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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. The purpose of this needs assessment was to determine baseline 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, current data specific to Oklahoma third grade children have not been previously available. Baseline data on the percent 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 percent 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 proto-

col 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 2002-2003 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 September of 2002. All schools in the spreadsheet with one or more third grade classrooms were retained for this study. Because this list included only schools that responded to an OSDE survey, other sources were accessed for a complete list of schools, including www.greatschools.net and www.nces.gov. In total, 985 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), Tulsa County, and Oklahoma County. The numerical breakdown for each region consisted of 20 counties in the NE region, 18 counties in the NW region, 24 counties in the SE region, 13 counties in the SW region, and one county each for both Oklahoma and Tulsa counties, representing the two metro 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 8.1. 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 was mailed, 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, up to three faxes and three follow-up calls. If a school refused to participate or did not respond, the next school on the 12-school random sampling list for the region was chosen and contacted using the same methods. Twelve schools declined or failed to respond to the consent acquisition attempts. 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. A secondary random sampling for each school was conducted, with one third-grade teacher being chosen per school. It was subsequently decided that if the school only had two third-grade classrooms, screenings for both classrooms would be conducted if warranted because of school needs and/or classroom size. The preceding map describes the regions sampled, and the 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 several weeks before the arrival of the dentists, in order for parents and students alike to have access to the information needed to make an informed deci-

sion 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; what the risks, benefits, and options of the study included; confidentiality of the study; the child's rights as a participant of the study; and pertinent contact information. Additionally, students could elect to participate or not participate in the study through the student assent form, which was administered at the time of the screening. Voluntary student participation was emphasized on this form, as well. Both parental and student consent forms had to be signed and dated in order to be included in the study.

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 name, 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. Overall, only one teacher refused to disclose the race and ethnicity of the screened students.

Two dentists (KTA and KSC) 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 two 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 was counted. 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, including 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, a tube of toothpaste, and an “I’ve been caught being good” pencil. A short oral health educational program was delivered in each classroom, using magic tricks to illustrate oral hygiene, healthy diets, and regular dental visits.

Data Entry and Analysis

All data were entered in Microsoft Access XP with student identifiers withheld to paper form only. After validation of data entry for accuracy, Microsoft Access was used to generate multiple reports. These included total number of sampled students per region; total estimated third graders in the state and per region (based on state numbers from the National Center for Education Statistics); 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 rates per region; sealant rates for the state and per region; percentage of each region that was sampled; and

the percentage of the total state population that was sampled.

Data were summarized and analyzed using SAS 8.1. Frequency and means procedures were used to generate statewide and regional estimates. Ninety-five percent confidence intervals were calculated for each statewide prevalence rate.

Weighted Analyses

Because the population of third graders and sample of participants were not equal across regions, weighting was used to adjust the statewide estimates. 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 original distribution. The adjusted regional estimates were then averaged to produce a weighted statewide estimate. Ninety-five percent confidence intervals were also calculated around the weighted estimates.

Table 1. Population proportions, sample proportions and weights, by region

Region	Population Proportion	Sample Proportion	Weight
1	0.219286	0.167677	1.307789
2	0.089767	0.147475	0.608697
3	0.230687	0.123232	1.871968
4	0.102217	0.278788	0.366648
5	0.179753	0.151515	1.186371
6	0.17829	0.131313	1.357746

Confidentiality

All data were stored in a password protected computer file. No names were entered into the electronic database. Signed parental consent forms, assent forms, and data entry forms with identifiers were stored in locking files. Only group data were analyzed, and no names will be used in any publication resulting from this needs assessment.

Results

A total of 495 third-grade students participated in the oral needs assessment from across Oklahoma. The final sample size of participating students was less than anticipated, because of the random selection of somewhat smaller classrooms. The overall participation rate was quite good, 73.6%. The number of students screened and participation rates varied by region (Table 2). Schools in the NE region had the highest participation rates (80.9%), while Oklahoma County had the lowest rates of participation (65.5%).

Table 2. Participating schools, by region

Region	School	County	# Parental Consents	# Screened	Participation rate*
Northwest	Goodwell Elementary	Texas	11	11	68.8%
	Hammon Elementary	Roger Mills	10	10	71.4%
	St. Paul Lutheran School	Garfield	14	14	87.5%
	Hillsdale Christian School	Garfield	12	12	75.0%
	Mustang Creek Elementary	Canadian	10	10	50.0%
	Central Elementary	Canadian	17	16	100%
Total Northwest			74	73	74.7%
Northeast	Jennings Elementary	Payne	9	9	64.3%
	Mounds Elementary	Creek	20	20	100%
	Harris-Jobe Elementary	Muskogee	21	20	87.5%
	Hulbert Elementary	Cherokee	21	20	70.5%
	Stilwell Elementary	Adair	7	7	100%
	Cave Springs Elementary	Adair	7	7	70.0%
Total Northeast			85	83	80.9%
Southeast	Jackson Elementary	Garvin	7	7	43.8%
	Justice Elementary	Seminole	11	11	91.7%
	Stuart Elementary	Hughes	18	17	94.7%
	Emerson Elementary	Coal	5	5	41.7%
	Robert E. Lee Elementary	Bryan	6	6	42.9%
	Bennington Elementary	Bryan	15	15	83.3%
Total Southeast			62	61	68.1%
Southwest	Hollis Elementary	Harmon	31	31	86.8%
	Bray-Doyle Elementary	Stephens	23	23	81.1%
	Geronimo Elementary	Comanche	12	11	80.0%
	Western Hills Elementary	Comanche	17	17	94.4%
	Lincoln Elementary	Comanche	35	35	73.7%
	Eisenhower Elementary	Comanche	21	21	54.4%
Total Southwest			139	138	75.1%
Oklahoma County	Arthur Elementary	Oklahoma	14	14	82.4%
	Shidler Elementary	Oklahoma	18	15	81.8%
	Adams Elementary	Oklahoma	12	12	75.0%
	Hayes Elementary	Oklahoma	11	11	55.0%
	Will Rogers Elementary	Oklahoma	10	10	40.0%
	Coolidge Elementary	Oklahoma	13	13	68.4%
Total Oklahoma County			78	75	65.5%
Tulsa County	Grove Elementary	Tulsa	13	13	86.7%
	Wolf Creek Elementary	Tulsa	15	15	100%
	Houston Elementary	Tulsa	11	10	84.6%
	Eastwood Elementary	Tulsa	12	12	66.7%
	Southside Elementary	Tulsa	12	11	70.6%
	Town & Country Elementary	Tulsa	4	4	44.4%
Total Tulsa County			67	65	77.0%
State Total			505	495	73.6%

*Participation rate is based on the number of parental consents returned divided by the total number of students in the class.

Overall, the mean age for the population screened was 8.9 years, with a minimum of 8.0 years and a maximum of 11.0 years. The standard deviation for the group age was 0.65 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 for all the students was 8 years of age with a maximum age of 11 for three of the regions. Table 3 describes the demographic characteristics of participating students. Additionally, demographic information on the study sample suggests an equal proportion of males and females were represented in the study (Males=50.1% and Females=49.9%). Racial

make-up for the sample also seemed to follow national population trends (except for Native Americans), with Whites equaling 64.1%, Blacks equaling 13.5%, Others (including Hispanics) equaling 12.5%, Native Americans equaling 8.2%, and Asian Americans equaling 1.6% of the sample population. There were some regional differences, as expected, in the race/ethnicity of participants. More than 90% of participants in the NW region were white, and 20.8% of participants in the NE region were Native American. These differences reflect the population demographics of different parts of the state.

Table 3. Participant characteristics, by region

	NW (n=73)	NE (n=83)	SE (n=61)	SW (n=138)	Oklahoma County (n=75)	Tulsa County (n=65)	Total (n=495)
Gender							
Male	40 (54.8%)	36 (43.4%)	37 (60.7%)	67 (49.3%)	36 (48.0%)	32(49.2%)	248 (50.1%)
Female	33 (45.2%)	47 (56.6%)	24 (39.3%)	69 (50.7%)	39 (52.0%)	33(50.8%)	247 (49.9%)
Age (years)							
8	25 (34.7%)	21 (25.3%)	16 (26.2%)	39 (28.3%)	17 (22.7%)	17(26.1%)	135 (27.3%)
9	39 (54.2%)	50 (60.2%)	39 (63.9%)	80 (58.0%)	43 (57.3%)	41(63.1%)	292 (59.1%)
10 +	8 (11.1%)	12 (14.5%)	6 (9.8%)	19 (13.7%)	15 (20.0%)	7(10.8%)	67 (13.6%)
Missing	1	0	0	0	0	0	1
Race							
White	65 (90.3%)	49 (63.6%)	42 (68.9%)	73 (52.9%)	40 (53.3%)	44(67.7%)	313 (64.1%)
Black	1 (1.4%)	6 (7.8%)	0	35 (25.4%)	11 (14.7%)	13(20.0%)	66 (13.5%)
Native American	3 (4.2%)	16 (20.8%)	13 (21.3%)	7 (5.1%)	0	1 (1.5%)	40 (8.2%)
Asian	1 (1.4%)	0	0	4 (2.9%)	1 (1.3%)	2 (3.1%)	8 (1.6%)
Other	2 (2.8%)	6 (7.8%)	6 (9.8%)	19 (13.8%)	23 (30.7%)	5 (7.7%)	61 (12.5%)
Missing	1	6	0	0	0	0	7
Ethnicity							
Hispanic	1 (1.4%)	6 (7.8%)	6 (9.8%)	18 (13.1%)	23 (30.7%)	5 (7.7%)	59 (12.1%)
Not Hispanic	70 (98.6%)	71 (92.2%)	55 (90.2%)	119 (86.9%)	52 (69.3%)	60(92.3%)	427 (87.9%)
Unknown	2	6	0	1	0	0	9

Overall Results

The dental health status of third grade students in Oklahoma is described in Table 4, using the weighted estimates. Over one-third of third grade students have one or more molar teeth with dental sealants (37.2%). The rate of caries experience is high, 69.4%, undoubtedly due to the relatively low rate of protective sealants. Much of the caries experience is being driven by high rates of decay in primary teeth. Active decay is observed more frequently in primary teeth (32.3%) as compared to permanent

teeth (19.8%). Likewise, primary teeth are more likely to have fillings/restorations (40.4%), as compared to permanent teeth (12.6%) of third graders. The prevalence of missing permanent teeth is very low, less than 1%. Not surprisingly, 16.4% of children have one or more missing primary teeth due to decay. (Normally a third grade child has approximately equal numbers of primary and permanent teeth, and the primary teeth have been in the mouth longer.)

Table 4. Summary of dental health status of Oklahoma third grade students, weighted estimates

Indicator	Prevalence (95% CI)
Percent of children in Oklahoma who have received protective sealants on at least one permanent molar tooth	37.2% (32.8-41.5)
Percent of children in Oklahoma with dental caries experience [at least one permanent or primary tooth decayed (untreated), missing, or filled (treated/restored)]	69.4% (65.1-73.4)
Percent of children in Oklahoma with untreated decay (active caries) in at least one permanent or primary tooth	40.2% (35.8-44.7)
Percent of children in Oklahoma with untreated decay in at least one permanent tooth (active caries)	19.8% (16.4-23.6)
Percent of children in Oklahoma with untreated decay in at least one primary tooth (active caries)	32.3% (28.0-36.4)
Percent of children in Oklahoma with at least one missing permanent tooth	0.6% (.12-1.8)
Percent of children in Oklahoma with at least one missing primary tooth	16.4% (13.2-19.9)
Percent of children in Oklahoma with at least one filled (treated/restored) permanent tooth	12.6% (9.7-15.8)
Percent of children in Oklahoma with at least one filled (treated/restored) primary tooth	40.4% (36.0-44.9)

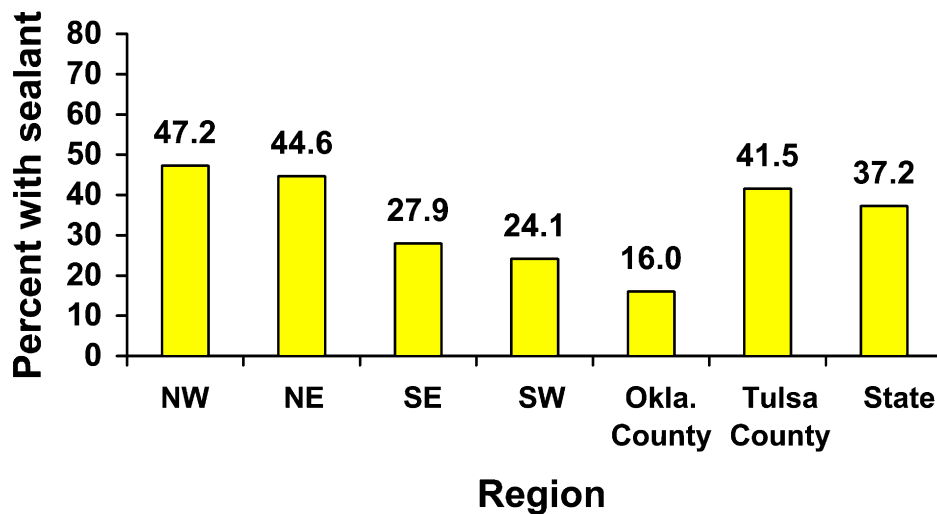
Results by Region

Sealants on Permanent Molar Teeth

Although over one-third (37.2%) of third graders in Oklahoma have sealants on one or more permanent molars, results by region were highly variable. Three regions, the NW, NE and Tulsa County, each had prevalence rates of sealants greater than 40%, while only 16% of children in Oklahoma County were observed to have

sealants(Figure 1). The number of sealants ranged from 0 to 8. Nearly one-quarter of all students sampled (24.3%) had four molars with protective sealants. The mean number of sealants on permanent molar teeth for the sample equaled 1.18 with a standard deviation of 1.811.

Figure 1. Percent of children with protective sealants on at least one permanent molar tooth, by region

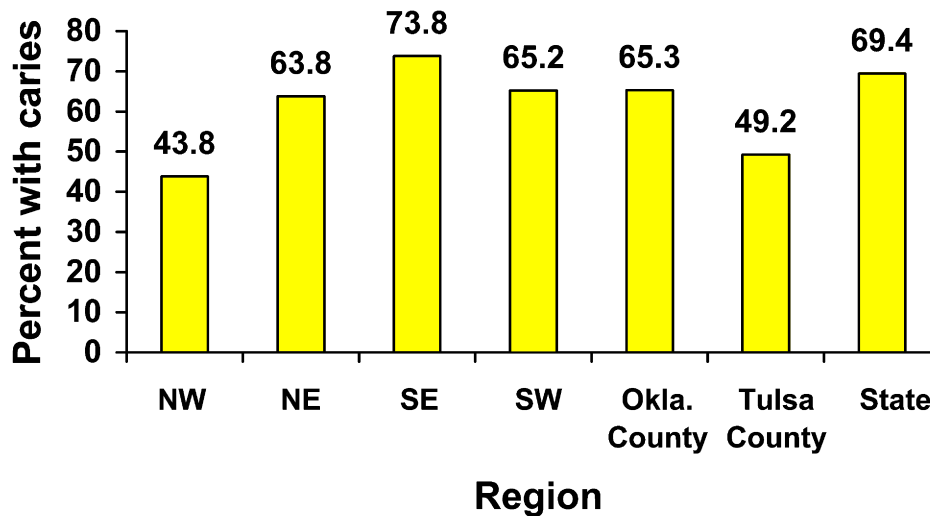


Caries Experience and DMFT/dmft Score

Total caries, or any caries experience, was calculated based on having at least one permanent or primary tooth decayed (untreated), missing (prematurely lost to decay), or filled (treated/restored). DMFT refers to decayed, missing or filled permanent teeth; while dmft is decayed, missing or filled primary teeth. The 495 third grade children examined had 1,385 teeth that had been affected by decay. Therefore, this results in a mean DMFT/dmft score of 2.8 teeth.

In other words, on an average, each third grade child has approximately 2.8 teeth that are decayed or have been decayed. Also, survey results show that 69.4% of third grade children in the state have caries experience (Figure 2). Regional differences were not as marked as those for sealants. The region with the lowest rate of caries experience was the NW with 43.8%. The NW region also had the highest rate of protective sealants. The region with the highest rate of caries experience was the SE (73.8%).

Figure 2. Percent of children with dental caries experience [at least one permanent or primary tooth decayed (untreated), missing, or filled (treated/restored)], by region

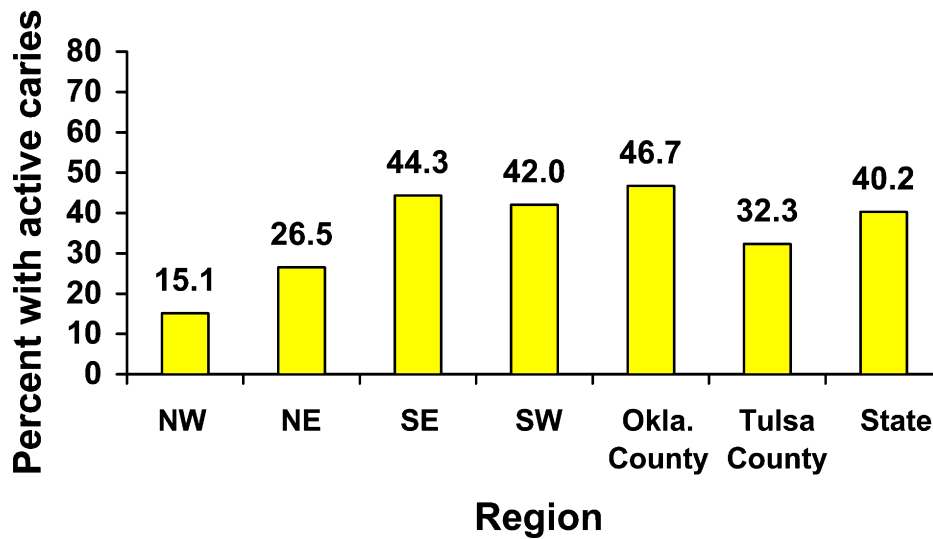


Untreated Decay in Permanent or Primary Teeth (active caries)

Another important dental health status indicator is active decay, defined as any untreated caries in at least one permanent or primary tooth. More than one-third (40.2%) of third grade children in Oklahoma are observed to have untreated

cavities(Figure 3). The rate of active decay in the NW region (15.1%) was less than half the state rate (40.2%). The rate of untreated caries was substantially lower in the NW than any other region. Almost half of the third grade students in Oklahoma County had untreated caries (46.7%).

Figure 3. Percent of children with untreated decay in at least one permanent or primary tooth (active caries), by region

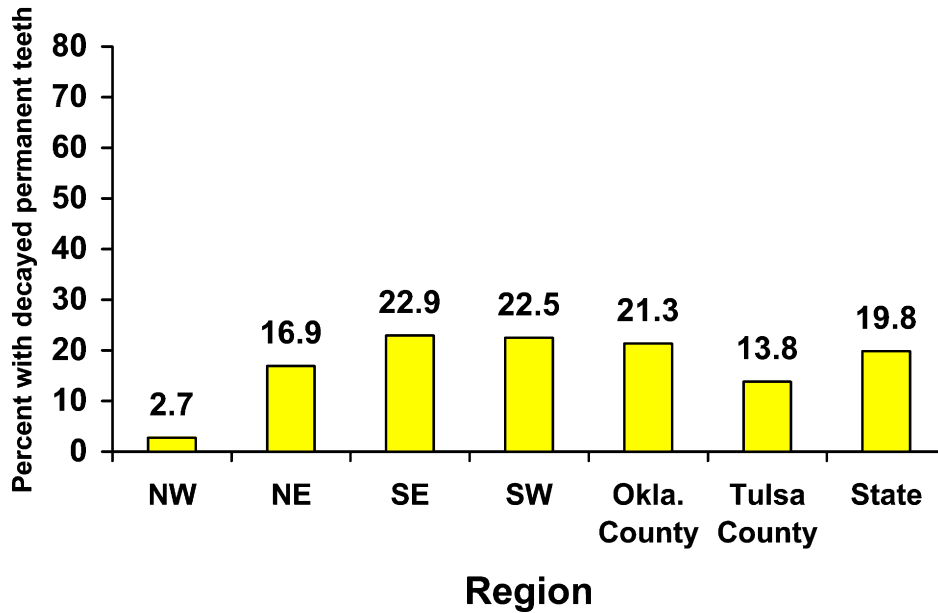


Untreated Decay in Permanent Teeth (active caries)

Statewide, 19.8% of third graders have decayed permanent teeth (untreated active decay)(Figure 4). Again, the NW region had the lowest rate of actively decayed permanent teeth (2.7%). The regions with the highest rates of decay were the SE (22.9%), the SW (22.5%),

and Oklahoma County (21.3%). The mean number of decayed permanent teeth for the 495 students was 0.38 teeth with a relatively moderate standard deviation of 0.99. The range was 0 to 9 teeth. While the majority of active decay was limited to one or two permanent teeth, 16 students (3.2%) were observed to have active decay in four teeth.

Figure 4. Percent of children with at least one decayed permanent tooth (active caries), by region

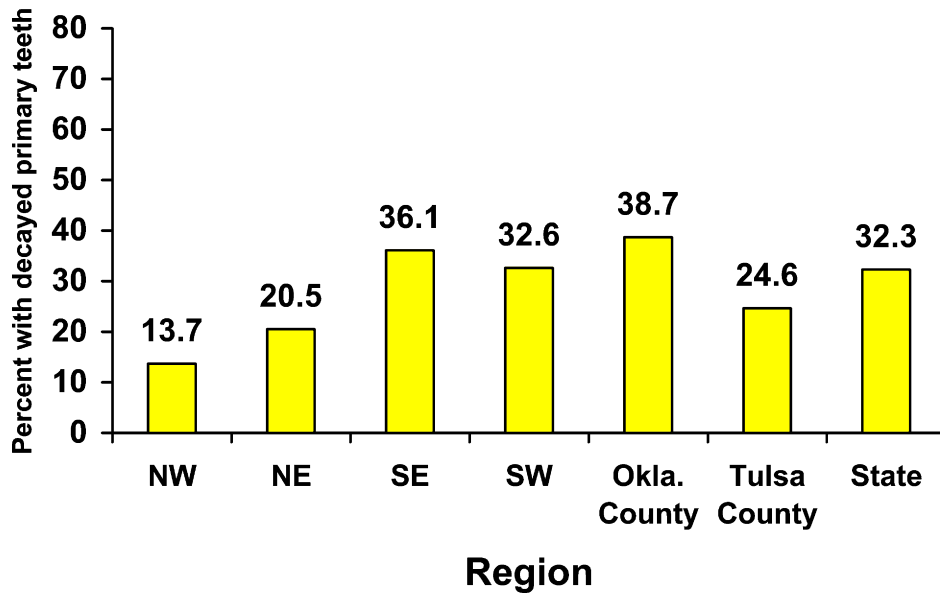


Untreated Decay in Primary Teeth (active caries)

The frequency of active decay in primary teeth was much higher. Almost one-third (32.3%) of third graders have active decay in one or more primary teeth. Children in the NW region had the lowest rates (13.7%). The prevalence rates of active decay in primary teeth were

all greater than 32% in the SE, SW, and Oklahoma County regions (Figure 5). In this state-wide sample, the mean number of decayed primary teeth was 0.75 with a standard deviation of 1.58. The range was 0 to 10 primary teeth with active decay. More than 7% of children had active, untreated, decay in 4 or more primary teeth.

Figure 5. Percent of children with at least one decayed primary tooth (active caries), by region

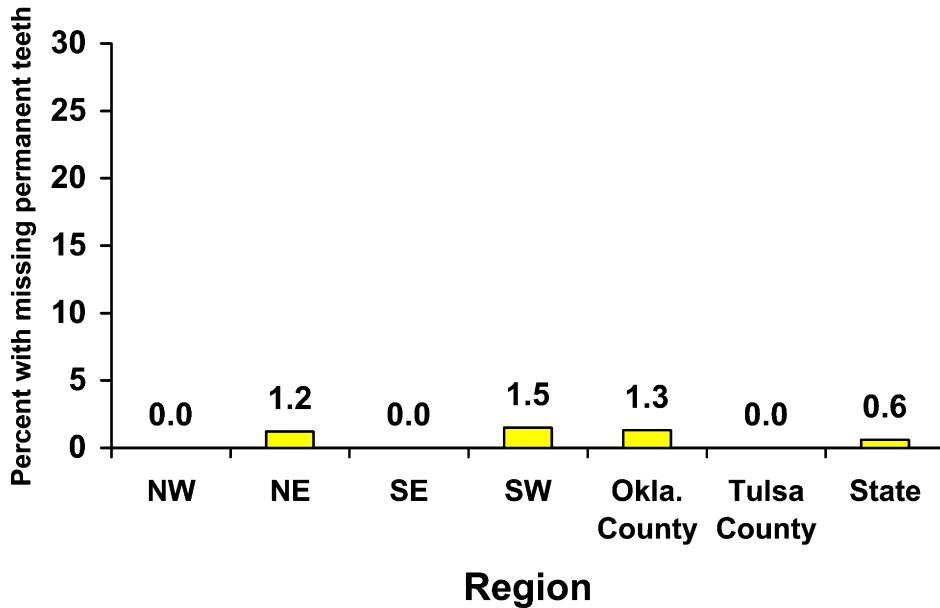


Missing Permanent Teeth

Relatively few participating third grade students were missing permanent teeth (<1% or 4 children). In three regions (NW, SE and Tulsa County) no children were observed to have missing permanent teeth (Figure 6). The mean number of missing permanent teeth for the sample equaled 0.02 with a standard deviation of 0.30.

The range was 0 to 6 missing permanent teeth. One child was missing one permanent tooth, two children were missing two teeth, and one child was missing six permanent teeth. (Missing teeth refers to teeth that would normally not be missing in a child this age.)

Figure 6. Percent of children with at least one missing permanent tooth, by region

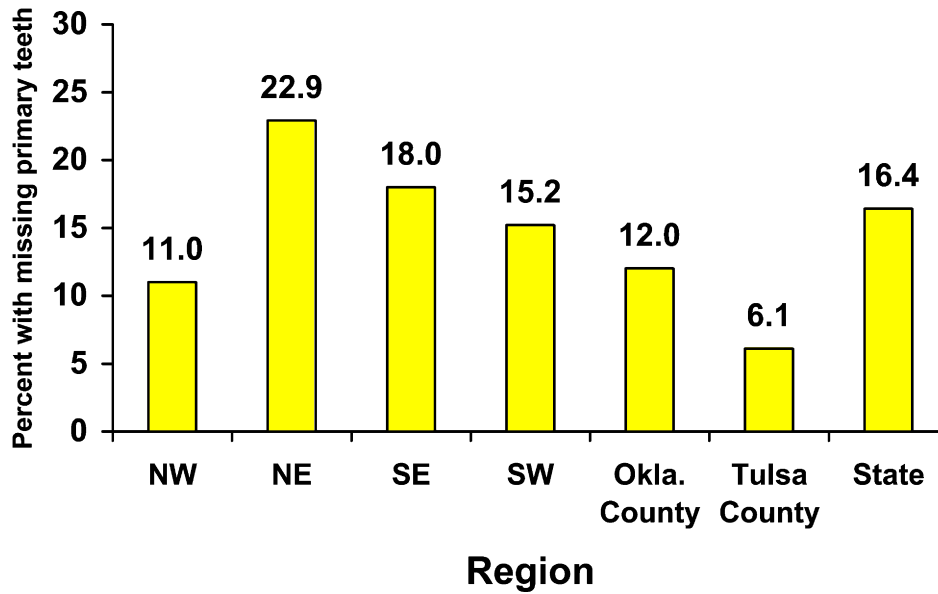


Missing Primary Teeth

As expected, significantly more children were missing primary teeth as compared to permanent teeth. For the entire state, 16.4% of third grade students are missing one or more primary teeth. Regional rates varied from 6.1% in Tulsa County to 22.9% in the NE region (Figure 7). The mean number of missing primary teeth for

the sample equaled 0.30 with a standard deviation of 0.83. The range was 0 to 5 missing primary teeth. Most students with missing primary teeth were missing one or two teeth. Ten students, or 3.8%, were missing three or more primary teeth. (Missing teeth refers to teeth that would normally not be missing in a child this age.)

Figure 7. Percent of children with at least one missing primary tooth, by region

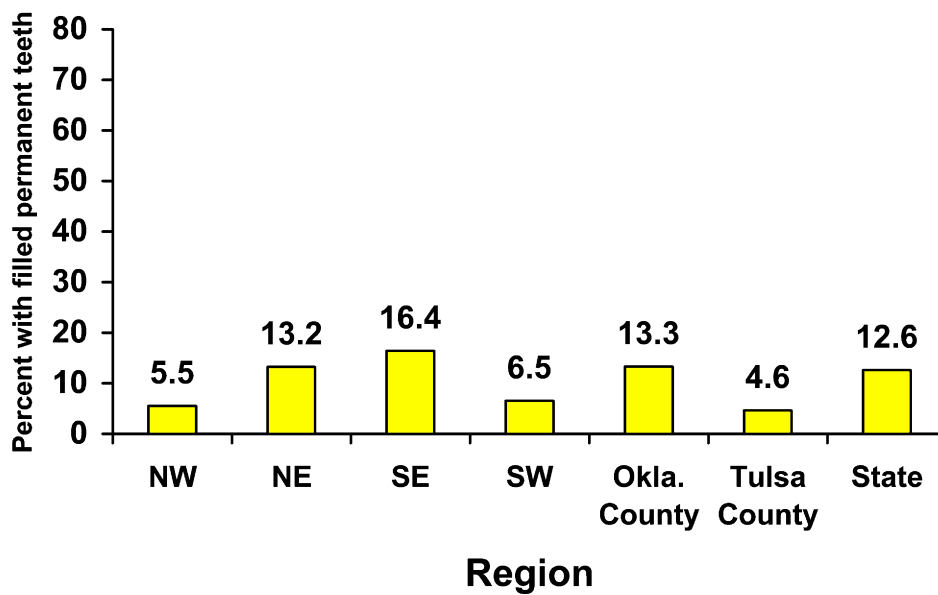


Filled (Treated/Restored) Permanent Teeth

Over 10% of third graders have filled (treated/restored) cavities in one or more permanent teeth. Differences by region were observed (Figure 8). Children in Tulsa County had the lowest rate of filled teeth with 4.6%. The highest rate of filled/treated permanent teeth was

observed in the SE region (16.4%). There was more than a three-fold difference in the rates of filled permanent teeth when the SE region was compared to Tulsa County (16.4% versus 4.6%). The mean number of filled permanent teeth for the sample was 0.20 with a standard deviation of 0.71. The range was 0 to 4 permanent teeth filled (treated/restored).

Figure 8. Percent of children with at least one filled (treated/restored) permanent tooth, by region

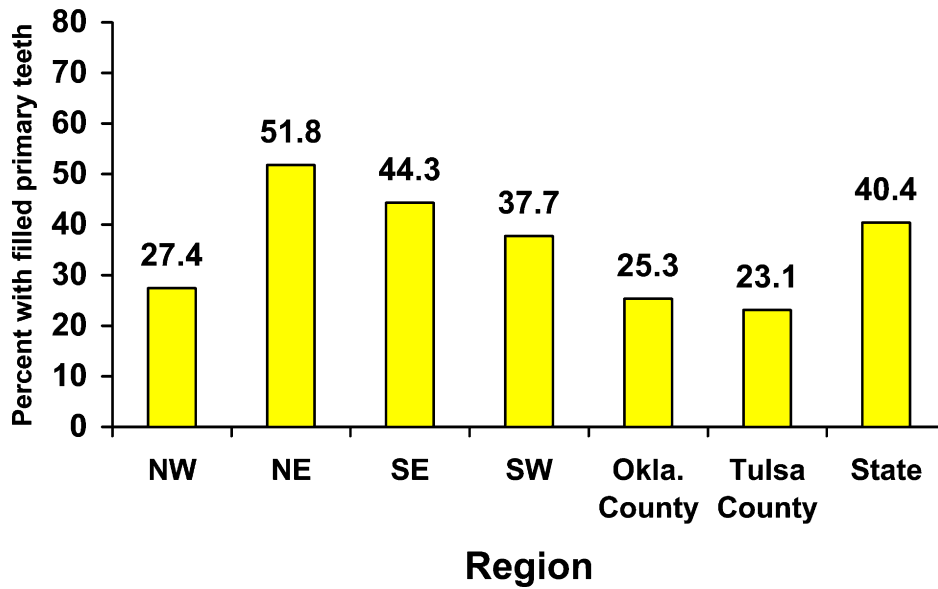


Filled (Treated/Restored) Primary Teeth

Significantly more children were observed to have filled (treated/restored) primary teeth. Overall, 40.4% of third graders have one or more filled primary teeth. Regional rates varied from 23.1% in Tulsa County to 51.8% in the NE re-

gion (Figure 9). The mean number of filled primary teeth for the sample was 1.15 with a standard deviation of 1.99. The range was 0 to 10 filled primary teeth. More than 15% of participants had four or more filled (treated/restored) primary teeth.

Figure 9. Percent of children with at least one filled (treated/restored) primary tooth, by region



Discussion

Dental caries (tooth decay) is the single most common chronic childhood disease. While some progress has been made in improving oral health in the United States, little is known about the dental health needs of children in Oklahoma. To establish a baseline for dental health indicators in third grade children in Oklahoma, the University of Oklahoma Colleges of Public Health and Dentistry conducted this needs assessment, with funding from the Oklahoma State Department of Health. This survey provides dental health professionals with the first statewide data to assess the dental health status of third grade children.

The Healthy People 2010 Objectives include

several measures related to oral health in children. These include to:

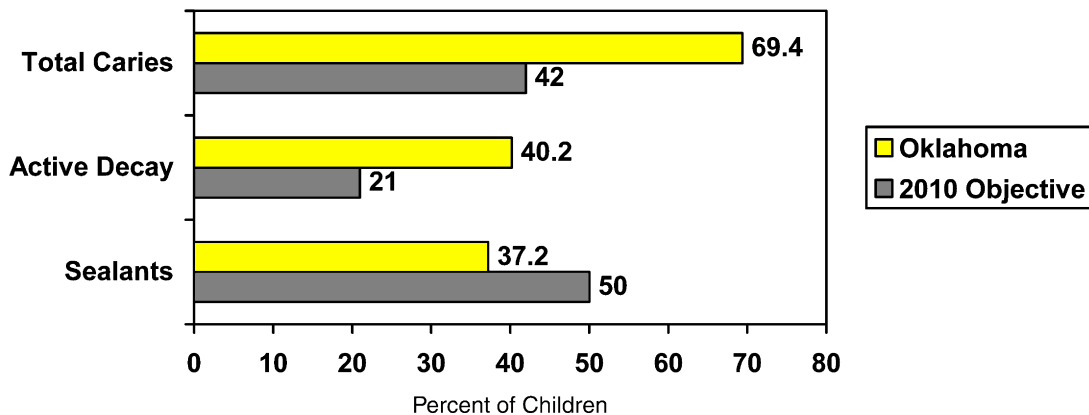
- * Reduce the proportion of children with dental caries experience in their primary and permanent teeth to 42%.

- * 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%.

Data from this study of Oklahoma children indicate significant improvements are needed before the 2010 Objectives can be met (Figure 10).

Figure 10. Oklahoma dental health measures compared to Healthy People 2010 targets



Other states have conducted similar assessments of children's oral health, and Oklahoma does not fare well by comparison. New Mexico and Wisconsin both reported total caries experience rates in excess of 60%, 60.1% and 64.6%, respectively. The statewide prevalence for dental caries experience in Oklahoma third graders was 69.4%, higher than any other state reported. The rate of active decay in Oklahoma (40.2%), defined as untreated caries in at least one permanent or primary tooth, was nearly twice the

Year 2010 Objective (21%). Similarly, the proportion of children with protective sealants is low in Oklahoma compared to other states. Only 37.2% of Oklahoma third graders have sealants on at least one permanent molar tooth, falling short of the Year 2010 Objective of 50%.

Large differences were observed in the results of the oral health needs assessment by region. The NW region had the highest rates of dental sealants and the lowest rates of any caries experience and active (untreated) decay.

Tulsa County also had higher sealant rates and lower rates of caries. By contrast, only 16% of third graders in Oklahoma County were observed to have protective sealants. Children in this county also had higher rates of active and treated caries. Simple urban-rural differences in access to dental care do not explain these differences. The two metropolitan regions had very different results. The rural, NW region of the state produced the best dental health status indicators. It is likely that water fluoridation levels may be related to these outcomes, but an analysis of community water fluoridation was not performed.

Although the sample in Oklahoma was selected to ensure representation from all six regions, participation rates varied, and sample

sizes were affected. The precision of estimates obtained in this study was still reasonable, as demonstrated by the small to moderate confidence intervals. The findings might still be somewhat affected by selection bias, as not all schools first contacted agreed to participate, and only 74% of selected students returned a signed parental consent form.

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

Recommendations to Improve Oral Health for Oklahoma Children and Adolescents

1. Increase efforts to educate the public about the importance of oral health as a part of total health.

Suggested Method:

Agencies and organizations such as the Oklahoma Department of Education, the Oklahoma State Department of Health, the Oklahoma Dental Association, Oklahoma elected officials, child advocacy groups, and the news media should work together to improve dental literacy. Develop a plan for dental disease prevention programs to be taught in grades K-12.

2. Increase access to dental care for children eligible for Medicaid.

Suggested Method:

Agencies and organizations such as the Oklahoma Health Care Authority, the Oklahoma Dental Association, and the Oklahoma State Department of Health should work together to significantly increase the number of dental providers who accept Medicaid.

3. Emphasize the importance of dental sealants for children to both the public and dental professionals to increase their usage.

Suggested Method:

Agencies, organizations, and institutions such as the Oklahoma Dental Association, the University of Oklahoma College of Dentistry, the Oklahoma State Department of Health, the Oklahoma Department of Education, and the news media should stress the need for dental sealants.

4. Increase the number of public water systems that fluoridate so a greater percentage of Oklahomans will have access to this safe and cost-effective method to reduce dental caries.

Suggested Method:

Agencies, organizations, and boards such as the Oklahoma Department of Environmental Quality, the Oklahoma State Department of Health, the water boards responsible for public water systems, and the Oklahoma Dental Association should assure the continued increase in public water system fluoridation.

5. Decrease the incidence of tobacco use to reduce oral lesions and oral disease.

Suggested Method:

Agencies and organizations such as the Oklahoma State Department of Health, tobacco use prevention organizations, the Oklahoma Dental Association, and the Oklahoma Medical Association should continue to work to reduce tobacco use in the state.

Since dental caries (tooth decay) is the single most common chronic childhood disease, all Oklahomans must work together to make oral health a priority in our state.

Appendices

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Appendix A

February 14, 2003

Principal
School
Address
Address

Dear _____:

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 Kevin Avery, DMD and Laura Beebe, PhD of the Oklahoma Health Science 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.

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. The one-hour time block for a visit to the classroom will be scheduled during an 8-week window from the beginning of March to mid-April. Each child in the classroom will receive 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 participation, we will randomly select one of your third grade classrooms for this screening. Furthermore, we will be contacting you via phone to acquire an appointment for the visit to the selected classroom. At that time, we will also 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 Rosina Everitte, Project Coordinator at (405) 271-2229 ext. 48034 for further clarification.

Sincerely,

Kevin Avery, DMD, MPH

Laura Beebe, PhD

Attachment: Returning fax form

SCHOOL PARTICIPATION - APPROVAL FORM

School Name _____ Elementary School

_____ **City** _____ **Oklahoma**

To: Rosina Everitte, 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 one classroom 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 by first and last names.

_____	_____
_____	_____
_____	_____

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. Your child will not be identified by name or description in any reports or publications about this assessment. Your child’s personal information will only be disclosed if required by law.

There are organizations that may inspect and/or copy your child’s screening record 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 Shari Kinney, OSDH IRB Coordinator at 271-4470.

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.

2002-2003 Oral Health Screening

School:	City:	Teacher:	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	Age	Gender M or F	Race *(W, B, NA, A, Other)	Ethnicity **(H, N, U)	For Office Use Only		
														Affected By Caries	Untreated Caries	
Students, in alphabetical order																
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
Totals																

* **W** = White, **B** = Black/African American, **NA** = Native American/Alaskan, **A** = Asian, **O** = Other
 ** **H** = Hispanic Origin, **N** = Not Hispanic Origin, **U** = Unknown

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

Table A1. Summary of dental health status of Oklahoma third grade students, unweighted prevalence rates

Indicator	Unweighted Prevalence (95% CI)
Percent of children in Oklahoma who have received protective sealants on at least one permanent molar tooth	32.5% (28.3-36.8)
Percent of children in Oklahoma with dental caries experience [at least one permanent or primary tooth filled (treated/restored), untreated, or missing]	60.8% (56.3-65.1)
Percent of children in Oklahoma with untreated decay (active caries) in at least one permanent or primary tooth	35.2% (30.9-39.5)
Percent of children in Oklahoma with untreated decay in at least one permanent tooth (active caries)	17.4% (14.1-21.0)
Percent of children in Oklahoma with untreated decay in at least one primary tooth (active caries)	28.1% (24.2-32.3)
Percent of children in Oklahoma with at least one missing permanent tooth	0.8% (.13-1.8)
Percent of children in Oklahoma with at least one missing primary tooth	14.5% (11.6-18.0)
Percent of children in Oklahoma with at least one filled (treated/restored) permanent tooth	9.5% (7.1-12.4)
Percent of children in Oklahoma with at least one filled (treated/restored) primary tooth	35.6% (31.3-39.9)

