth	6.6%	4.9% - 8.3%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary tooth	14.2%	11.8% - 16.7%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	0.8%	0.2% - 1.4%
Percentage of third graders in Oklahoma with at least one missing primary tooth	19.7%	16.9% - 22.4%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	12.9%	10.6% - 15.3%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	44.7%	41.2% - 48.1%

## Appendix F

### Overall Participant Characteristics, Including Percent Missing

		No.	Percent			No.	Percent
<b>Age</b>	8	173	22.0%	<b>Gender</b>	Female	422	53.6%
	9	534	67.8%		Male	366	46.4%
	10	78	9.9%		Missing	N/A	N/A
	11	1	0.1%	<b>Race</b>	Asian	8	1.0%
	Missing	2	0.3%		Black	113	14.3%
<b>Ethnicity</b>	Hispanic	119	15.1%		Native American	71	9.0%
	Non-Hispanic	548	69.5%		Other	51	6.5%
	Unknown	76	9.6%		White	543	68.9%
	Missing	45	5.7%	Missing	2	0.3%	

\*All percentages are rounded to one decimal place; therefore, total may not add to 100%

## Appendix G

### Participant Characteristics by Region

		NE		NW		SE		SW		OKC		Tulsa	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Age	8	14	8.5	34	37.0	39	21.4	37	26.1	45	26.6	4	10.5
	9	133	80.6	55	59.8	123	67.6	80	56.3	114	67.5	29	76.3
	10	17	10.3	3	3.3	20	11.0	24	16.9	9	5.3	5	13.2
	11	N/A	N/A	N/A	N/A	N/A	N/A	1	0.7	N/A	N/A	N/A	N/A
	Missing	1	0.6	N/A	N/A	N/A	N/A	N/A	N/A	1	0.6	N/A	N/A
Gender	Female	87	52.7	43	46.7	112	61.5	68	47.9	100	59.2	12	31.6
	Male	78	47.3	49	53.3	70	38.5	74	52.1	69	40.8	26	68.4
Race	Asian	N/A	N/A	2	2.2	N/A	N/A	N/A	N/A	6	3.6	N/A	N/A
	Black	25	15.2	N/A	N/A	16	8.8	22	15.5	50	29.6	N/A	N/A
	Native American	13	7.9	3	3.3	31	17.0	15	10.6	9	5.3	N/A	N/A
	Other	3	1.8	1	1.1	7	3.8	7	4.9	33	19.5	N/A	N/A
	White	123	74.5	86	93.5	128	70.3	98	69.0	70	41.4	38	100.0
	Missing	1	0.6	N/A	N/A	N/A	N/A	N/A	N/A	1	0.6	N/A	N/A
Ethnicity	Hispanic	7	4.2	11	12.0	22	12.1	42	29.6	34	20.1	3	7.9
	Non-Hispanic	141	85.5	81	88.0	134	73.6	86	60.6	86	50.9	20	52.6
	Unknown	10	6.1	N/A	N/A	25	13.7	13	9.2	16	9.5	12	31.6
	Missing	7	4.2	N/A	N/A	1	0.5	1	0.7	33	19.5	3	7.9

\*All percentages are rounded to one decimal place; therefore, total may not add to 100%