

Oklahoma Oral Health Needs Assessment 2008

Third Grade Children



Oklahoma State Department of Health
Dental Health Services

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 each of the last five 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 have 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 prevent almost all 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 2007-2008 school year.

This study was submitted to and approved by both the University of Oklahoma Health Sciences Center Institutional Review Board (IRB #10401) 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 2007. All schools in the spreadsheet with one or more third grade classrooms and at least five third grade students were retained for this study. Nearly 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 an inflated 12-school-per-region random sample was selected using SAS 9.1. Each school had an equal probability of being included in the sample.

The first six schools sampled from each region were asked to participate in the study. A descriptive letter about the study and an informational flyer were faxed to the school, along with a return fax form 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 faxes and three follow-up calls. If a school refused to participate or did not respond within a reasonable time period, the next school on the 12-school random sampling list for the region was chosen and contacted using the same methods. By using the sample replacement strategy described, a final sample of 36 participating schools was obtained.

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.

Special issues arose in the sampling for the Tulsa County Region during this year's screening as the largest school district in the region did not participate in the screenings. The sampling for this region required two additional 6-school samples to obtain a 12-school sample that did not include any schools from the non-participating district. This school district 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 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.

Three dentists (KSB, KTA, and KLH) performed the screenings. 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 resin on occlusal surfaces of permanent teeth was counted, resulting in a range of 0 to 4 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. The 2007-2008 screening form included an additional outcome variable to be filled in by the dentists that reflected the results sent home with each participating student. 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 9.1. 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 statewide distribution of the population of third graders and the regional distribution of the sample of participants were not the same; therefore, weighting was used to adjust the regional sample estimates to reflect the statewide distribution and provide weighted statewide estimates. (Appendix H).

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 917 third-grade students participated in the oral needs assessment from across Oklahoma. The overall participation rate was 47.1%. Both the number of students screened and participation rates varied by region (Table 2). Schools in the NW region of the state had the highest participation rates (59.7%) while Tulsa County had the lowest rate of participation (37.4%). The NE region had the fewest number of students screened, with data collected from 105 students.

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</i>
NE	A (N= 12)	Adair	6	6	50.0%
	B (N= 12)	Adair	11	11	91.7%
	C (N= 14)	Craig	12	12	85.7%
	D (N= 52)	Creek	14	14	26.9%
	E (N= 78)	Nowata	35	35	44.9%
	F (N= 39)	Washington	31	27	79.5%
		<i>Total</i>		109	105
NW	A (N= 58)	Canadian	42	42	72.4%
	B (N=104)	Canadian	47	47	45.2%
	C (N= 60)	Garfield	39	39	65.0%
	D (N= 28)	Garfield	15	15	53.6%
	E (N= 32)	Harper	24	24	75.0%
	F (N= 13)	Kingfisher	9	9	69.2%
		<i>Total</i>		176	176
SE	A (N= 81)	Carter	15	15	18.5%
	B (N= 53)	Garvin	16	16	30.2%
	C (N= 24)	Leflore	22	20	91.7%
	D (N= 20)	Love	19	19	95.0%
	E (N= 80)	Pottawatomie	29	29	36.3%
	F (N= 15)	Seminole	9	9	60.0%
		<i>Total</i>		110	108
SW	A (N= 80)	Comanche	19	18	23.8%
	B (N= 50)	Comanche	37	37	74.0%
	C (N= 19)	Comanche	15	15	78.9%
	D (N= 43)	Grady	23	23	53.5%
	E (N= 41)	Grady	38	38	92.7%
	F (N= 15)	Stephens	6	6	40.0%
		<i>Total</i>		138	137
OKC	A (N= 55)	Oklahoma	8	8	14.5%
	B (N= 49)	Oklahoma	33	32	67.3%
	C (N= 49)	Oklahoma	14	14	28.6%
	D (N= 50)	Oklahoma	26	24	52.0%
	E (N= 33)	Oklahoma	22	21	66.7%
	F (N= 59)	Oklahoma	48	48	81.4%
		<i>Total</i>		151	147
Tulsa	A (N=205)	Tulsa	39	39	19.0%
	B (N= 82)	Tulsa	56	56	68.3%
	C (N= 93)	Tulsa	21	21	22.6%
	D (N= 90)	Tulsa	24	24	26.7%
	E (N= 90)	Tulsa	49	49	54.4%
	F (N= 95)	Tulsa	56	55	58.9%
		<i>Total</i>		245	244

*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 8.8 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 all but one of the regions was ten years of age, with the maximum age of eleven in one region. 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=44.4% and Females=55.6%). Racial make-up for the sample seemed to follow Oklahoma population trends, with Whites equaling 72.1%, Blacks equaling 11.5%, Others (including Hispanics) equaling 7.4%, Native Americans equaling 7.2%, and Asian Americans equaling 1.8% of the sample population.

There were some regional differences in the race/ethnicity of participants. Approximately 23% of participants in the NE region were Native American, and 38.1% of participants in Oklahoma County were Black. Oklahoma County had the highest percentage of Black and Hispanic participants, accounting for 55% of Black participants in the study and 10.9% Hispanic. In the NW region, over 80% of participants were White.

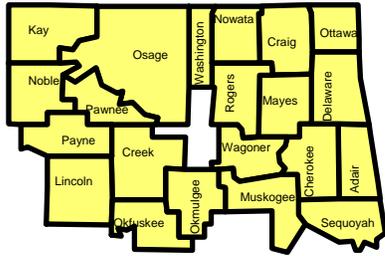
Table 3. Overall participant characteristics, among non-missing data

		<i>No.</i>	<i>Percent</i>			<i>No.</i>	<i>Percent</i>
Age	8	257	28.1%	Gender	Female	510	55.6%
	9	598	65.3%		Male	407	44.4%
	10	60	6.6%	Race	Asian	16	1.8%
11	1	0.1%	Black		102	11.5%	
Ethnicity	Hispanic	60	9.1%		Native American	64	7.2%
	Non-Hispanic	558	84.7%	Other	65	7.4%	
	Unknown	41	6.2%	White	637	72.1%	

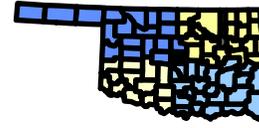
*All percentages are rounded to one decimal place; therefore, total may not add to 100%

Participant characteristics, by region

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



Northeast Region



Participant Characteristics (n=105)

Age (years)

	Number	Percentage
8	31	29.5%
9	70	66.7%
10	4	3.8%
11	N/A	N/A
Missing	N/A	N/A

Gender

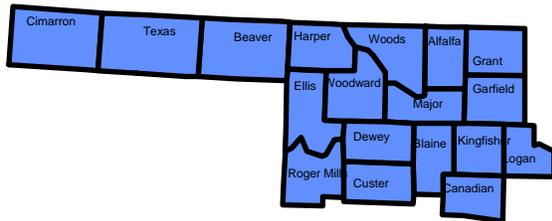
	Number	Percentage
Female	61	58.1%
Male	44	41.9%
Missing	N/A	N/A

Ethnicity

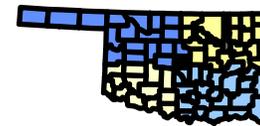
	Number	Percentage
Hispanic	10	9.5%
Non-Hispanic	81	77.1%
Unknown	N/A	N/A
Missing	14	13.3%

Race

	Number	Percentage
Asian	1	1.0%
Black	8	7.6%
Native American	24	22.9%
White	61	58.1%
Other	7	6.7%
Missing	4	3.8%



Northwest Region



Participant Characteristics (n=176)

Age (years)

	Number	Percentage
8	65	36.9%
9	101	57.4%
10	8	4.5%
11	1	0.6%
Missing	1	0.6%

Gender

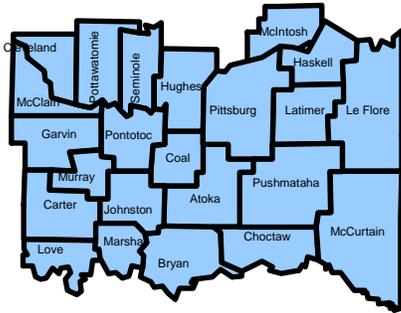
	Number	Percentage
Female	94	53.4%
Male	82	46.6%
Missing	N/A	N/A

Ethnicity

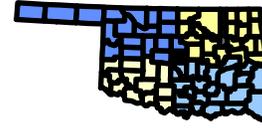
	Number	Percentage
Hispanic	7	4.0%
Non-Hispanic	93	52.8%
Unknown	17	9.7%
Missing	59	33.5%

Race

	Number	Percentage
Asian	5	2.8%
Black	1	0.6%
Native American	5	2.8%
White	142	80.7%
Other	6	3.4%
Missing	17	9.7%



Southeast Region



Participant Characteristics (n=108)

Age (years)

	Number	Percentage
8	33	30.6%
9	69	63.9%
10	6	5.6%
11	N/A	N/A
Missing	N/A	N/A

Ethnicity

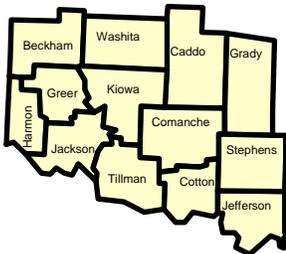
	Number	Percentage
Hispanic	3	2.8%
Non-Hispanic	74	68.5%
Unknown	22	20.4%
Missing	9	8.3%

Gender

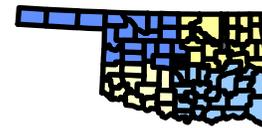
	Number	Percentage
Female	64	59.3%
Male	44	40.7%
Missing	N/A	N/A

Race

	Number	Percentage
Asian	1	0.9%
Black	5	4.6%
Native American	14	13.0%
White	84	77.8%
Other	3	2.8%
Missing	1	0.9%



Southwest Region



Participant Characteristics (n=137)

Age (years)

	Number	Percentage
8	47	34.3%
9	82	59.9%
10	8	5.8%
11	N/A	N/A
Missing	N/A	N/A

Ethnicity

	Number	Percentage
Hispanic	10	7.3%
Non-Hispanic	84	61.3%
Unknown	N/A	N/A
Missing	43	31.4%

Gender

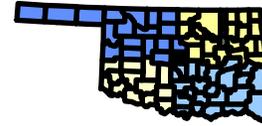
	Number	Percentage
Female	74	54.0%
Male	63	46.0%
Missing	N/A	N/A

Race

	Number	Percentage
Asian	N/A	N/A
Black	19	13.9%
Native American	7	5.1%
White	97	70.8%
Other	9	6.6%
Missing	5	3.6%



Oklahoma County Region



Participant Characteristics (n=147)

Age (years)

	Number	Percentage
8	28	19.0%
9	96	65.3%
10	23	15.6%
11	N/A	N/A
Missing	N/A	N/A

Gender

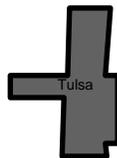
	Number	Percentage
Female	82	55.8%
Male	65	44.2%
Missing	N/A	N/A

Ethnicity

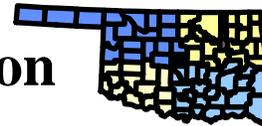
	Number	Percentage
Hispanic	16	10.9%
Non-Hispanic	110	74.8%
Unknown	2	1.4%
Missing	19	12.9%

Race

	Number	Percentage
Asian	2	1.4%
Black	56	38.1%
Native American	6	4.1%
White	63	42.9%
Other	20	13.6%
Missing	N/A	N/A



Tulsa County Region



Participant Characteristics (n=244)

Age (years)

	Number	Percentage
8	53	21.7%
9	180	73.8%
10	11	4.5%
11	N/A	N/A
Missing	N/A	N/A

Gender

	Number	Percentage
Female	135	55.3%
Male	109	44.7%
Missing	N/A	N/A

Ethnicity

	Number	Percentage
Hispanic	14	5.7%
Non-Hispanic	116	47.5%
Unknown	N/A	N/A
Missing	114	46.7%

Race

	Number	Percentage
Asian	7	2.9%
Black	13	5.3%
Native American	8	3.3%
White	190	77.9%
Other	20	8.2%
Missing	6	2.5%

The distribution of the sample by region is shown in Table 4. These numbers are the denominators for the various percentages presented. The Tulsa region had the largest sample size, followed by the Northwest region. The Northeast and Southeast 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	105	11.5%
NW	176	19.2%
SE	108	11.8%
SW	137	14.9%
OKC	147	16.0%
Tulsa	244	26.6%
<i>Total</i>	<i>917</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 (39.7%). The percentage of dental caries (cavities) experience is high, 71.5%. Furthermore, 32.3% of children have untreated active caries in at least one permanent or primary tooth. Active caries are observed more frequently in primary teeth (28.5%) as compared to permanent teeth (8.4%). Likewise, primary teeth are more likely to have fillings/restorations (48.8%), when compared to permanent teeth (14.9%). The prevalence of missing permanent teeth is very low (1.1%); however, 12.6% 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

<i>Dental Health Status Indicator</i>	<i>Weighted Estimate</i>
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	14.9%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	48.8%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	1.1%
Percentage of third graders in Oklahoma with at least one missing primary tooth	12.6%
Percentage of third graders in Oklahoma with dental caries experience	71.5%
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	39.7%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent or primary tooth	32.3%
Percentage of third graders in Oklahoma with untreated decay in at least one permanent tooth (active caries)	8.4%
Percentage of third graders in Oklahoma with untreated decay in at least one primary tooth (active caries)	28.5%

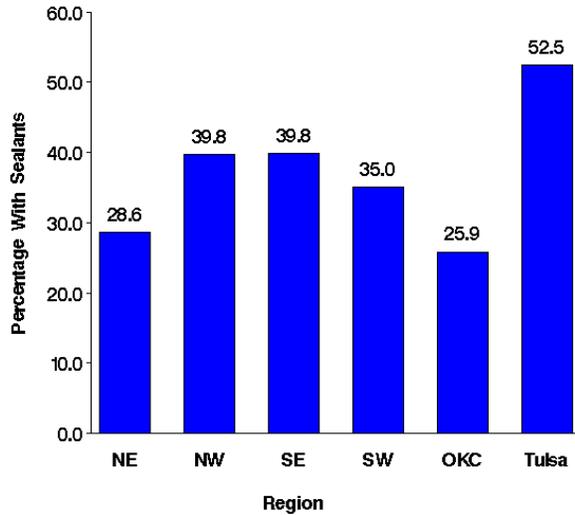
Results by Region

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 40% of third graders in Oklahoma have sealants on one or more permanent molars, results by region are highly variable. Four of the six regions have a prevalence of sealants greater than 30%. Approximately 53% of children in Tulsa County are observed to have sealants. Of all students sampled, 20.0% have four molars with protective sealants. The mean number of sealants on permanent molar teeth for the students assessed equals 1.2 with a standard deviation of 1.6. In the six years this

needs assessment has been conducted, the 2007-2008 screening saw the highest percentage of children with protective sealants, although it was only a slight increase (Figure 3).

**Figure 1. Percentage of third graders with sealants on at least one permanent molar tooth
Oklahoma 2007–2008**



**Figure 2. Percentage of third graders with sealants on at least one permanent molar tooth
In order from best to worst
Oklahoma 2007–2008**

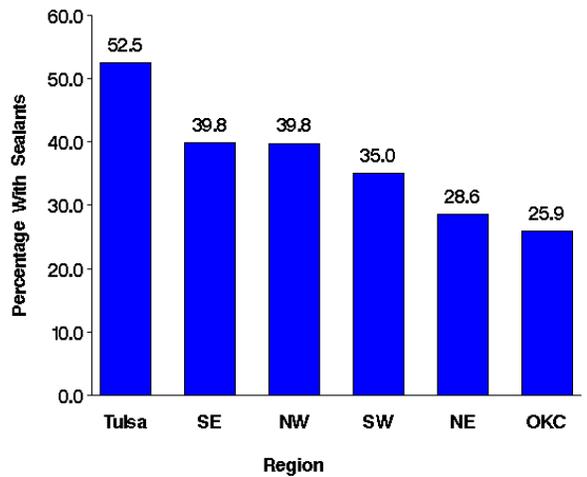
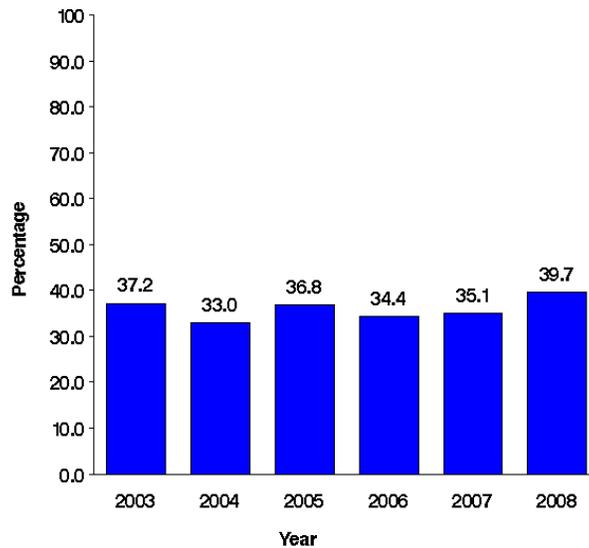


Figure 3. Weighted estimates of percentage of third graders with sealants on at least one permanent molar tooth



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 917 third grade children examined, 546 children, or 2,245 teeth, have been affected by decay. This results in a mean DMFT/dmft score of 2.5 teeth per child. In other words, on average, each third grade child has approximately 2.5 teeth that are decayed or were decayed and treated. Additionally, survey results show that 71.5% of third graders in the state have caries experience, which is nearly 5% higher than last year. The region with the lowest prevalence of caries experience is Tulsa County with 49.6%, while the NE region has the highest with 72.4%.

Figure 4. Percentage of third graders with dental caries experience Oklahoma 2007–2008

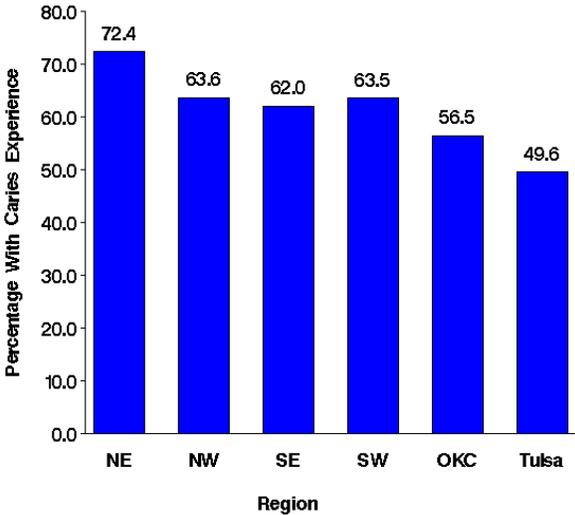


Figure 5. Percentage of third graders with dental caries experience In order from best to worst Oklahoma 2007–2008

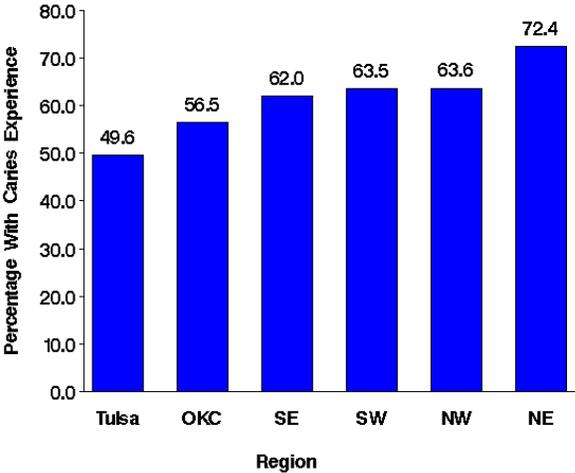
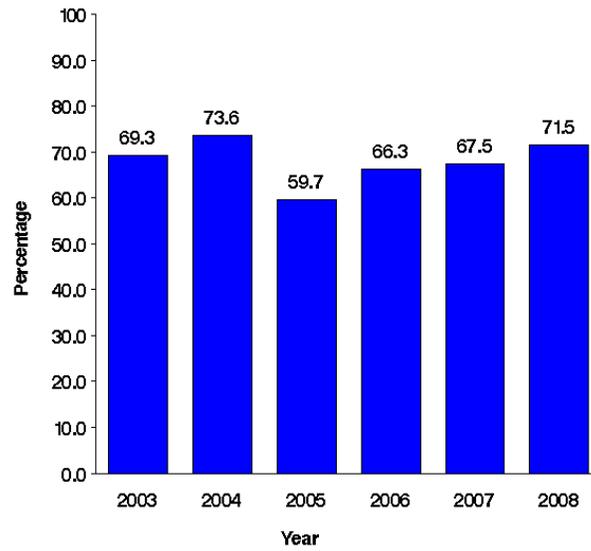


Figure 6. Weighted estimates of percentage of third graders with dental caries experience



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-third (32.3%) of third grade children in Oklahoma are observed to have untreated caries. The percentage of children with untreated decay has decreased since 2003, but is higher now than it was in 2005. The prevalence of untreated caries is lower in Tulsa County (19.3%) compared with any other region. The NE region has the highest prevalence of untreated caries (39.0%).

Figure 7. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)
Oklahoma 2007–2008

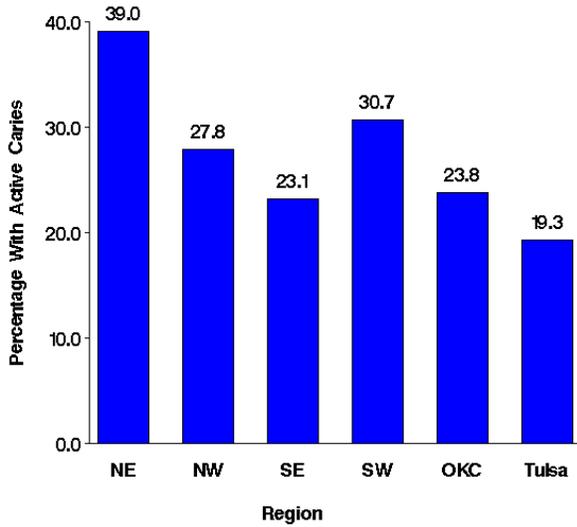


Figure 8. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)
In order from best to worst
Oklahoma 2007–2008

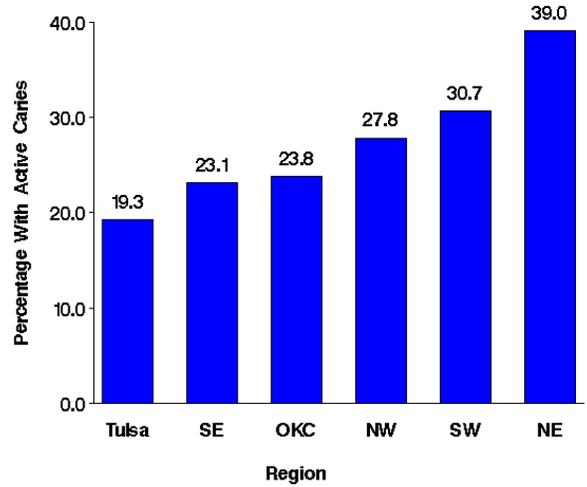
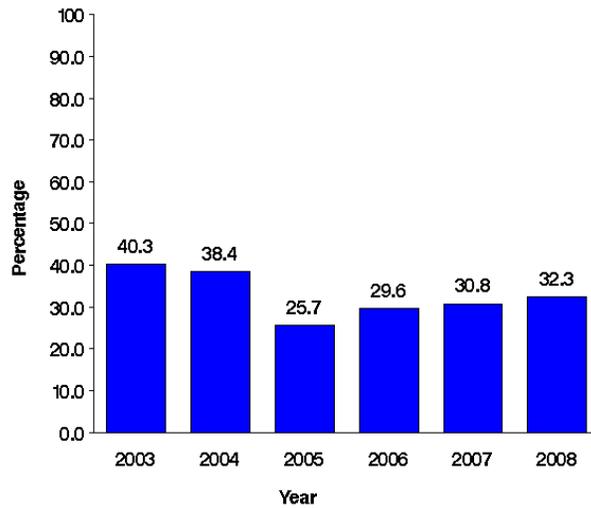


Figure 9. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent or primary tooth



Untreated Decay in Permanent Teeth (active caries)

Statewide, 8.4% of third graders have decayed permanent teeth (untreated active caries). Tulsa County has the lowest prevalence of

actively decayed permanent teeth (2.9%) while the NE region has the highest prevalence of decay (9.5%). The mean number of decayed permanent teeth for the 917 students is 0.1 teeth with a relatively moderate standard deviation of 0.4 and a range of 0 to 4 teeth. The majority of active decay is limited to one or two permanent teeth, with only 2 students (0.2%) observed to have active decay in four teeth. Furthermore, the estimated percentage of children in Oklahoma with decayed permanent teeth is less than half that of 2003 and 2004 estimates (Figure 11).

Figure 10. Percentage of third graders with at least one decayed permanent tooth (active caries) Oklahoma 2007–2008

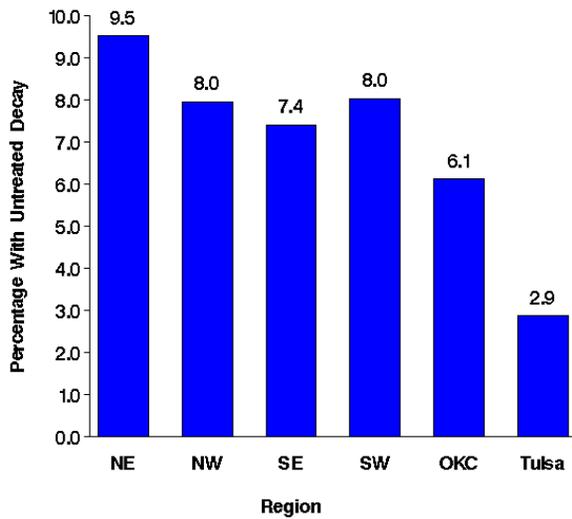
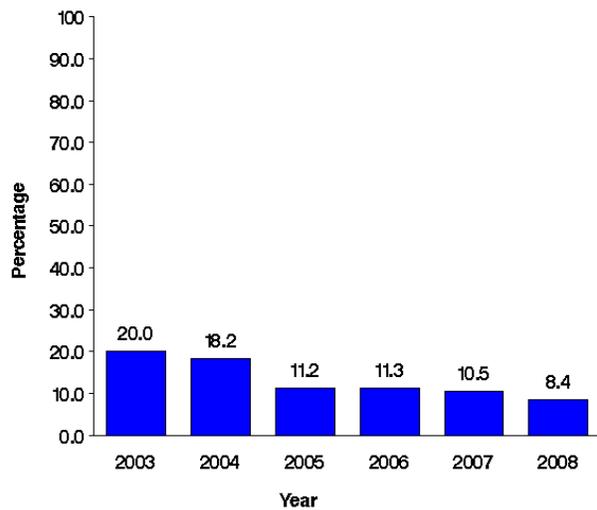


Figure 11. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent tooth



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. More than one-fourth (28.5%) of third graders have active decay in one or more primary teeth. Children in Tulsa County have the lowest prevalence (18.0%), while the NE region has the highest prevalence of untreated decay in primary

teeth (35.2%). In this statewide sample, the mean number of decayed primary teeth is 0.5 with a standard deviation of 1.1 and a range of 0 to 8 primary teeth with active decay. About five 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 2007–2008

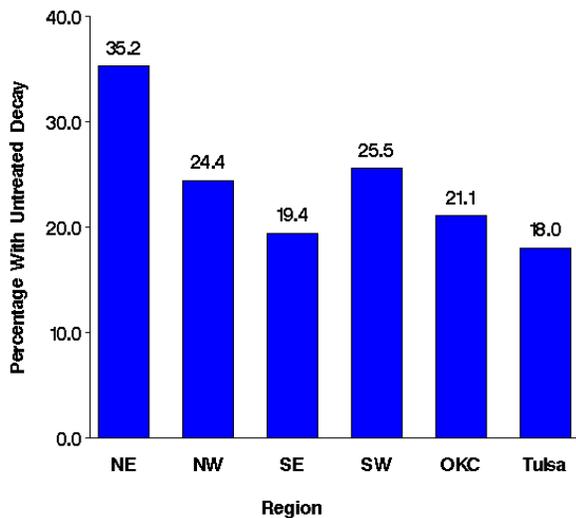
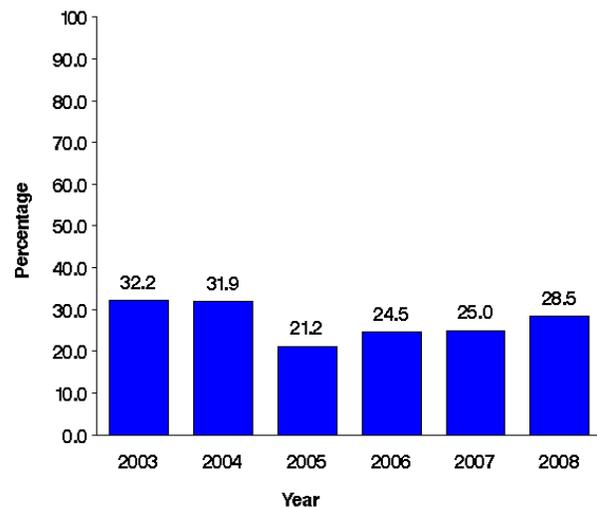


Figure 13. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one primary tooth



Missing Permanent Teeth

Only five third grade students screened (1.1%) are missing permanent teeth with a range of 0 to 1 missing permanent teeth. Two children in Tulsa County are missing one permanent tooth and in each of the NE, NW, and SE regions, one child is 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, 12.6% of third grade students are missing one or more primary teeth, which is more than an 8%

decrease compared with 2007 survey data. Regional percentages vary from 8.3% in the SE region to 14.6% in the SW region (Figure 14). The mean number of missing primary teeth for the sample equals 0.2 with a standard deviation of 0.7 and a range of 0 to 5 missing primary teeth. Most students with missing primary teeth are missing one or two teeth. Nineteen students, or 2.1%, are missing three or more primary teeth.

Figure 14. Percentage of third graders with at least one missing primary tooth Oklahoma 2007–2008

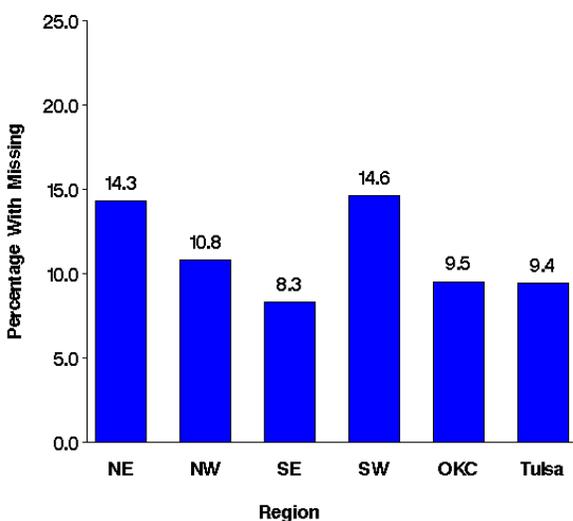
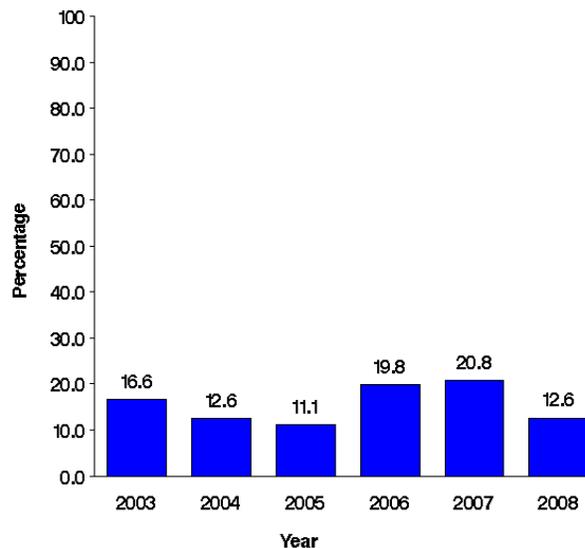


Figure 15. Weighted estimates of percentage of third graders with at least one missing primary tooth



Filled (Treated/Restored) Permanent Teeth

Fifteen percent of third graders have filled (treated/restored) cavities in one or more permanent teeth. Differences by region are observed (Figure 16). Children in Oklahoma County have the lowest percentage of filled teeth with 7.5%. The highest percentage of filled/treated permanent teeth is observed in the SE region (15.7%) and there is a more than two-fold increase in the percentage of filled permanent teeth when Oklahoma County is compared to the SE region (7.5% versus 15.7%, 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 6 permanent teeth filled

(treated/restored). The estimated percentage of children in Oklahoma with filled permanent teeth has remained less than or equal to 15% during the six years of this needs assessment. However, it has risen steadily over the last three years.

Figure 16. Percentage of third graders with at least one filled (treated/restored) permanent tooth Oklahoma 2007–2008

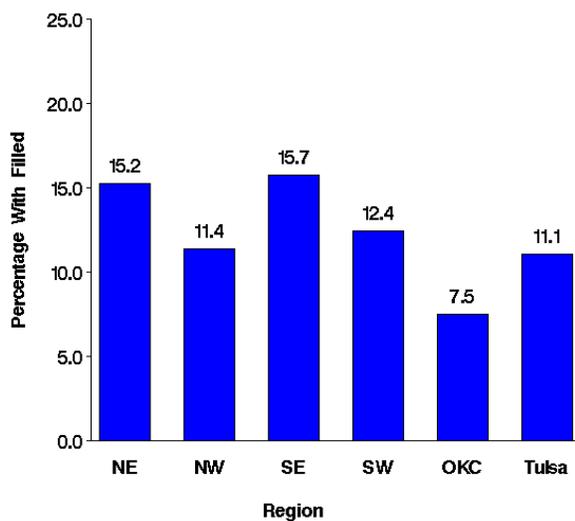
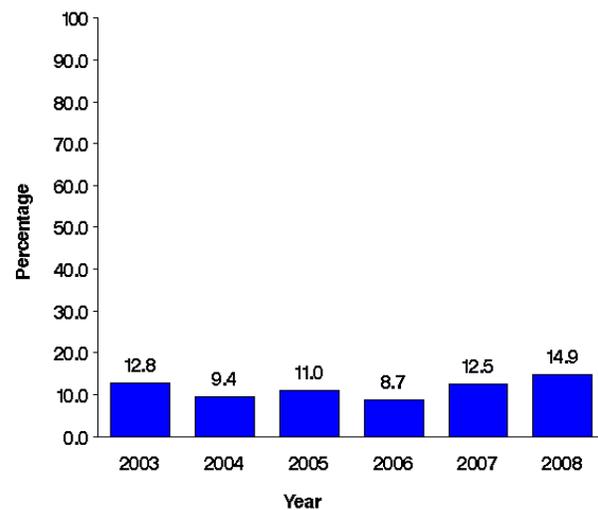


Figure 17. Weighted estimates of percentage of third graders with at least one filled (treated/restored) permanent tooth



Filled (Treated/Restored) Primary Teeth

Significantly more children are observed to have filled (treated/restored) primary teeth compared to permanent teeth. Overall, 48.8% of third graders have one or more filled primary teeth. Regional proportions vary from 34.4% in Tulsa County to 48.6% in the NE region (Figure 18). The mean number of filled primary teeth for the sample is 1.5 with a standard deviation of 2.2 teeth and a range of 0 to 10 filled primary teeth. Less than 20% (18.7%) 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 six years of this needs assessment (Figure 19).

**Figure 18. Percentage of third graders with at least one filled (treated/restored) primary tooth
Oklahoma 2007–2008**

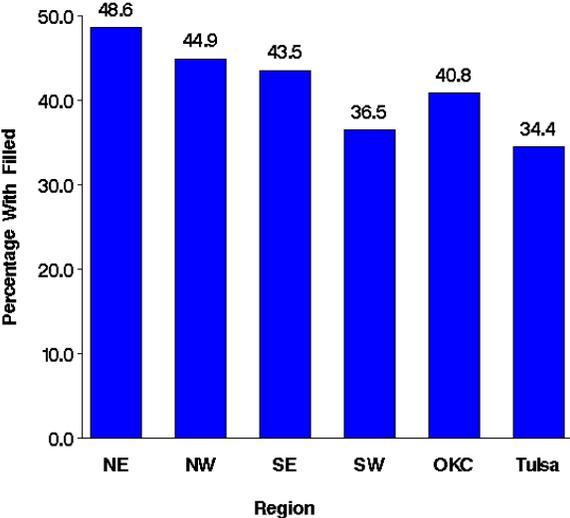
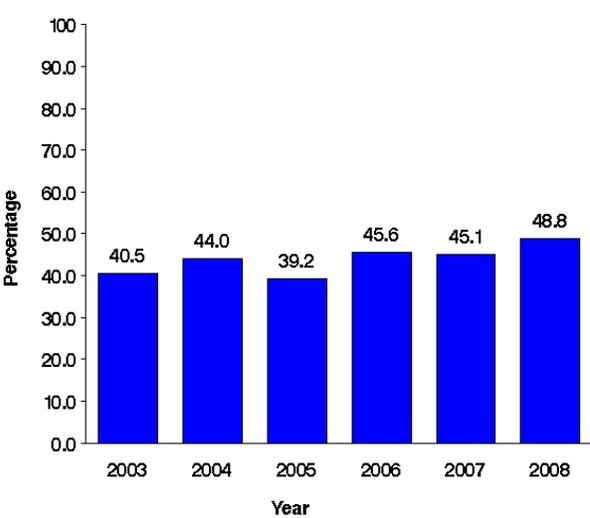


Figure 19. Weighted estimates of percentage of third graders with at least one filled (treated/restored) primary tooth



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 (72.3%) had no dental problems, and only 7.1% 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

<i>Screening Results</i>	<i>No.</i>	<i>Percent</i>
Observed no dental problems	646	72.3%
Observed dental problems that need attention soon	184	20.6%
Observed dental problems that need attention immediately	63	7.1%
Missing	24	.

Most of the regions had similar results (Table 7). The Northeast region had the worst outcomes with the smallest percentage of children with no dental problems (58.7%) and the largest percentage of children with dental problems that needed immediate attention (11.5%). The Tulsa County region had the best outcomes with nearly 80% of children with no dental problems and only 3% of children with dental problems that needed immediate attention.

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

<i>Screening Results</i>	<i>Region</i>					
	<i>NE</i>	<i>NW</i>	<i>SE</i>	<i>SW</i>	<i>OKC</i>	<i>Tulsa</i>
Observed no dental problems	58.7%	71.6%	75.0%	69.9%	71.4%	79.4%
Observed dental problems that need attention soon	29.8%	20.0%	21.3%	19.9%	20.4%	17.3%
Observed dental problems that need attention immediately	11.5%	8.4%	3.7%	10.3%	8.2%	3.3%

Discussion

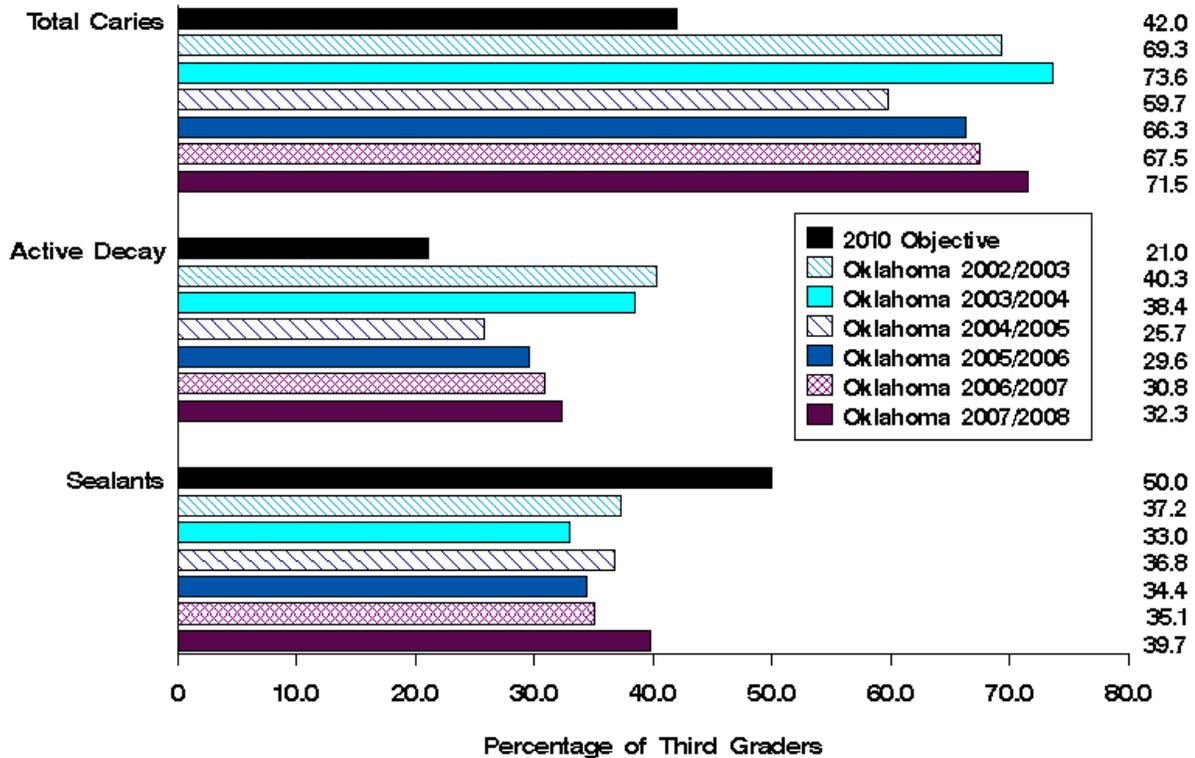
Dental caries is one of the most common chronic childhood diseases. To establish a baseline for dental health indicators in third grade children in Oklahoma, this sixth annual needs assessment was conducted by the University of Oklahoma Colleges of Public Health and Dentistry, with funding from the Oklahoma 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 2010 Objectives

Led by the U.S. Department of Health and Human Services, Healthy People 2010 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 2010 objectives is monitored using specific, measurable objectives. The Healthy People 2010 Objectives include several measures related to oral health in children ages six to eight. These include:

- Reduce the proportion of children with dental caries experience in their primary and permanent teeth to 42%.
- Reduce the proportion of children with untreated dental decay in primary and permanent teeth to 21%.
- Increase the proportion of children receiving dental sealants on their molar teeth to 50%.

Consistent with data from the previous dental assessments, data from the 2007-2008 study of Oklahoma children indicate significant improvements are needed before the 2010 Objectives can be met (Figure 20).

Figure 20. Oklahoma dental measures compared to Healthy People 2010 targets



The statewide prevalence for total dental caries experience in Oklahoma third graders is 71.5%, which is much higher than the Year 2010 Objective (42%). The prevalence of active decay in Oklahoma (32.3%), defined as untreated caries in at least one permanent or primary tooth, is also higher than the Year 2010 Objective (21%). Additionally, the proportion of children with protective sealants is low in Oklahoma (39.7%) compared to the Year 2010 Objective (50%). However, it is the largest percentage seen in the six years of this assessment.

Large regional differences are observed in the results of the oral health needs assessment. Tulsa County has the highest prevalence of dental sealants (52.5%), and is the only region to meet the Year 2010 Objective (50%). Tulsa County is also the only region to have a proportion (19.3%) of children with active (untreated) decay below the Year 2010 Objective (21%).

Third graders in Oklahoma County have the second lowest prevalence of any caries experience, but also have the lowest prevalence of dental sealants. Tulsa County ranks highest for a majority of the dental health status indicators measured. Oklahoma County and the SE region have proportions close to those of Tulsa County for many of the dental health indicators.

However, the participation rate in Tulsa County was the lowest among all the regions, with only about 38% 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 largest school district in the state did not participate in the screenings. As a result of these issues, the sample for this region was not fully representative of the county.

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 47.1% of selected students returned a signed parental consent form. In some 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



The University of Oklahoma *Health Sciences Center*

DEPARTMENT OF BIOSTATISTICS AND EPIDEMIOLOGY

Month XX, 20XX

All Third Grade Teachers;

Your school has been randomly chosen from all the schools in Oklahoma to participate in a voluntary dental screening for area third graders. Sponsored by the Oklahoma State Department of Health and directed by Kay Beavers, DDS and Laura Beebe, PhD of the Oklahoma Health Sciences Center, this screening will help assess the prevalence of dental sealants and cavities in Oklahoma third graders. In turn, this information will help develop dental health programs throughout the state. An executive report of the program may be accessed through the following hyperlink:

<http://www.health.state.ok.us/program/dental/index.html>

In choosing for your school to participate, you will be allowing your students to have their mouths evaluated by a dentist to assess overall dental health. Dental health promotion activities will also be utilized to educate students on proper dental health techniques. These activities should take about one hour of classroom time. Each child in the classroom will receive toothpaste and a new toothbrush, and the results of each child's dental screening will be provided for the child's parents.

Attached is a fax form for returning affirmation of your school's participation. After confirmation of your assent to the visit, we will be contacting you to acquire an appointment for the visit to **all the third grade classrooms at your school**. We will then distribute parental consent forms to be sent home with the children involved in the screening.

If you have any questions, please do not hesitate to contact Claire Beebe, Project Coordinator by phone at (405) 271-2229 ext. 48057 or by email: claire-beebe@ouhsc.edu for further clarification.

Sincerely,

Kay Beavers, DDS

Laura Beebe, PhD

Attachment: Returning fax form
Informational flyer

SCHOOL PARTICIPATION – APPROVAL FORM

School Name: _____
Address: _____
City and Zip: _____
Phone: _____

To: Claire Beebe, Project Coordinator, BSE

Fax Number: (405) 271-2068

From: _____
 School Principal's Name

I give my permission for a dental health needs assessment screening to take place in all third grade classrooms at the above selected school on a yet-to-be-determined date. I understand that I am choosing for this school to participate in a statewide endeavor to assess dental health needs throughout the state.

School Principal's Signature

Today's Date

Please list all third grade teachers in your school including their name, contact information (email/fax, whatever is preferred), the best times to contact them, and the number of students in each class.

Name	Contact Info	Best Times	# Students
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Oklahoma Dental Health Needs Assessment

What is it and why should I care?

Objectives of the Needs Assessment...

- Measure the dental health of students to evaluate Oklahoma health policies.
- Develop resources to improve the dental health of Oklahoma's children.
- Produce statewide estimates of dental health status indicators.

Do you know...

- Dental Diseases are among the most prevalent health problems in Oklahoma.
- Tooth decay is the single most common chronic childhood disease.
- Most of Oklahoma's population is affected with some form of dental disease at some time during their lives.

During the 2006-2007 School Year...

- More than two-thirds of Oklahoma third graders had tooth decay, treated or untreated.
- One-fourth of Oklahoma third graders had untreated decay in primary teeth.
- 10.5% of Oklahoma third graders had untreated decay in permanent teeth.
- 20.8% of Oklahoma third graders had one or more missing primary teeth due to decay.

In cooperation with the
Oklahoma State Department of Health
OU College of Dentistry
OU College of Public Health

Phone: 405-271-2229 x 48057
Fax: 405-271-2068
E-mail: Claire-Beebe@ouhsc.edu

Appendix B

University of Oklahoma Health Sciences Center
College of Public Health
PARENTAL/GUARDIAN CONSENT FORM
Dental Health Needs Assessment
Dr. Laura A. Beebe, 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 Dr. Laura Beebe.

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 600 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 dental health screening and education will last less than one hour.

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 needs 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 Dr. Laura Beebe 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 Sue Mallonee, OSDH IRB Coordinator at 271-4200.

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)

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

2007-2008 Oral Health Screening

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														
6														
7														
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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

<i>Dental Health Status Indicator</i>	<i>Prevalence</i>	<i>95% Confidence Limits</i>	
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	11.8%	9.7%	13.9%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	40.5%	37.3%	43.6%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	0.5%	0.1%	1.0%
Percentage of third graders in Oklahoma with at least one missing primary tooth	10.9%	8.9%	12.9%
Percentage of third graders in Oklahoma with dental caries experience	59.5%	56.4%	62.7%
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	38.9%	35.8%	42.1%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary or permanent tooth	26.1%	23.2%	28.9%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent tooth	6.4%	4.8%	8.0%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary tooth	23.0%	20.3%	25.7%

Appendix F

Overall Participant Characteristics, Including Percent Missing

		<i>No.</i>	<i>Percent</i>			<i>No.</i>	<i>Percent</i>
Age	8	257	28.0%	Gender	Female	510	55.6%
	9	598	65.2%		Male	407	44.4%
	10	60	6.5%		Missing	N/A	N/A
	11	1	0.1%	Race	Asian	16	1.7%
	Missing	1	0.1%		Black	102	11.1%
Ethnicity	Hispanic	60	6.5%		Native American	64	7.0%
	Non-Hispanic	558	60.9%		Other	65	7.1%
	Unknown	41	4.5%		White	637	69.5%
	Missing	258	28.1%		Missing	33	3.6%

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

Appendix G

Participant Characteristics by Region

		NE (N=105)		NW (N=176)		SE (N=108)		SW (N=137)		OKC (N=147)		Tulsa (N=244)	
		<i>No.</i>	<i>Percent</i>	<i>No.</i>	<i>Percent</i>	<i>No.</i>	<i>Percent</i>	<i>No.</i>	<i>Percent</i>	<i>No.</i>	<i>Percent</i>	<i>No.</i>	<i>Percent</i>
Age	8	31	29.5	65	36.9	33	30.6	47	34.3	28	19.0	53	21.7
	9	70	66.7	101	57.4	69	63.9	82	59.9	96	65.3	180	73.8
	10	4	3.8	8	4.5	6	5.6	8	5.8	23	15.6	11	4.5
	11	N/A	N/A	1	0.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Missing	N/A	N/A	1	0.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gender	Female	61	58.1	94	53.4	64	59.3	74	54.0	82	55.8	135	55.3
	Male	44	41.9	82	46.6	44	40.7	63	46.0	65	44.2	109	44.7
	Missing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Race	Asian	1	1.0	5	2.8	1	0.9	N/A	N/A	2	1.4	7	2.9
	Black	8	7.6	1	0.6	5	4.6	19	13.9	56	38.1	13	5.3
	Native American	24	22.9	5	2.8	14	13.0	7	5.1	6	4.1	8	3.3
	Other	7	6.7	6	3.4	3	2.8	9	6.6	20	13.6	20	8.2
	White	61	58.1	142	80.7	84	77.8	97	70.8	63	42.9	190	77.9
	Missing	4	3.8	17	9.7	1	0.9	5	3.6	N/A	N/A	6	2.5
Ethnicity	Hispanic	10	9.5	7	4.0	3	2.8	10	7.3	16	10.9	14	5.7
	Non-Hispanic	81	77.1	93	52.8	74	68.5	84	61.3	110	74.8	116	47.5
	Unknown	N/A	N/A	17	9.7	22	20.4	N/A	N/A	2	1.4	N/A	N/A
	Missing	14	13.3	59	33.5	9	8.3	43	31.4	19	12.9	114	46.7

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

Appendix H

Weighted Analyses

Weights were calculated to reflect the actual proportion of children per region. To do this, first the population region proportion of children was calculated, reflecting the differential number of children per region. Then, the sample region proportion of children was calculated. Dividing the population proportion by the sample proportion created the weight (Table 1). This weight adjusted the regional estimates to reflect the regional distribution. The adjusted regional estimates were then averaged to produce a weighted statewide estimate.

Population proportions, sample proportions and weights, by region

<i>Region</i>	<i>Population Proportion</i>	<i>Sample Proportion</i>	<i>Weight</i>
NE	0.2256	0.1145	1.9702
NW	0.0923	0.1919	0.4811
SE	0.2193	0.1178	1.8617
SW	0.0996	0.1494	0.6668
OKC	0.1831	0.1603	1.1421
Tulsa	0.1801	0.2661	0.6769