Oklahoma Oral Health Needs Assessment 2010

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 six of the last seven 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 2009-2010 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 2009. 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

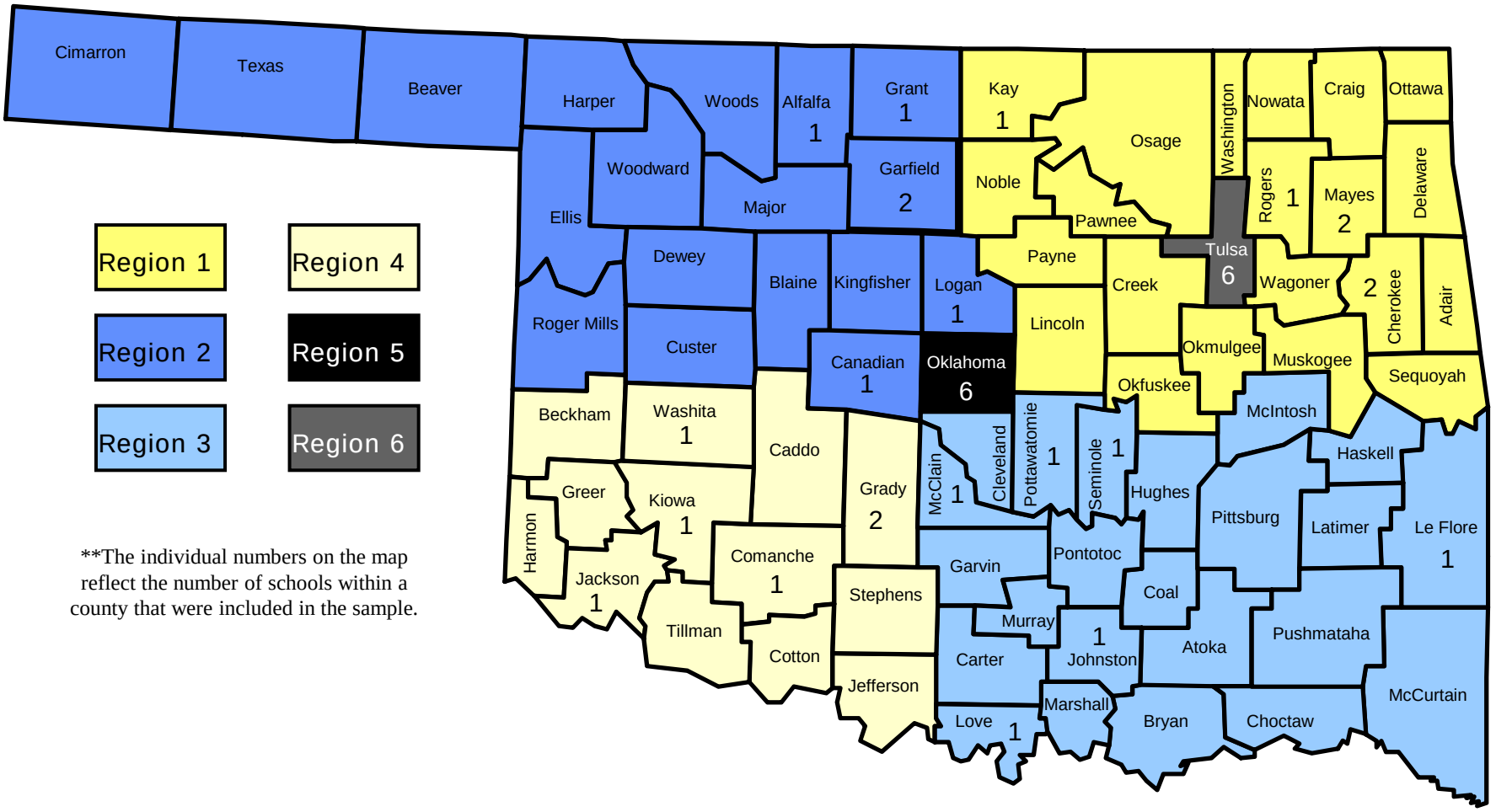
were selected to participate, for a total of 36 schools statewide. The sampling frame of all schools was stratified by region, and a 6-school-per-region random sample was selected using SAS 9.1. Each school had an equal probability of being included in the sample.

The six schools sampled from each region were asked to participate in the study. A descriptive letter about the study 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, a replacement school was selected that matched the original school by region, class size, and percent of students eligible for free and reduced priced meals. 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 additional replacement school samples to obtain a 6-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.



**The individual numbers on the map reflect the number of schools within a county that were included in the sample.

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, KLH, and KTA) 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. 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 751 third-grade students participated in the oral needs assessment from across Oklahoma. The overall participation rate was 43.1%. 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 (59.1%) while Tulsa County had the lowest rate of participation (32.4%). The NW region, with 81 students, and the SE region, with 87 students, had the fewest number of students screened.

Table 2. Participating schools, by region

Region	School	County	# Parental Consents	# Screened	Participation Rate◇
NE	A (N= 68)	Cherokee	19	19	27.9%
	B (N= 28)	Cherokee	13	13	46.4%
	C (N= 49)	Kay	16	16	32.7%
	D (N= 60)	Mayes	51	51	85.0%
	E (N= 9)	Mayes	9	8	100.0%
	F (N= 89)	Rogers	40	38	44.9%
		Total	*148*	*145*	*48.8%*
NW	A (N= 14)	Alfalfa	9	9	64.3%
	B (N= 11)	Canadian	4	4	36.4%
	C (N= 34)	Garfield	27	27	79.4%
	D (N= 37)	Garfield	9	9	24.3%
	E (N= 22)	Grant	17	17	77.3%
	F (N= 19)	Logan	15	15	78.9%
		Total	*81*	*81*	*59.1%*
SE	A (N= 11)	Johnston	3	3	27.3%
	B (N= 80)	Leflore	37	36	46.3%
	C (N= 20)	Love	12	12	60.0%
	D (N= 46)	McClain	21	21	45.7%
	E (N= 12)	Pottawatomie	7	7	58.3%
	F (N= 14)	Seminole	9	8	64.3%
		Total	*89*	*87*	*48.6%*
SW	A (N= 29*)	Comanche	13	13	44.8%
	B (N= 28)	Grady	20	20	71.4%
	C (N= 41)	Grady	19	19	46.3%
	D (N= 30)	Jackson	16	15	53.3%
	E (N= 36)	Kiowa	11	11	30.6%
	F (N= 51)	Washita	27	28	52.9%
		Total	*106*	*106*	*49.3%*
OKC	A (N= 50)	Oklahoma	26	25	52.0%
	B (N= 22)	Oklahoma	13	13	59.1%
	C (N= 38)	Oklahoma	14	14	36.8%
	D (N=109)	Oklahoma	41	40	37.6%
	E (N= 95)	Oklahoma	42	41	44.2%
	F (N= 57)	Oklahoma	22	21	38.6%
		Total	*158*	*154*	*42.6%*
Tulsa	A (N= 80)	Tulsa	31	31	38.8%
	B (N= 78)	Tulsa	54	52	69.2%
	C (N= 44)	Tulsa	25	25	56.8%
	D (N=147)	Tulsa	41	40	27.9%
	E (N=49*)	Tulsa	9	9	18.4%
	F (N=166*)	Tulsa	23	21	13.9%
		Total	*183*	*178*	*32.4%*

*Number obtained from school master list, not directly from school.

◇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 ten 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 the regions was ten 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=48.1% and Females=51.9%). Racial make-up for the sample seemed to follow Oklahoma population trends, with Whites equaling 75.3%, Blacks equaling 5.3%, Others (including Hispanics) equaling 7.5%, Native Americans equaling 10.9%, and Asian Americans equaling 1.0% of the sample population.

There were some regional differences in the race/ethnicity of participants. Approximately 25% of participants in the NE region were Native American, and 11.7% of participants in Oklahoma County were Black. Oklahoma County had the highest percentage of Black and Hispanic participants, accounting for 47% of Black participants in the study and 37.7% Hispanic. In the NW and SW regions, over 80% of participants were White. The sample for Tulsa County had fewer Black participants than in the overall population of Tulsa County [2.2% sample vs. 11.7% population (U.S Census Bureau, 2009 State and County QuickFacts)].

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

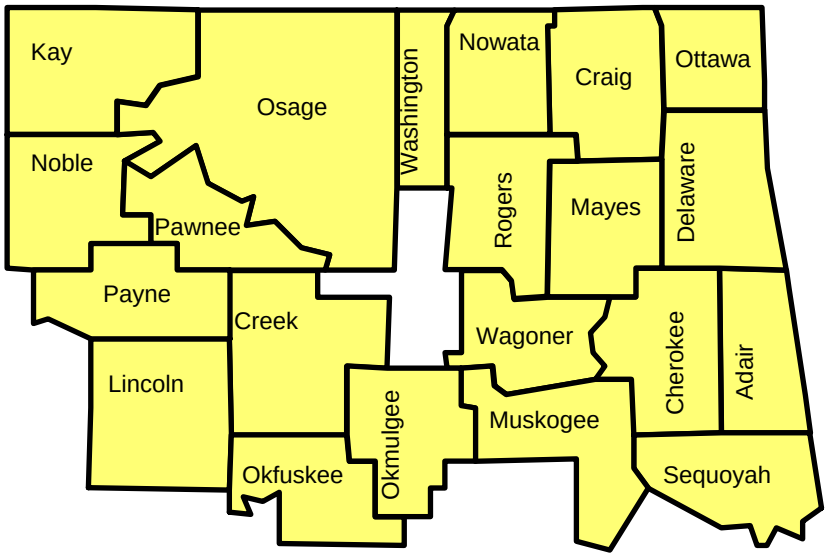
		No.	*Percent*			*No.*	*Percent*
Age	8	217	29.1%	**Gender**	Female	390	51.9%
	9	474	63.5%		Male	361	48.1%
	10	55	7.4%	**Race**	Asian	7	1.0%
Ethnicity	Hispanic	77	13.8%		Black	38	5.3%
	Non-Hispanic	452	81.1%		Native American	78	10.9%
	Unknown	28	5.0%		Other	54	7.5%
					White	540	75.3%

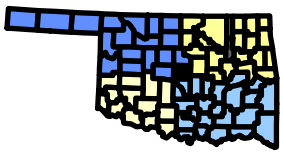
*All percentages are rounded to one decimal place; therefore, total may not add to 100%

Participant characteristics, by region

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

Northeast Region





Participant Characteristics (n=145)

Age (years)

	Number	Percentage
8	47	32.4%
9	90	62.1%
10	8	5.5%
Missing	N/A	N/A

Ethnicity

	Number	Percentage
Hispanic	4	2.8%
Non-Hispanic	116	80.0%
Unknown	19	13.1%
Missing	6	4.1%

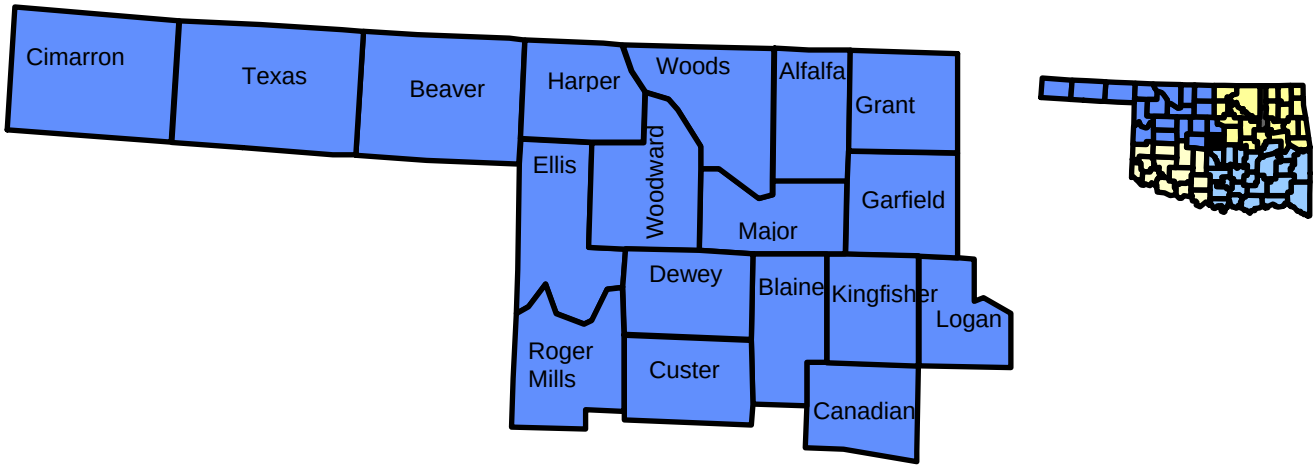
Gender

	Number	Percentage
Female	83	57.2%
Male	62	42.8%
Missing	N/A	N/A

Race

	Number	Percentage
Asian	1	0.7%
Black	1	0.7%
Native American	36	24.8%
White	103	71.0%
Other	3	2.1%
Missing	1	0.7%

Northwest Region



Participant Characteristics (n=81)

Age (years)

	Number	Percentage
8	18	22.2%
9	56	69.1%
10	7	8.6%
Missing	N/A	N/A

Gender

	Number	Percentage
Female	37	45.7%
Male	44	54.3%
Missing	N/A	N/A

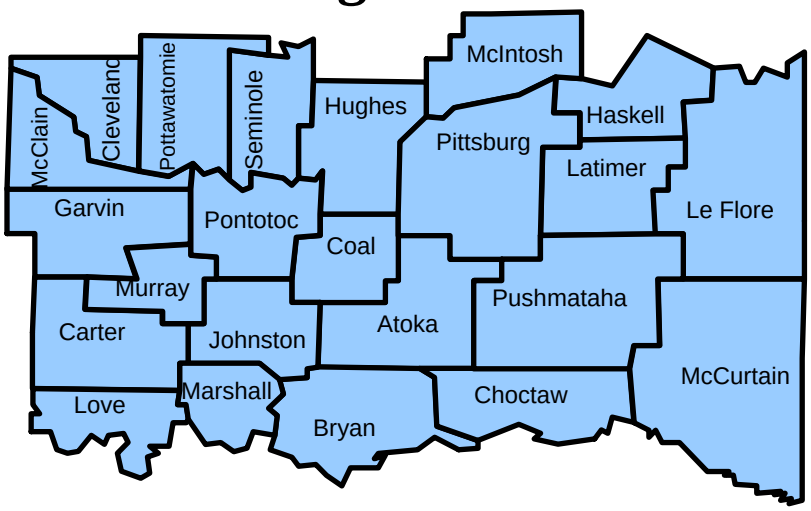
Ethnicity

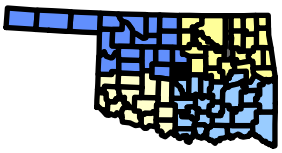
	Number	Percentage
Hispanic	10	12.3%
Non-Hispanic	71	87.7%
Unknown	N/A	N/A
Missing	N/A	N/A

Race

	Number	Percentage
Asian	N/A	N/A
Black	5	6.2%
Native American	4	4.9%
White	66	81.5%
Other	6	7.4%
Missing	N/A	N/A

Southeast Region





Participant Characteristics (n=87)

Age (years)

	Number	Percentage
8	19	21.8%
9	59	67.8%
10	8	9.2%
Missing	1	1.1%

Gender

	Number	Percentage
Female	48	55.2%
Male	39	44.8%
Missing	N/A	N/A

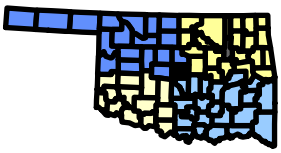
Ethnicity

	Number	Percentage
Hispanic	18	20.7%
Non-Hispanic	41	47.1%
Unknown	N/A	N/A
Missing	28	32.2%

Race

	Number	Percentage
Asian	N/A	N/A
Black	1	1.1%
Native American	17	19.5%
White	51	58.6%
Other	7	8.0%
Missing	11	12.6%

Southwest Region



Participant Characteristics (n=106)

Age (years)

	Number	Percentage
8	33	31.1%
9	63	59.4%
10	10	9.4%
Missing	N/A	N/A

Ethnicity

	Number	Percentage
Hispanic	7	6.6%
Non-Hispanic	75	70.8%
Unknown	N/A	N/A
Missing	24	22.6%

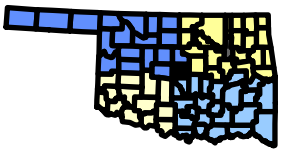
Gender

	Number	Percentage
Female	54	50.9%
Male	52	49.1%
Missing	N/A	N/A

Race

	Number	Percentage
Asian	N/A	N/A
Black	9	8.5%
Native American	4	3.8%
White	86	81.1%
Other	4	3.8%
Missing	3	2.8%

Oklahoma County Region



Participant Characteristics (n=154)

Age (years)

	Number	Percentage
8	45	29.2%
9	94	61.0%
10	11	7.1%
Missing	4	2.6

Gender

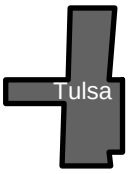
	Number	Percentage
Female	82	53.2%
Male	72	46.8%
Missing	N/A	N/A

Ethnicity

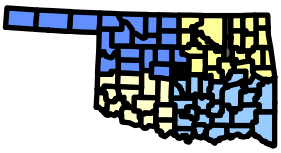
	Number	Percentage
Hispanic	29	18.8%
Non-Hispanic	52	33.8%
Unknown	2	1.3%
Missing	71	46.1%

Race

	Number	Percentage
Asian	5	3.2%
Black	18	11.7%
Native American	5	3.2%
White	92	59.7%
Other	23	14.9%
Missing	11	7.1%



Tulsa County Region



Participant Characteristics (n=178)

Age (years)

	Number	Percentage
8	55	90.0%
9	112	62.9%
10	11	6.2%
Missing	N/A	N/A

Gender

	Number	Percentage
Female	86	48.3%
Male	92	51.7%
Missing	N/A	N/A

Ethnicity

	Number	Percentage
Hispanic	9	5.1%
Non-Hispanic	97	54.5%
Unknown	7	3.9%
Missing	65	36.5%

Race

	Number	Percentage
Asian	1	0.6%
Black	4	2.2%
Native American	12	6.7%
White	142	79.8%
Other	11	6.2%
Missing	8	4.5%

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 Oklahoma City region. The NW and SE regions contributed the fewest children.

Table 4. Summary of Regional and Overall Sample Size

Region	*Sample Size (n)*	*Percent*
NE	145	19.3%
NW	81	10.8%
SE	87	11.6%
SW	106	14.1%
OKC	154	20.5%
Tulsa	178	23.7%
Total	*751*	*100%*

Overall Results

The dental health status of third grade students in Oklahoma is described in Table 5, using weighted estimates. One-third of third grade students have one or more molar teeth with dental sealants (33.1%). The percentage of dental caries (cavities) experience is high, 58.0%. Furthermore, 22.6% of children have untreated active caries in at least one permanent or primary tooth. Active caries are observed more frequently in primary teeth (19.5%) as compared to permanent teeth (4.5%). Likewise, primary teeth are more likely to have fillings/restorations (42.6%), when compared to permanent teeth (11.5%). The prevalence of missing permanent teeth is very low (0.3%); 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 and 95% confidence intervals

Dental Health Status Indicator	*Weighted Estimate*	*95% CI*
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	11.5%	9.0% - 14.0%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	42.6%	38.9% - 46.3%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	0.3%	0.0% - 0.7%
Percentage of third graders in Oklahoma with at least one missing primary tooth	12.6%	10.1% - 15.1%
Percentage of third graders in Oklahoma with dental caries experience	58.0%	54.3% - 61.7%
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	33.1%	29.6% - 36.6%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent or primary tooth	22.6%	19.3% - 25.8%
Percentage of third graders in Oklahoma with untreated decay in at least one permanent tooth (active caries)	4.5%	2.9% - 6.1%
Percentage of third graders in Oklahoma with untreated decay in at least one primary tooth (active caries)	19.5%	16.4% - 22.6%

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 33% 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 38% of children in Tulsa 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 0.9 with a standard deviation of 1.5. In the seven years

this needs assessment has been conducted, the 2009-2010 screening saw the largest decrease in the percentage of children with protective sealants, a 6.6% drop from the 2007-2008 screening, nearing levels seen in 2003-2004 (Figure 3).

Figure 1. Percentage of third graders with sealants on at least one permanent molar tooth
Oklahoma 2009–2010

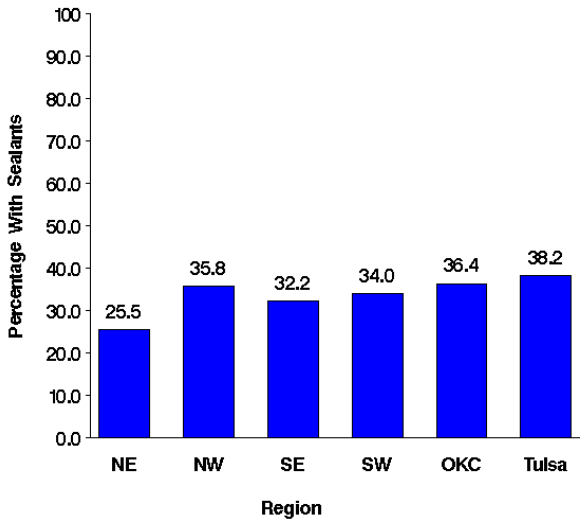


Figure 2. Percentage of third graders with sealants on at least one permanent molar tooth In order from best to worst
Oklahoma 2009–2010

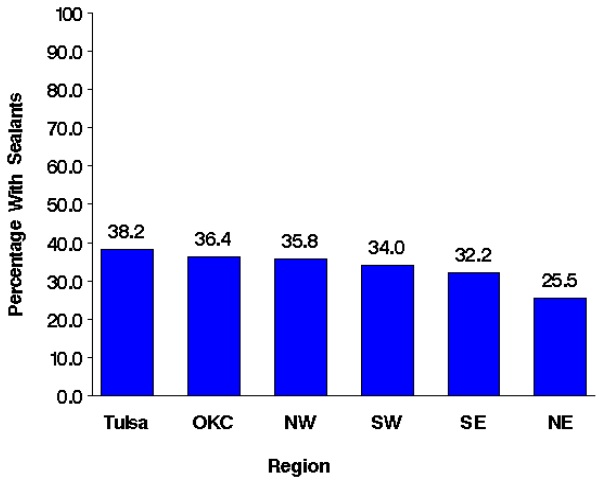
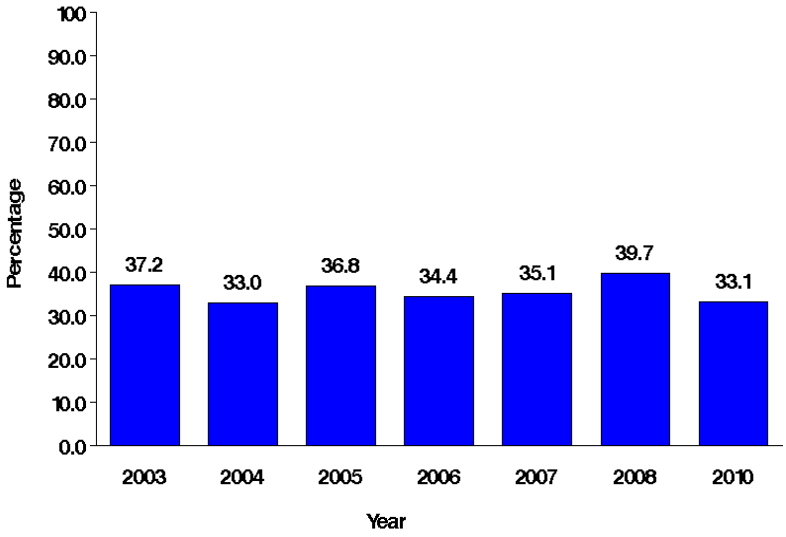


Figure 3. Weighted estimates of percentage of third graders with sealants on at least one permanent molar tooth



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 751 third grade children examined, 426 children, or 1,763 teeth, have been affected by decay. This results in a mean DMFT/dmft score of 2.3 teeth per child. In other words, on average, each third grade child has approximately 2.3 teeth that are decayed or were decayed and treated. Additionally, survey results show that 58.0% of third graders in the state have caries experience, which is nearly 14% lower than last year. The region with the lowest prevalence of caries experience is Tulsa County with 47.8%, while the SE region has the highest with 65.5%.

Figure 4. Percentage of third graders with dental caries experience
Oklahoma 2009–2010

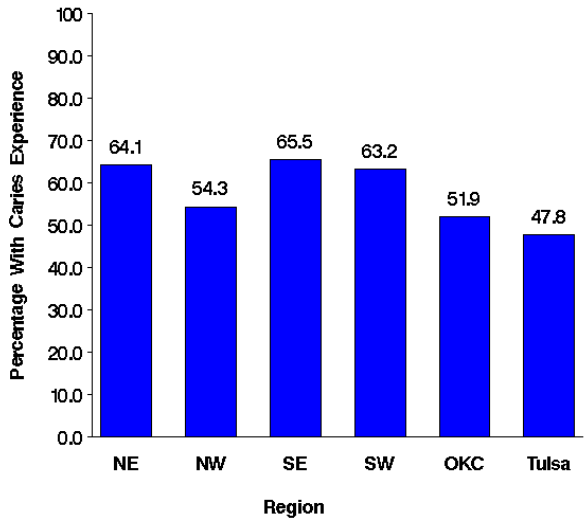


Figure 5. Percentage of third graders with dental caries experience In order from best to worst
Oklahoma 2009–2010

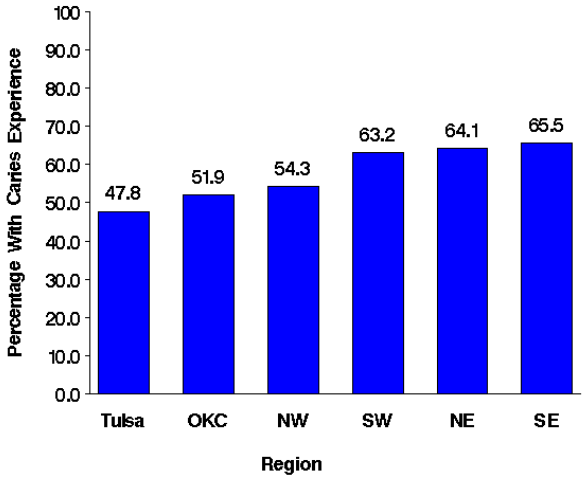
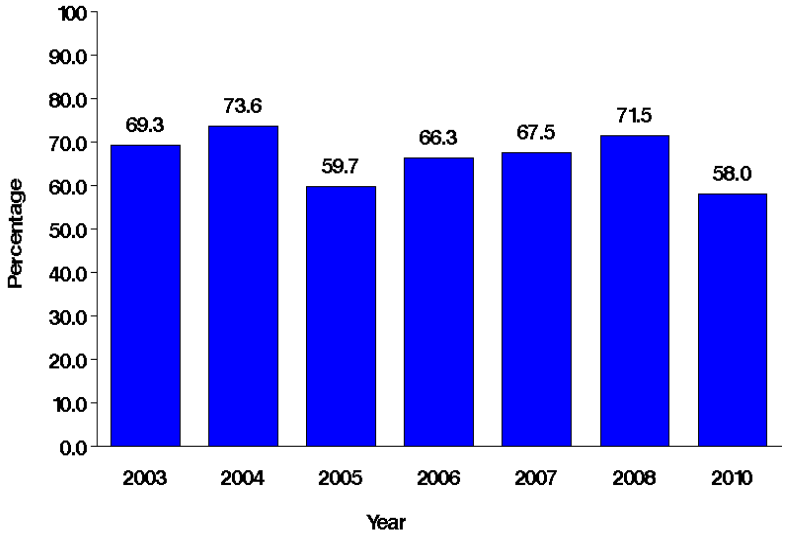


Figure 6. Weighted estimates of percentage of third graders with dental caries experience



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. Over one-fifth (22.6%) 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 (14.6%) compared with any other region. The SE region has the highest prevalence of untreated caries (32.2%).

Figure 7. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)
Oklahoma 2009–2010

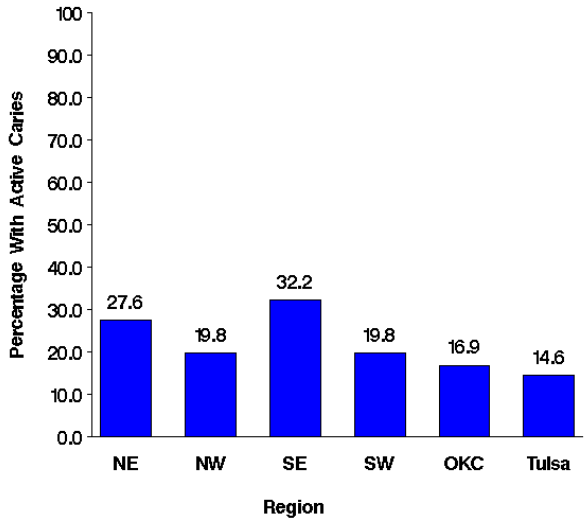


Figure 8. Percentage of third graders with untreated decay in permanent or primary teeth (active caries)
In order from best to worst
Oklahoma 2009–2010

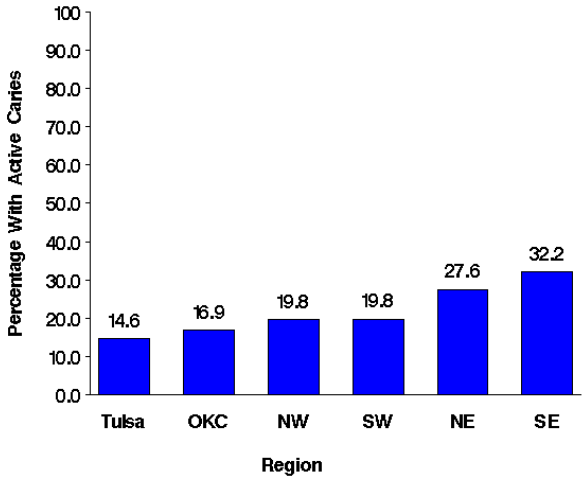
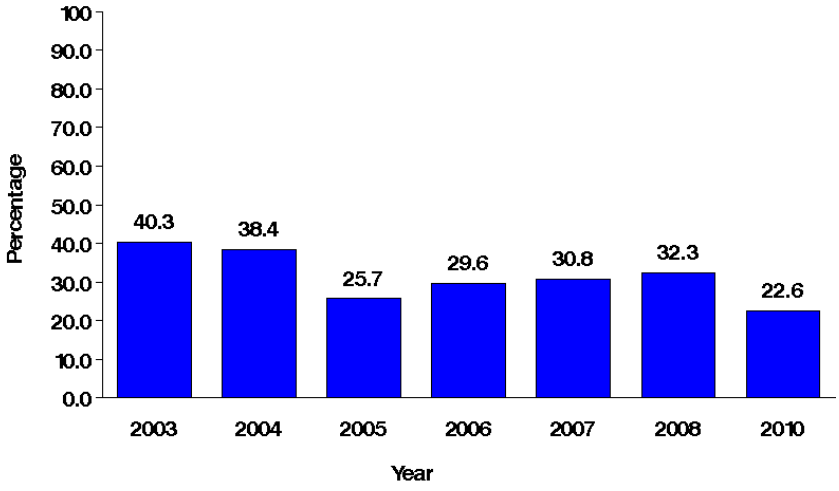


Figure 9. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent or primary tooth



Untreated Decay in Permanent Teeth (active caries)

Statewide, 4.5% of third graders have decayed permanent teeth (untreated active caries). Tulsa County has the lowest prevalence of

actively decayed permanent teeth (2.8%) while the NE region has the highest prevalence of decay (6.9%). The mean number of decayed permanent teeth for the 751 students is 0.1 teeth with a relatively moderate standard deviation of 0.4 and a range of 0 to 5 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 five teeth. Furthermore, the estimated percentage of children in Oklahoma with decayed permanent teeth is almost half that of the 2008 estimate (Figure 11).

Figure 10. Percentage of third graders with at least one decayed permanent tooth (active caries)
Oklahoma 2009–2010

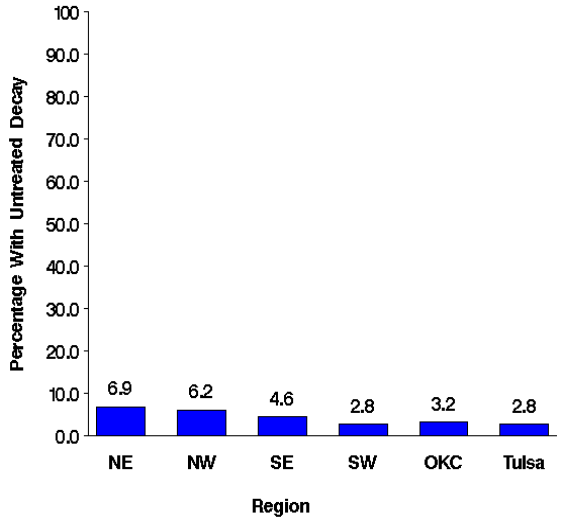
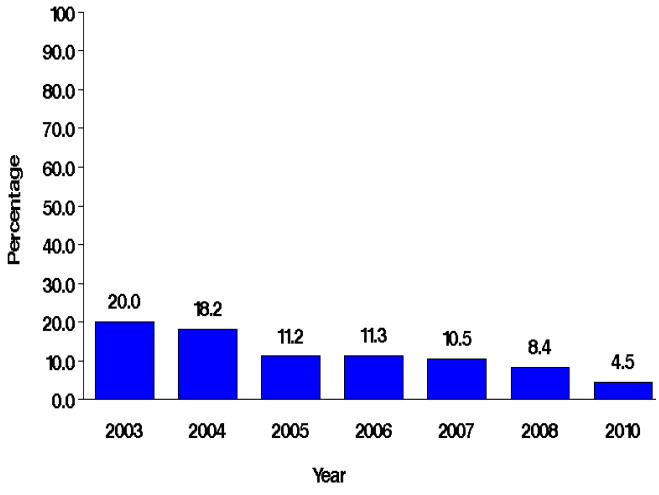


Figure 11. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one permanent tooth



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-fifth (19.5%) of third graders have active decay in one or more primary teeth. Children in Tulsa County have the lowest prevalence (14.0%), while the SE region has the highest prevalence of untreated decay in primary teeth

(28.7%). In this statewide sample, the mean number of decayed primary teeth is 0.4 with a standard deviation of 1.0 and a range of 0 to 8 primary teeth with active decay. About two 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 2009–2010

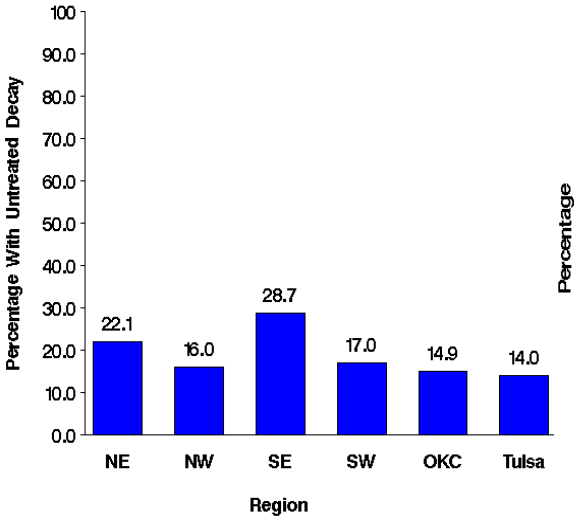
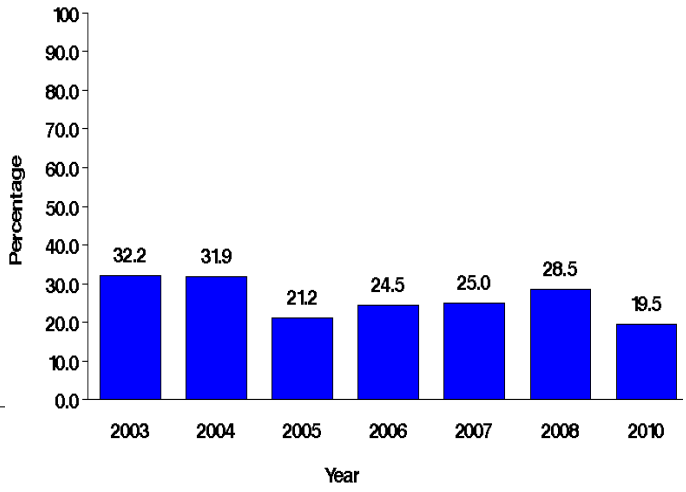


Figure 13. Weighted estimates of percentage of third graders with untreated decay (active caries) in at least one primary tooth



Missing Permanent Teeth

Only three third grade students screened (0.4%) are missing permanent teeth with a range of 0 to 2 missing permanent teeth. One child from the Oklahoma City region is missing two permanent teeth. One child from the Oklahoma City region and one child from the SE 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, 12.6% of third grade students are missing one or more primary teeth, showing no change from the 2008 survey data. Regional percentages vary from 11.0% in the Oklahoma City region to 14.8% in the NW region (Figure 14). The mean number of missing primary teeth for the sample equals 0.2 with a standard deviation of 0.8 and a range of 0 to 6 missing primary teeth. Most students with missing primary teeth are missing one or two teeth. Twenty-five students, or 3.3%, are missing three or more primary teeth.

Figure 14. Percentage of third graders with at least one missing primary tooth
Oklahoma 2009–2010

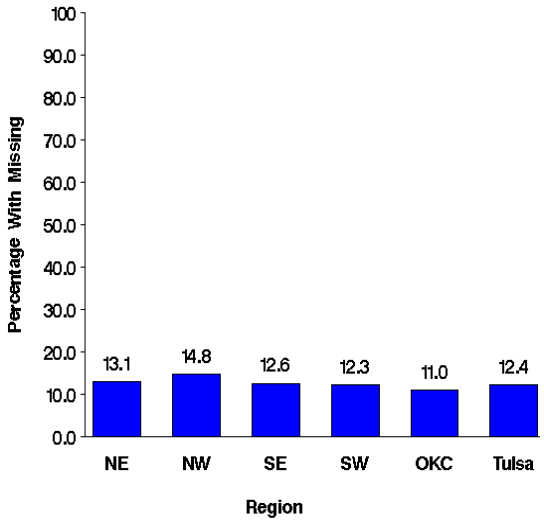
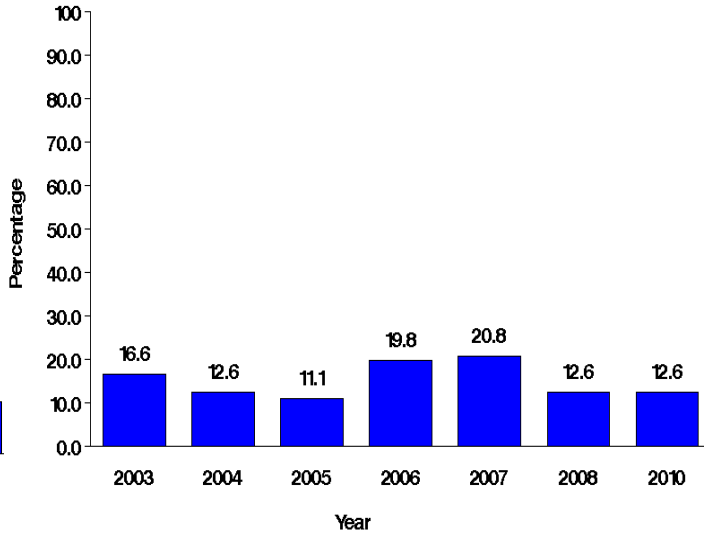


Figure 15. Weighted estimates of percentage of third graders with at least one missing primary tooth



Filled (Treated/Restored) Permanent Teeth

Approximately 12% of third graders have filled (treated/restored) cavities in one or more permanent teeth. Differences by region are observed (Figure 16). Children in SW region have the lowest percentage of filled teeth with 7.5%. The highest percentage of filled/treated permanent

teeth is observed in the SE region (18.4%), and there is a more than two-fold increase in the percentage of filled permanent teeth when the SW region is compared to the SE region (7.5% versus 18.4%, respectively). The mean number of filled permanent teeth for the sample is 0.2 with a standard deviation of 0.7 and a range of 0 to 4 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 seven years of this needs assessment.

Figure 16. Percentage of third graders with at least one filled (treated/restored) permanent tooth
Oklahoma 2009–2010

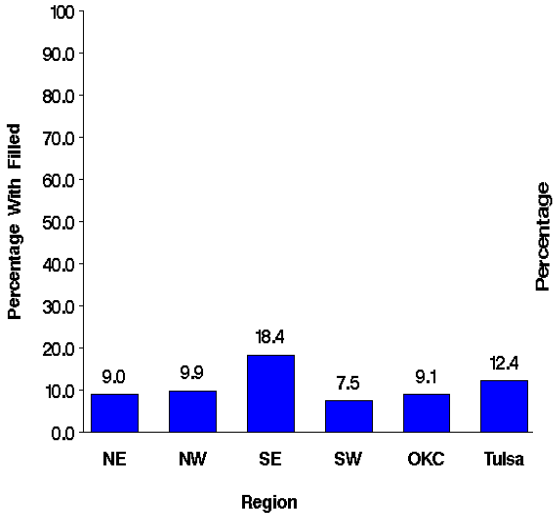
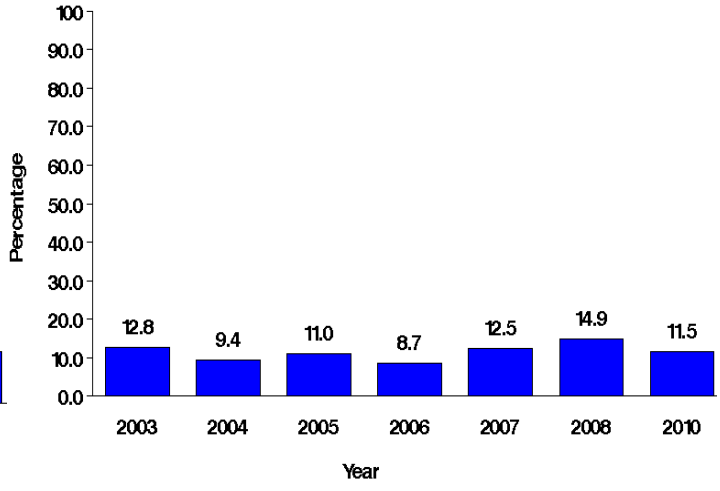


Figure 17. Weighted estimates of percentage of third graders with at least one filled (treated/restored) permanent tooth



Filled (Treated/Restored) Primary Teeth

Significantly more children are observed to have filled (treated/restored) primary teeth compared to permanent teeth. Overall, 42.6% of third graders have one or more filled primary teeth. Regional proportions vary from 34.8% in Tulsa County to 48.1% in the SW region (Figure 18). The mean number of filled primary teeth for the sample is 1.5 with a standard deviation of 2.2 teeth and a range of 0 to 9 filled primary teeth. Less than 20% (18.9%) 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 2009–2010

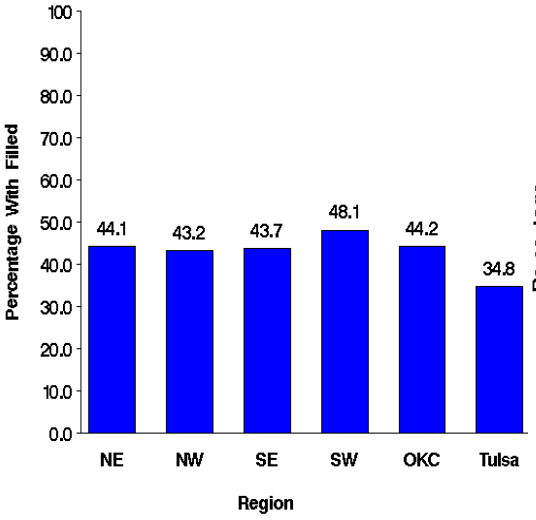
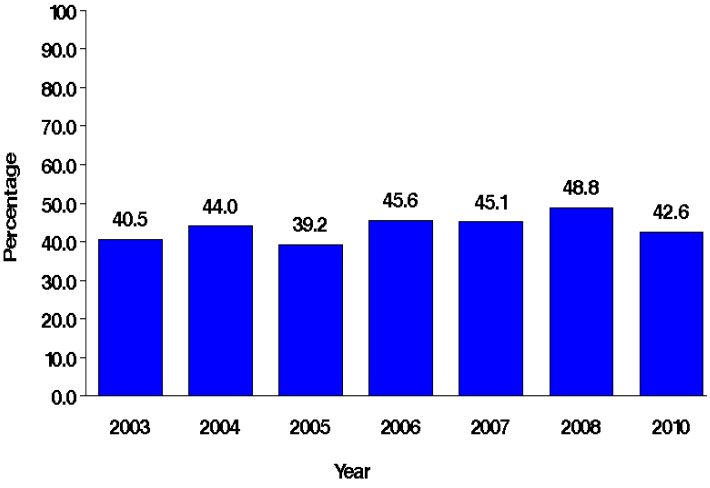


Figure 19. Weighted estimates of percentage of third graders with at least one filled (treated/restored) primary tooth



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 (75.8%) had no dental problems, and only 2.8% 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

Screening Results	*No.*	*Percent*
Observed no dental problems	567	75.8%
Observed dental problems that need attention soon	160	21.4%
Observed dental problems that need attention immediately	21	2.8%
Missing	3	.

Most of the regions had similar results (Table 7). The SE region had the smallest percentage of children with no dental problems (61.2%) and the NW region had the largest percentage of children with dental problems that needed immediate attention (7.4%). The Oklahoma City region had highest percentage (80.8%) of children with no dental problems, and the NE region had the lowest percentage of children with dental problems that needed immediate attention, at 1.4%.

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

Screening Results	*Region*					
	NE	*NW*	*SE*	*SW*	*OKC*	*Tulsa*
Observed no dental problems	70.3%	79.0%	61.2%	77.4%	80.8%	80.5%
Observed dental problems that need attention soon	28.3%	13.6%	35.3%	19.8%	17.5%	16.9%
Observed dental problems that need attention immediately	1.4%	7.4%	3.5%	1.7%	2.6%	2.8%

Discussion

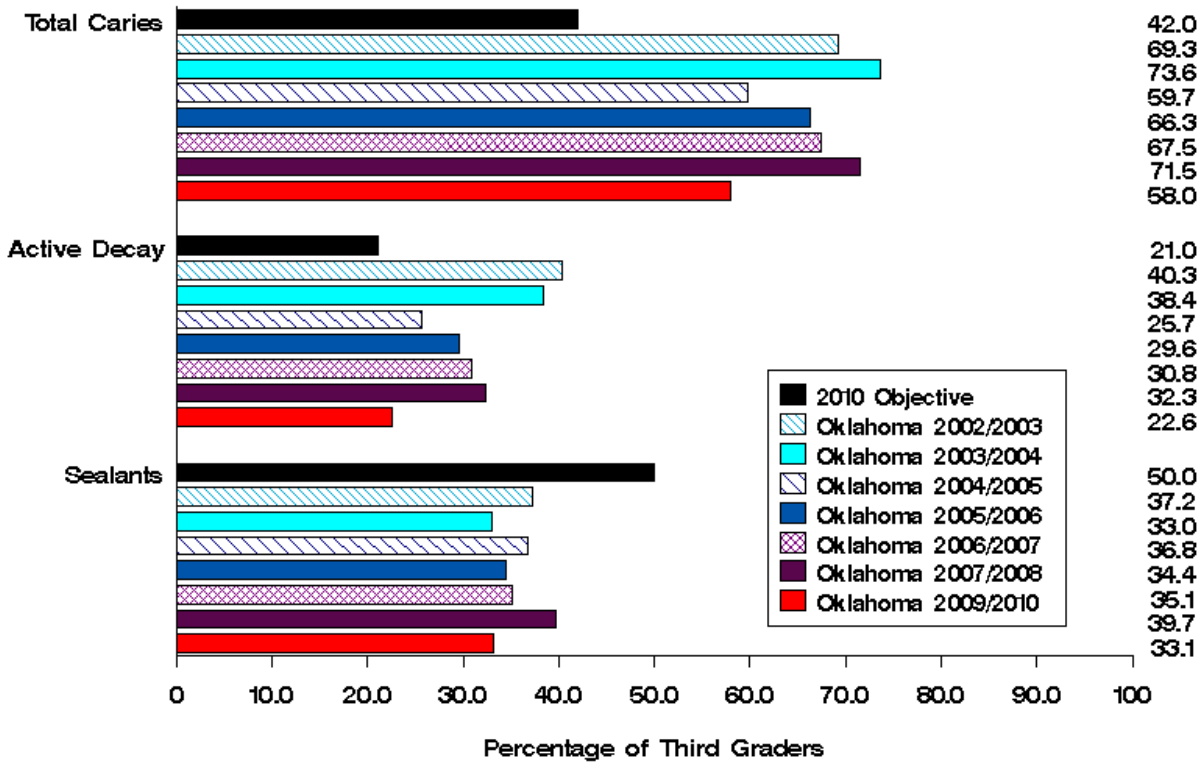
Dental caries is one of the most common chronic childhood diseases. To establish a baseline for dental health indicators in third grade children in Oklahoma, this seventh annual needs assessment was conducted by the University of Oklahoma Colleges of Public Health and Dentistry, with funding from the 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 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 2009-2010 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 58%, which is higher than the Year 2010 Objective (42%). The prevalence of active decay in Oklahoma (22.6%), defined as untreated caries in at least one permanent or primary tooth, is still slightly higher than the Year 2010 Objective (21%). Additionally, the proportion of children with protective sealants is low in Oklahoma (33.1%) compared to the Year 2010 Objective (50%). The proportion of children with protective sealants from the 2009-2010 survey is the only measure that did not show improvement from the previous three years of this assessment.

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 (27.6% and 32.2%), and are the only regions to not meet the Year 2010 Objective (21%). Tulsa County has the lowest proportion (14.6%)

of children with active (untreated) decay. However, none of the regions met the Year 2010 Objectives for prevalence of total caries or sealants.

Tulsa County ranks highest for a majority of the dental health status indicators measured. Oklahoma County ranks second, with 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 32% 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. Also, Blacks only made up 2.2% of students participating from Tulsa County. This number is quite low, and does not represent the true racial make-up of Tulsa County [2.2% of the sample vs. 11.7% of Tulsa County population (U.S Census Bureau, 2009 State and County QuickFacts)]. 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 43.1% 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

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 Lindsay Boeckman, MS 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.ok.gov/health/Child_and_Family_Health/Dental_Health_Service/

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 Lindsay Boeckman by phone at (405) 271-2229 ext. 48058 or by email: Lindsay-Boeckman@ouhsc.edu for further clarification.

Sincerely,

Kay Beavers, DDS

Lindsay Boeckman, MS

Attachment: Returning fax form
Informational flyer

SCHOOL PARTICIPATION – APPROVAL FORM

School Name: _____

Address: _____

City and Zip: _____

Phone: _____

To: Lindsay Boeckman

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?

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.

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.

During the 2007-2008 School Year...

- More than two-thirds of Oklahoma third graders had tooth decay, treated or untreated.
- Almost 30% of Oklahoma third graders had untreated decay in primary teeth.
- 9% of Oklahoma third graders had untreated decay in permanent teeth.
- 13% 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 48058
Fax: 405-271-2068
E-mail: Lindsay-Boeckman@ouhsc.edu

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 Sue Mallonee, OSDH IRB Coordinator at 405-271-4200.

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)

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

2009-2010 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: City: Teacher: Students, in alphabetical order	D Number Permanent Teeth Decayed	M Number Permanent Teeth Missing	F Number Permanent Teeth Filled	d Number Primary Teeth Decayed	m Number Primary Teeth Missing	f Number Primary Teeth Filled	Number Sealants on Permanent Molars	To be completed by Teacher				Outcome ✓		
								Age	Gender M or F	Race *(W, B, NA, A, Other)	Ethnicity **(H, N, U)	No Problems	Problems/ Need Attn	Problems/ Need Immediate Attn
1														
2														
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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

Dental Health Status Indicator	*Prevalence*	*95% Confidence Interval*
Percentage of third graders in Oklahoma with at least one filled (treated/restored) permanent tooth	10.8%	8.6% - 13.0%
Percentage of third graders in Oklahoma with at least one filled (treated/restored) primary tooth	42.3%	38.8% - 45.9%
Percentage of third graders in Oklahoma with at least one missing permanent tooth	0.4%	0.0% - 0.9%
Percentage of third graders in Oklahoma with at least one missing primary tooth	12.5%	10.1% - 14.9%
Percentage of third graders in Oklahoma with dental caries experience	56.7%	53.2% - 60.3%
Percentage of third graders in Oklahoma with sealants on at least one permanent molar tooth	33.8%	30.4% - 37.2%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary or permanent tooth	20.9%	18.0% - 23.8%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one permanent tooth	4.3%	2.8% - 5.7%
Percentage of third graders in Oklahoma with untreated decay (active caries) in at least one primary tooth	18.1%	15.4% - 20.9%

Appendix F

Overall Participant Characteristics, Including Percent Missing

		No.	*Percent*			*No.*	*Percent*
Age	8	217	28.9%	**Gender**	Female	390	51.9%
	9	474	63.1%		Male	361	48.1%
	10	55	7.3%		Missing	N/A	N/A
	Missing	5	0.7%	**Race**	Asian	7	0.9%
Ethnicity	Hispanic	77	10.3%		Black	38	5.1%
	Non-Hispanic	452	60.2%		Native American	78	10.4%
	Unknown	28	3.7%		Other	54	7.2%
	Missing	194	25.8%		White	540	71.9%
					Missing	34	4.5%

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

Appendix G

Participant Characteristics by Region

		NE (N=145)		*NW (N=81)*		*SE (N=87)*		*SW (N=106)*		*OKC (N=154)*		*Tulsa (N=178)*	
		No.	*Percent*	*No.*	*Percent*	*No.*	*Percent*	*No.*	*Percent*	*No.*	*Percent*	*No.*	*Percent*
Age	8	47	32.4	18	22.2	19	21.8	33	31.1	45	29.2	55	30.9
	9	90	62.1	56	69.1	59	67.8	63	59.4	94	61.0	112	62.9
	10	8	5.5	7	8.6	8	9.2	10	9.4	11	7.1	11	6.2
	Missing	N/A	N/A	N/A	N/A	1	1.1	N/A	N/A	4	2.6	N/A	N/A
Gender	Female	83	57.2	37	45.7	48	55.2	54	50.9	82	53.2	86	48.3
	Male	62	42.8	44	54.3	39	44.8	52	49.1	72	46.8	92	51.7
Race	Asian	1	0.7	N/A	N/A	N/A	N/A	N/A	N/A	5	3.2	1	0.6
	Black	1	0.7	5	6.2	1	1.1	9	8.5	18	11.7	4	2.2
	Native American	36	24.8	4	4.9	17	19.5	4	3.8	5	3.2	12	6.7
	Other	3	2.1	6	7.4	7	8.0	4	3.8	23	14.9	11	6.2
	White	103	71.0	66	81.5	51	58.6	86	81.1	92	59.7	142	79.8
	Missing	1	0.7	N/A	N/A	11	12.6	3	2.8	11	7.1	8	4.5
Ethnicity	Hispanic	4	2.8	10	12.3	18	20.7	7	6.6	29	18.8	9	5.1
	Non-Hispanic	116	80.0	71	87.7	41	47.1	75	70.8	52	33.8	97	54.5
	Unknown	19	13.1	N/A	N/A	N/A	N/A	N/A	N/A	2	1.3	7	3.9
	Missing	6	4.1	N/A	N/A	28	32.2	24	22.6	71	46.1	65	36.5

*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). The weights were then used with SAS PROC SURVEYFREQ to produce weighted statewide prevalence estimates and 95% confidence intervals.

Table: Population proportions, sample proportions and weights, by region

Region	*Population Proportion*	*Sample Proportion*	*Weight*
NE	0.2247	0.1931	1.1639
NW	0.0972	0.1079	0.9012
SE	0.2047	0.1158	1.7666
SW	0.0968	0.1411	0.6855
OKC	0.1898	0.2051	0.9256
Tulsa	0.1869	0.2370	0.7884