



Smiles Across Kansas



2004

THE ORAL HEALTH  
OF KANSAS CHILDREN





KANSAS  
HEALTH  
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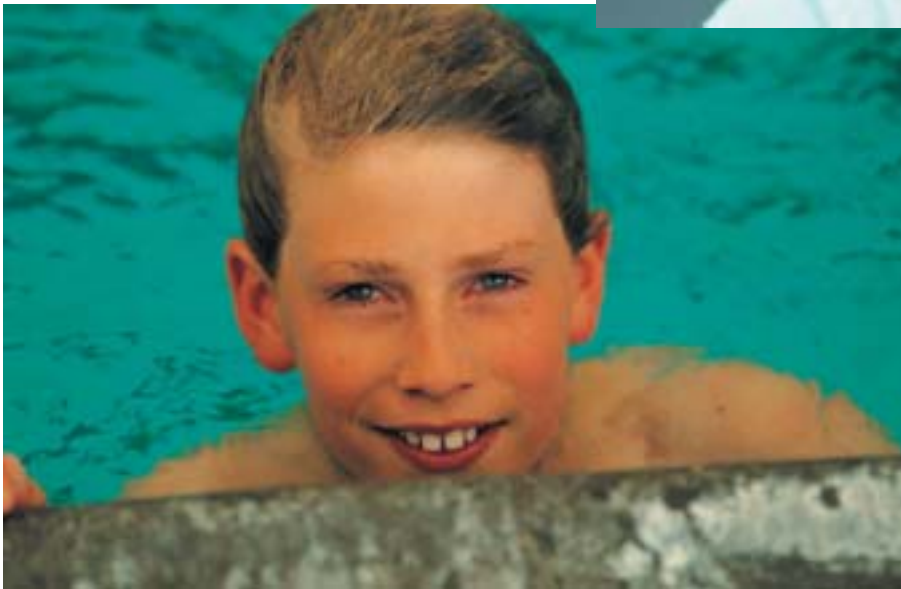
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2004 Smiles Across Kansas

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# SMILES ACROSS KANSAS 2004: THE ORAL HEALTH OF KANSAS CHILDREN

## EXECUTIVE SUMMARY

Oral health among children is a key measure in assessing the overall health of our state. Knowing the oral health status of children enables policymakers to support programs that encourage good oral hygiene and identify areas in need of policy intervention. Ensuring a healthy dentition and establishing good oral hygiene is a lifelong investment in positive health outcomes that will impact Kansas individuals and families into the future.

The purpose of the Smiles Across Kansas project was to complete a comprehensive oral health survey of third-grade children in Kansas. The survey collected information on caries (tooth decay), the prevalence of dental sealants on permanent molar teeth, and the need for urgent dental treatment. Other important information also was collected, such as the ability of families to obtain dental care, their dental insurance status, and intervals between visits to dental care providers.

Forty-nine schools across the state participated in the Smiles Across Kansas project, and more than 1,000 children were screened. This sample was large enough to draw sound conclusions about the condition of third graders' oral health for the entire state. We have learned through this important, first-time study that Kansas has many areas where oral health improvement could benefit children. Findings included the following:

- ❑ One in every four children in third grade had untreated dental decay, and more than 50 percent of all children in the study have experienced dental decay during their lives. These observations are higher than the goal of 42 percent set by the Healthy People 2010 national initiative.
- ❑ Dental sealants, a well accepted clinical intervention to prevent tooth decay on molar teeth, are underutilized as a preventive treatment among Kansas children. Only three of 10 children studied were observed having sealants on these teeth.

- ❑ African-American children in Kansas received dental sealants at a lower rate than all other groups of children. These children also reported having the greatest difficulty in accessing general dental care during the 12 months prior to the study.
- ❑ Children who attended schools with a higher percent of students who were eligible for free or reduced-price school lunches had worse oral health than other children.
- ❑ Seventy-three percent of children had a visit with a dentist during the previous 12 months, and 58 percent of them reported visiting for a routine check-up.
- ❑ More than 7 percent of all third graders had never been to a dentist, and almost 5 percent had not been in more than three years. This pattern was particularly acute in the South West and South East regions of the state and may be caused by a shortage of providers.

Many of these findings can be addressed, and children’s oral health can be improved. Providers of dental care services, schools and educators, philanthropies, local public health officials, and state-based initiatives can work collaboratively to implement solutions. Recommended policy options include:

- ❑ Develop “dental care homes” for children not currently seen by area dentists by using dental hygienists and possibly other mid-level professionals to extend the impact of dentistry into the community.
- ❑ Encourage public-private partnerships between schools, local public health departments and private practice dentists to serve the oral health needs of children, possibly through creative options in dental care reimbursement.
- ❑ Through an improved training and awareness campaign, work to encourage dental care providers to place dental sealants on healthy molars to decrease the chances of dental decay.
- ❑ Actively address oral health disparities observed among minority Kansas children.
- ❑ Implement “promising practices” interventions.

Increasing public awareness, investing in novel collaborations, and tapping into evidence-based and creative interventions will make Kansas a state where children’s oral health has the priority it deserves.



## BACKGROUND AND PURPOSE

In 2003, the Kansas Department of Health and Environment (KDHE) initiated an oral health screening project to collect data among school age children in the state. With funding from the Health Resources and Services Administration to the Kansas Bureau for Children, Youth and Families, a baseline study of third graders was developed. Third graders were selected because they typically have at least one set of permanent molars and because they have been the subject of comparable studies in other states. This allows Kansas to compare its study population profile to other states and to institute strategies used by other states to achieve positive oral health outcomes.

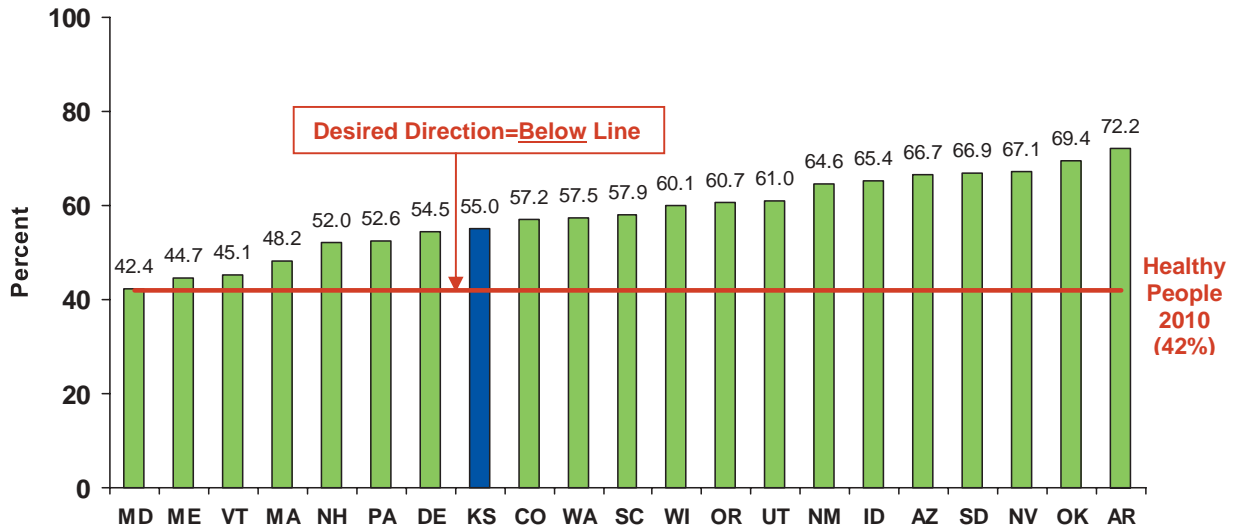
Information concerning how the survey was conducted and how the data were analyzed can be found in subsequent sections of this report.



*Traci Meyer's third grade class at Village Elementary in Emporia, Kansas*

# KEY FINDING #1: FIFTY-FIVE PERCENT OF CHILDREN IN THIRD GRADE HAVE EXPERIENCED DENTAL DECAY

**FIGURE 1 – PERCENT OF CHILDREN WITH DENTAL DECAY BY STATE**



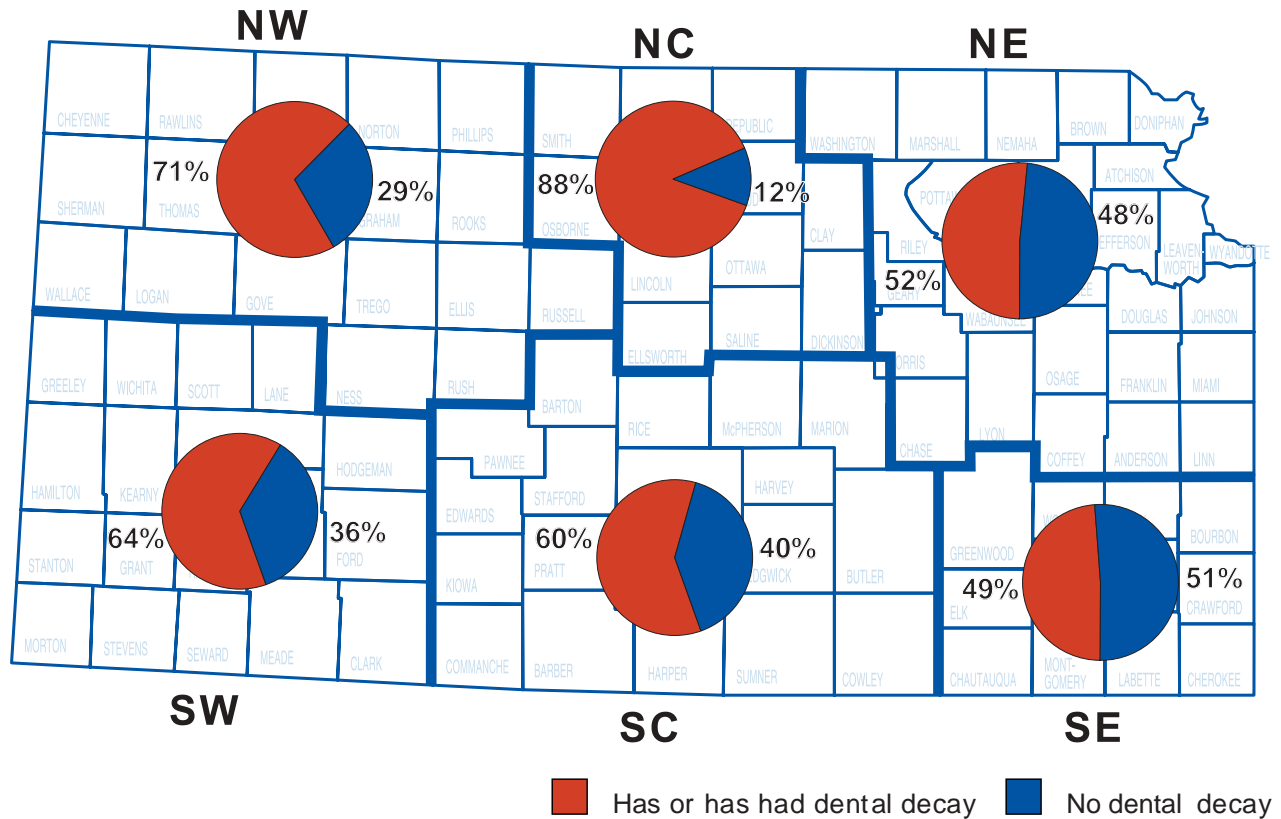
Note: The percent shown is for the most recent year of data available. Not every state has data for school year 2003-2004. Data were adjusted for non-response, except for AR, ME, NH, NM, OK, UT, WA and WI where only unadjusted data are available for the most recent survey.

Source: National Oral Health Surveillance System ([www.cdc.gov/nohss](http://www.cdc.gov/nohss))

Dental decay is preventable because the combination of factors that cause it can be reduced through a variety of interventions. Factors include the communicable nature of the bacteria that principally cause dental decay (through decalcification of the tooth’s mineral structure), diets that include simple carbohydrates (sugars) that fuel bacterial action, proper dental hygiene, and routine dental visits that allow for early intervention if decay has begun.

Given that dental decay can be avoided almost entirely, the fact that more than 50 percent of 7 to 9-year-olds in Kansas have suffered the damaging effects of decay represents a public health challenge.

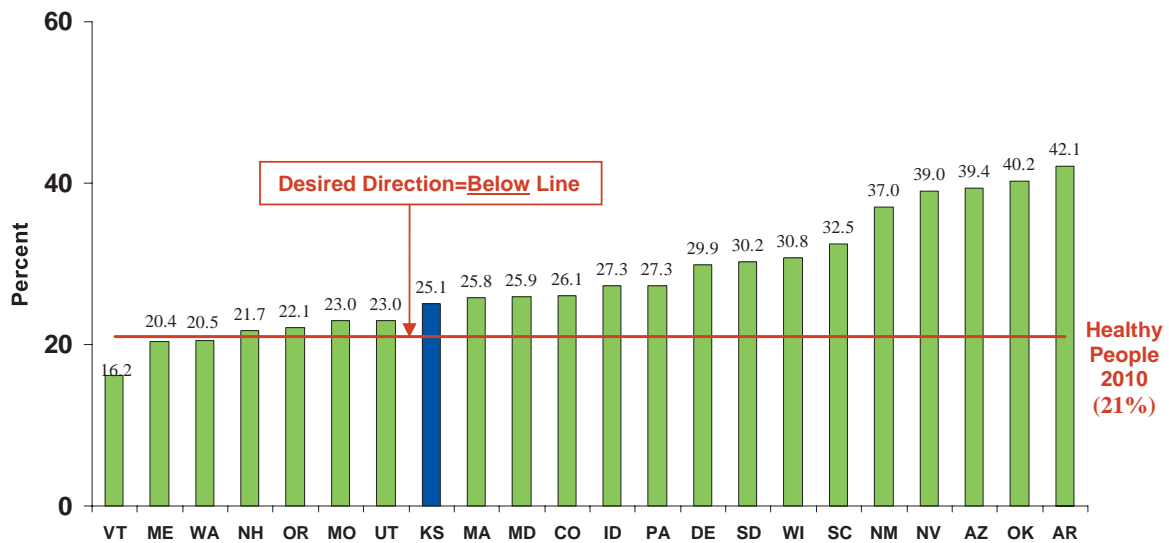
**FIGURE 2 – PERCENT OF CHILDREN WITH DENTAL DECAY BY REGION**



Six regions are defined by KDHE (North West, North Central, North East, South West, South Central, and South East) and are used for a variety of intra-state comparisons (see Appendix D). The best performing region, South East, had 51 percent of their third graders without any history of dental decay. In the poorest performing region, North Central, only 12 percent of third-grade children had intact dentitions that were free of dental decay. Local factors, including the availability of preventive services, dental care professionals, and possibly levels of water fluoridation, may explain the key differences between these regions and among the other regions in the state.

## KEY FINDING #2: ONE OUT OF FOUR KANSAS THIRD GRADERS HAD UNTREATED DENTAL DECAY

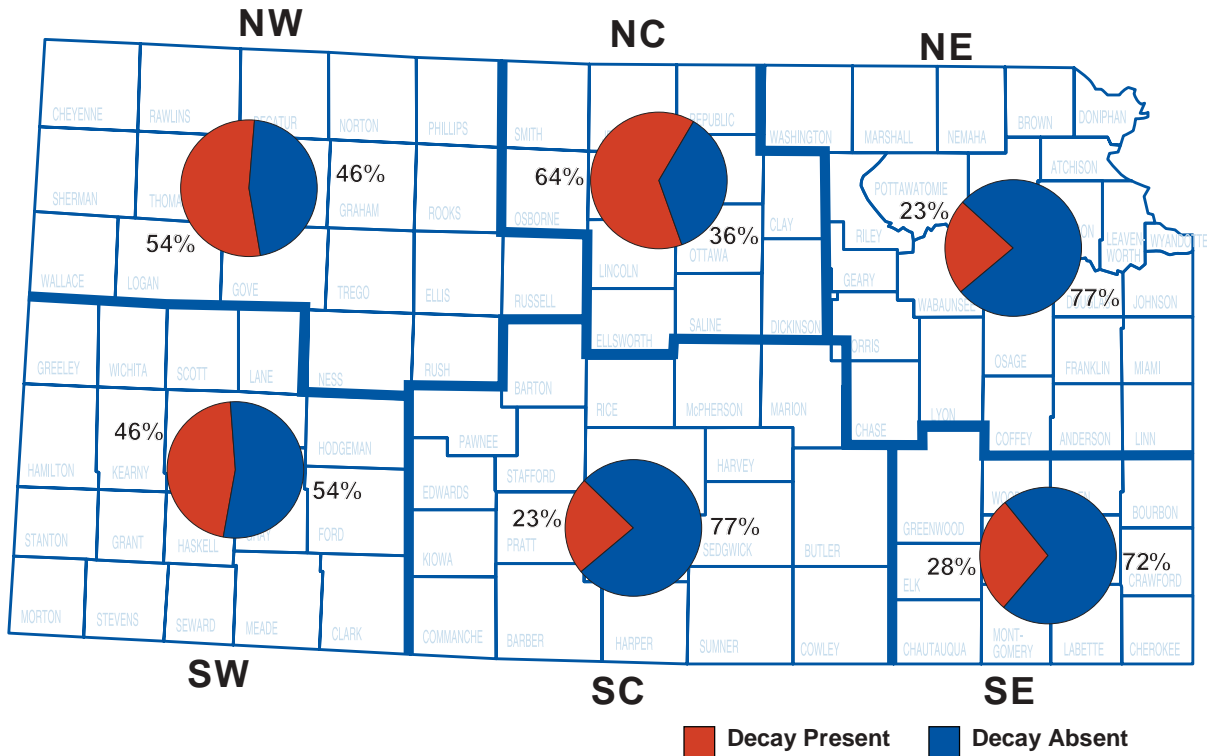
**FIGURE 3 – PERCENT OF CHILDREN WITH UNTREATED DENTAL DECAY BY STATE**



Note: The percent shown is for the most recent year of data available. Not every state has data for school year 2003-2004. Data were adjusted for non-response, except for AR, ME, MO, NH, NM, OK, UT, WA and WI, where only unadjusted data for non-response is available for the most recent survey.  
Source: National Oral Health Surveillance System ([www.cdc.gov/nohss](http://www.cdc.gov/nohss))

Twenty-five percent of children had active dental decay. If the dental professional recording data could observe decay given the methods of observation used for this study, the dental defect had to be observable to the naked eye. Such defects are unlikely to reverse themselves and are more likely to require dental treatment. The earlier children are seen by a dental provider the more likely it is that the provider can mitigate the damage already present.

**FIGURE 4 – PERCENT OF KANSAS THIRD GRADERS WITH UNTREATED DENTAL DECAY BY REGION**

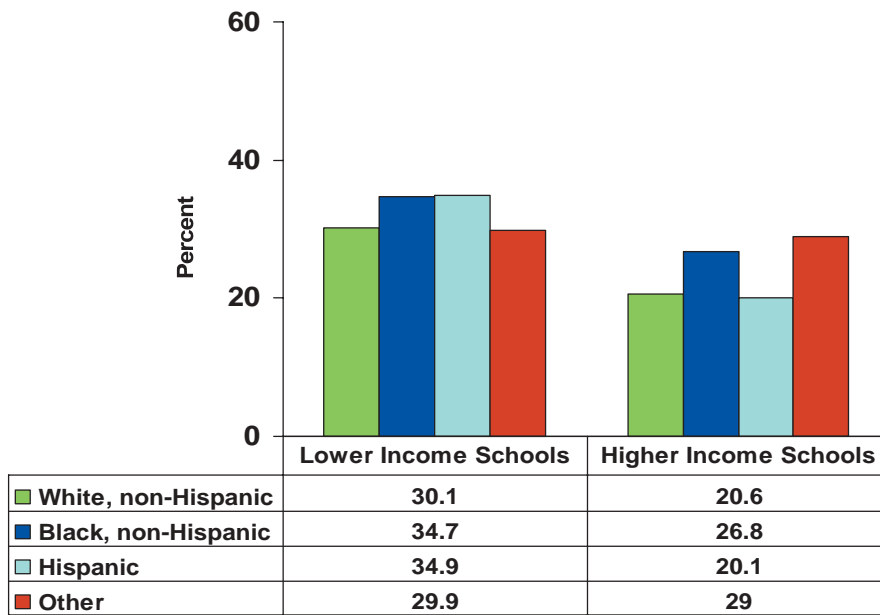


Third graders in three of the six regions defined by KDHE (North West, North Central and South West) had dental decay present at substantially higher levels (64–46 percent) than was observed in the other three regions (28–23 percent). The North Central region was particularly noteworthy because dental decay was present at over twice the rate of the better-performing regions.

The general northeast to southwest, diagonal pattern observed here characterizes other demographic and health indicators observed in Kansas, such as population density. The most rural areas with poorer provider distribution and availability appear to have more children with untreated dental decay.

The North Central and North West regions in the state had the highest levels of untreated decay among third graders. In the North Central region, the rate of untreated decay was almost three times greater (64 percent) than regions with the lowest rate (23 percent). Even the best performing regions (South Central and North East regions with the lowest rates of untreated decay) did not meet the national Healthy People 2010 goal of 21 percent or lower.

**FIGURE 5 – PERCENT OF KANSAS THIRD GRADERS WITH UNTREATED DENTAL DECAY BY RACE/ETHNICITY AND INCOME**

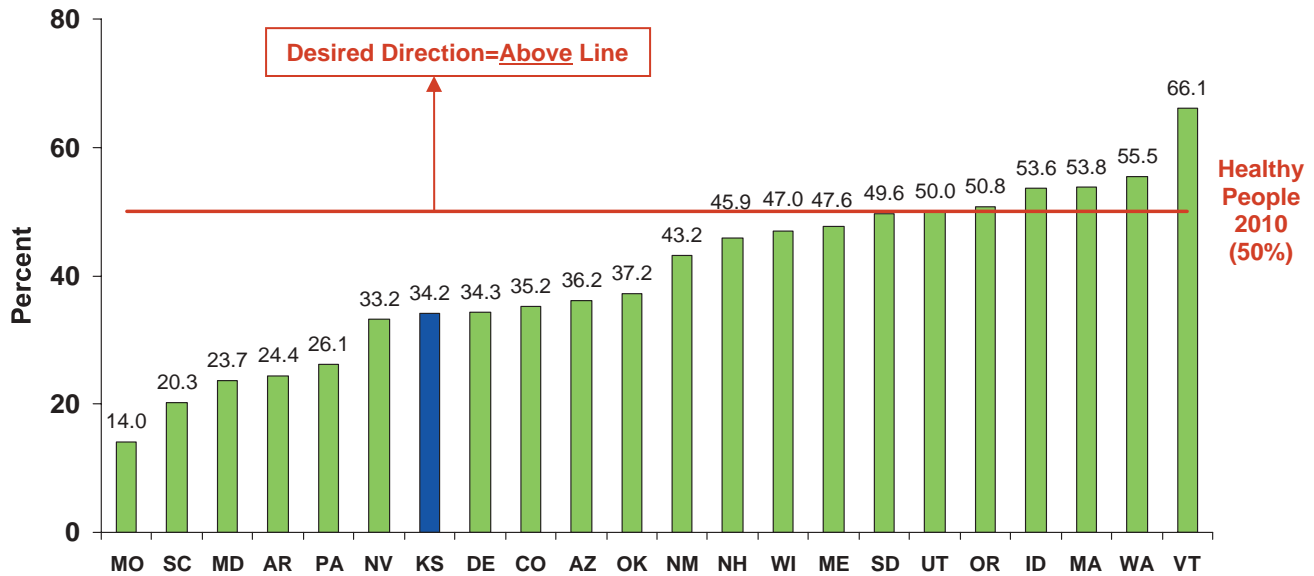


Disparities in health care services often are associated with income. This study used information on the number of children who receive free or reduced-price lunches at each school to evaluate such disparities. This measure was an indirect measure of income, as the free or reduced-price lunch program is administered based on financial need (see Methods section).

Figure 5 shows that, in general, lower-income students had more untreated dental decay than children in higher-income schools. The positive health trend associated with higher income was less noticeable among African-American children than for other children in the sample, which might indicate a racial disparity in care or access.

## KEY FINDING #3: DENTAL SEALANTS ARE UNDERUSED AS A PREVENTIVE TREATMENT

**FIGURE 6 – PERCENT OF CHILDREN WITH DENTAL SEALANTS BY STATE**



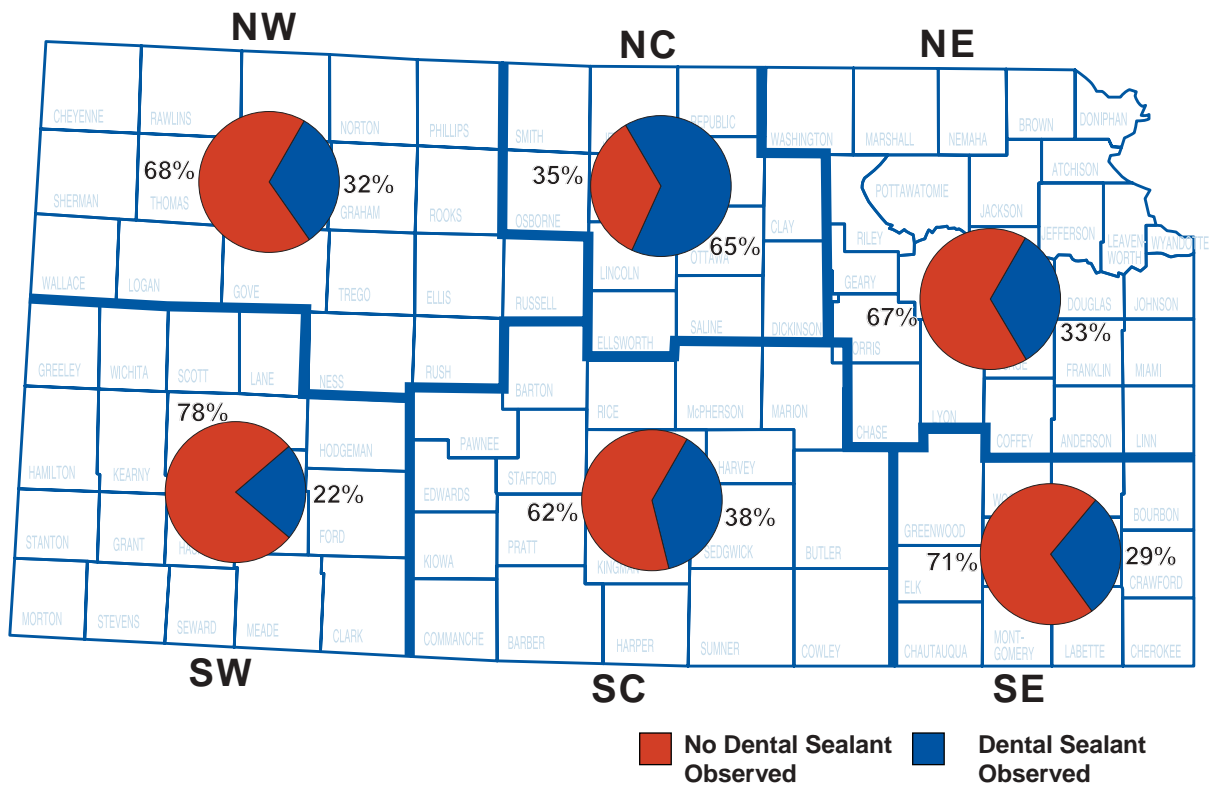
Note: The percent shown is for the most recent year of data available. Not every state has data for school year 2003-2004. The percent has been adjusted for non-response, except for AR, ME, MO, NH, NM, OK, UT, WA and WI, where only unadjusted data for non-response is available for the most recent survey.

Source: National Oral Health Surveillance System ([www.cdc.gov/nohss](http://www.cdc.gov/nohss))

Dental sealants are widely accepted by dental professionals as an effective decay preventive treatment. A plastic-like material is bonded to the chewing surfaces of permanent molar teeth, and the sealant works to prevent bacteria and acid byproducts from creating decay in the pits and grooves of healthy teeth.

Despite the wide acceptance of this practice, only three in 10 children were observed having sealants on these teeth. Sealants placed on molar teeth alone, however, do not fully address the issue of dental decay observed among these children. Relatively greater use of sealants (as seen in the North Central region as observed among 65 percent of study participants) does not predict relatively lower levels of dental decay (88 percent of study participants in that region had experienced dental decay, the highest level observed statewide).

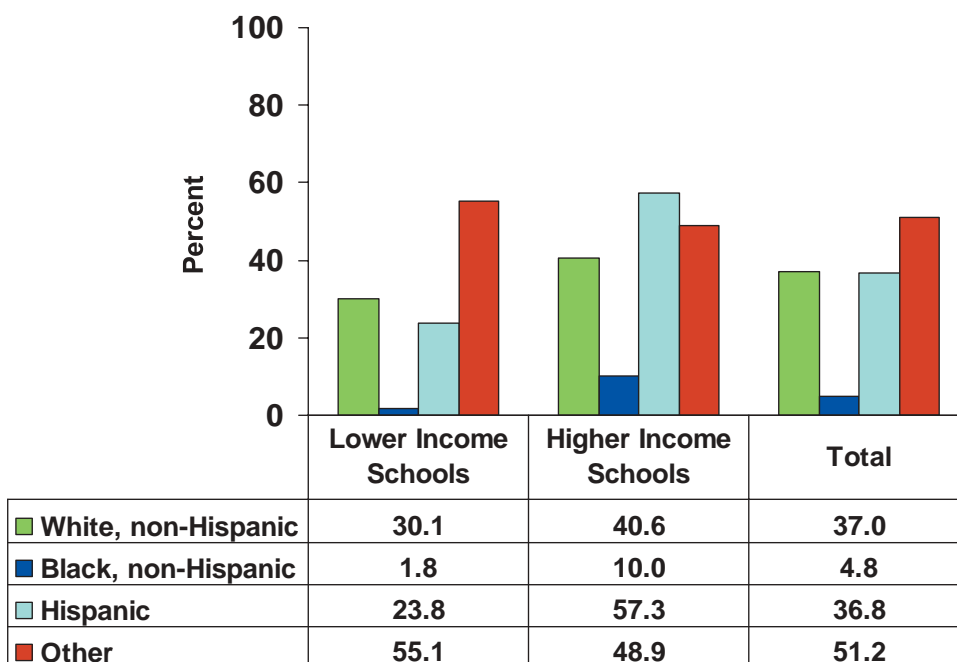
**FIGURE 7 – PERCENT OF CHILDREN WITH DENTAL SEALANTS BY REGION**



Sixty-five percent of third-grade children in the North Central region had dental sealants, which was more than that observed in any other region. This was the only region in Kansas that met or exceeded the Healthy People 2010 goals for sealant use. The causes for practice pattern variation in the use of sealants among dental professionals in Kansas are unclear without further information.



**FIGURE 8 – PERCENT OF CHILDREN WITH DENTAL SEALANTS BY RACE/ETHNICITY AND INCOME**



Disparities in health care services often are associated with income. This study used information on the number of children who receive free or reduced-price lunches at each school to evaluate such disparities. This measure was an indirect measure of income, as the free or reduced-price lunch program is administered based on financial need.

Higher income non-Hispanic white, and Hispanic children had higher rates of dental sealants, but African-American children, regardless of income, had a statistically significant lower rate of dental sealants. This was a potentially disturbing finding, and it required attention and interpretation. The following list identifies some *possible* explanations.

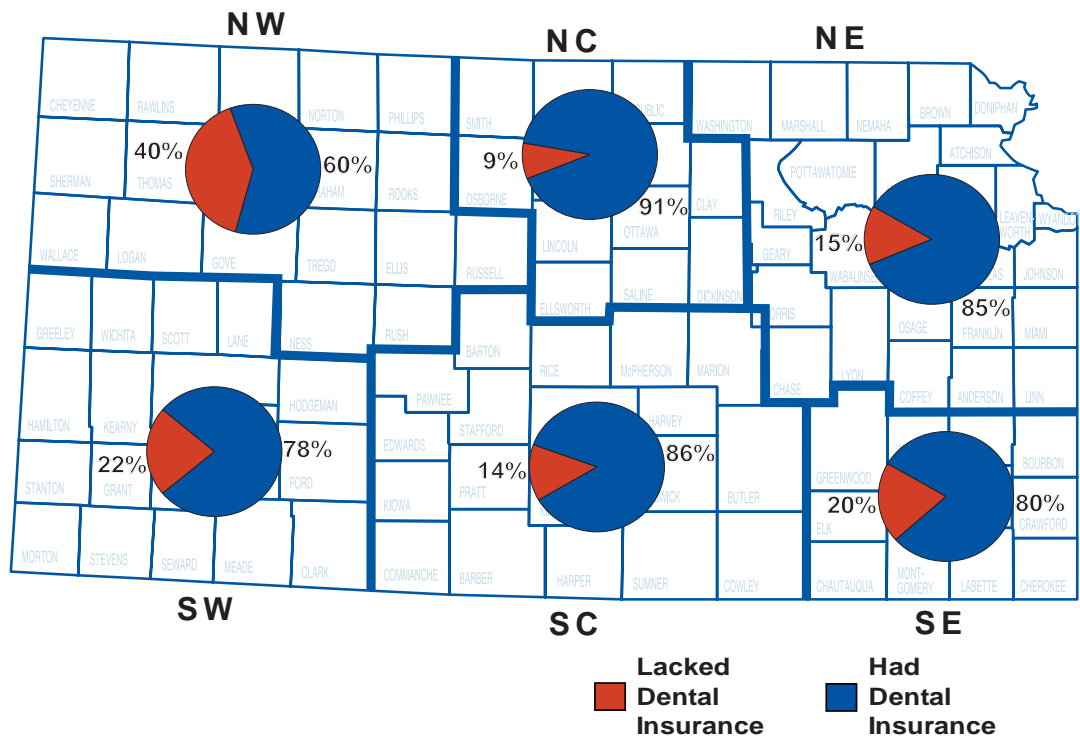
1. Although the sample of children drawn for this study is sufficiently large enough to extrapolate to the entire state, perhaps there were too few African-American children in the sample to truly represent this population. Those that were included may have been, for some unidentified reason or by chance, substantially different than those who were not

included and might be unrepresentative.

2. Dental professionals who examined each student may have inadvertently undercounted sealants in African-American students. This could have happened because the examiner may not have inspected these children's teeth closely enough to determine if they had a sealant.
3. One factor that can affect the retention of sealants is diet. If a child chews on hard materials repetitively (such as ice), sealants can crack and be lost. Dietary preferences among African-American children may mean that they had sealants placed, but had lost the sealants prematurely. The type of oral examination conducted for this study would not have been able to detect whether a sealant had ever been placed, only whether it was observed at the time of the exam.
4. If African-American children experience fewer dental visits or if the interval between visits is greater than for other children, the opportunity to place dental sealants may be diminished. Only intact, healthy molars are candidates for sealants, and if these children had oral health issues once seen by a dentist, there would not be an option to place the sealant.
6. The conversations among patients, caretakers, and dental professionals, as with all health professionals, are affected by the cultural competencies and abilities of those delivering and receiving health messages. Perhaps the explanations of the value of dental sealants, the procedure required for placement, or other issues at the time of patient's and caregiver's education were less effective with African-Americans than with others.
6. Dental professionals may have preconceived notions or biases about how African-American children and their caregivers will accept the idea of dental sealants or they may have experienced difficulty in their placement, retention, and effectiveness in these children. These factors could have influenced dental professionals to the extent that they may not have discussed or offered this treatment to their African-American patients.

## KEY FINDING #4: MOST KANSAS THIRD GRADERS HAVE SOME FORM OF DENTAL INSURANCE

**FIGURE 9 – PERCENT OF CHILDREN WITH DENTAL INSURANCE**

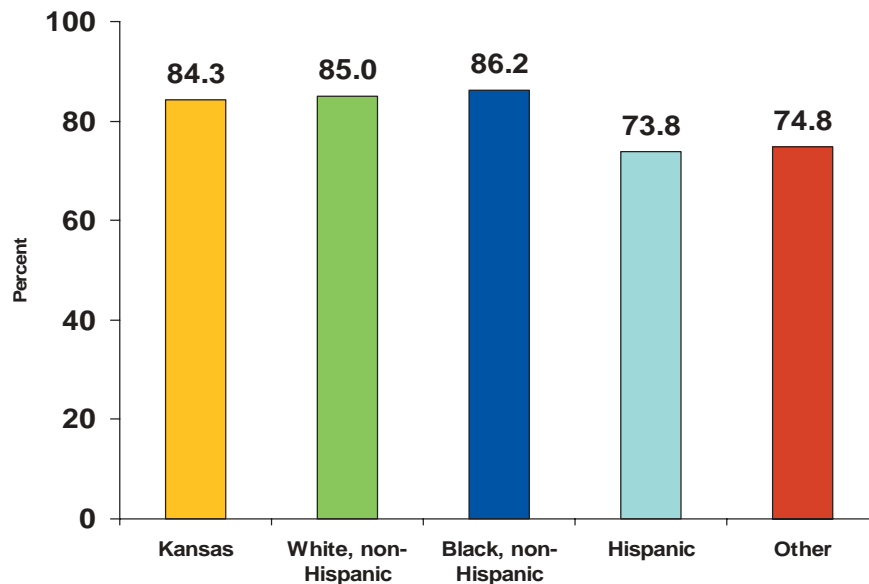


Most third graders in Kansas had dental insurance (84.3 percent), but the number without insurance varied by region across the state. Lack of insurance was observed among 40 percent of all third graders in the North West region and was lowest among children in the North Central region (only 9 percent of the children reported not having dental insurance). Given this higher than expected level of reported insurance, it was possible that the respondents confused dental insurance and health insurance or did not fully understand the question, and they may have reported inaccurate information.

Because having dental insurance can affect whether a student will be seen in certain dental provider settings, it might be predicted that children in the North West region would have the most difficulty accessing a dental provider. These children had a higher percent of untreated dental decay [54 percent vs. 23 percent (best performing region); see Figure 4 on page 9] but they did *not* report having difficulty receiving care (see Finding #7 on page 20).

National studies note that racial and ethnic minority children more frequently lack dental insurance, and this fact might provide further explanation for racial disparities already noted. This did not seem to explain the disparities for African-Americans and dental sealants (see page 12) as they reported the highest levels of dental insurance compared to all other groups.

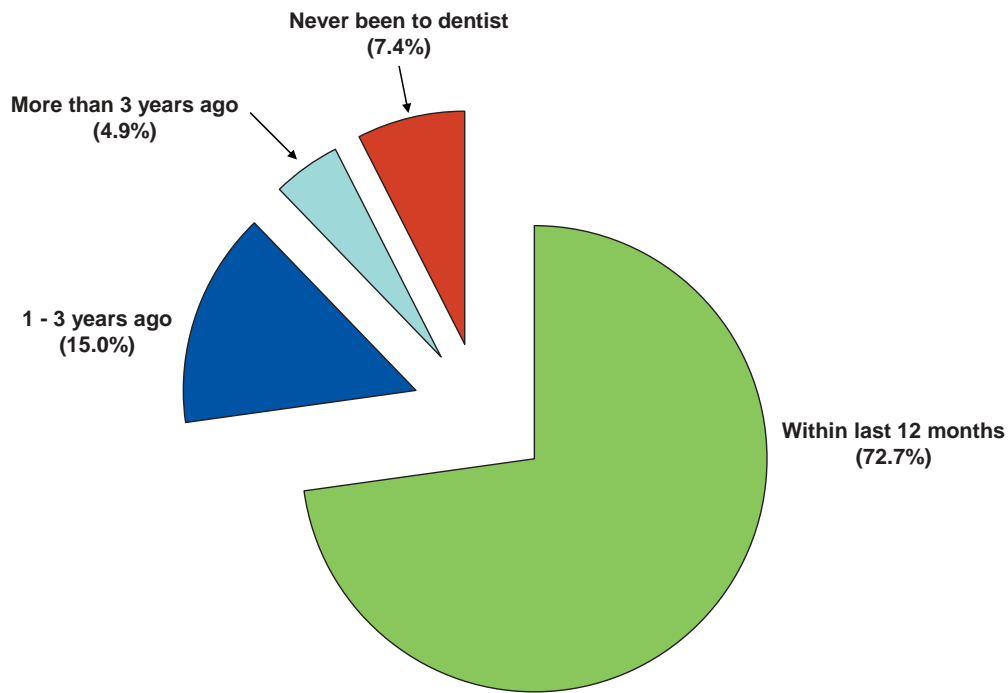
**FIGURE 10 – PERCENT OF CHILDREN WITH DENTAL INSURANCE BY RACE/ETHNICITY**



Most Kansas third-grade students report having some kind of dental insurance. Eighty-five percent of non-Hispanic white children have insurance, and 86.2 percent of African-American students report coverage. However, as is the case with other studies of health insurance, Hispanics in this study reported a lower level of dental insurance coverage. Some speculate that there may be a cultural bias against accepting health and dental insurance if it is perceived as charity among Hispanics/Latinos. In addition, it is interesting to note that those whose race and ethnicity was recorded as “Other” mimic the pattern observed for Hispanics (74.8 vs. 73.8 percent, respectively). In national studies, those who select “Other” are most frequently Hispanics/Latinos, which was the case in this study (most of those who chose the “Other” race category also chose “Yes” to the question of Hispanic ethnicity). In this study, “Other” also included those who were Asians, Pacific Islanders, Native Americans, or Alaska Natives.

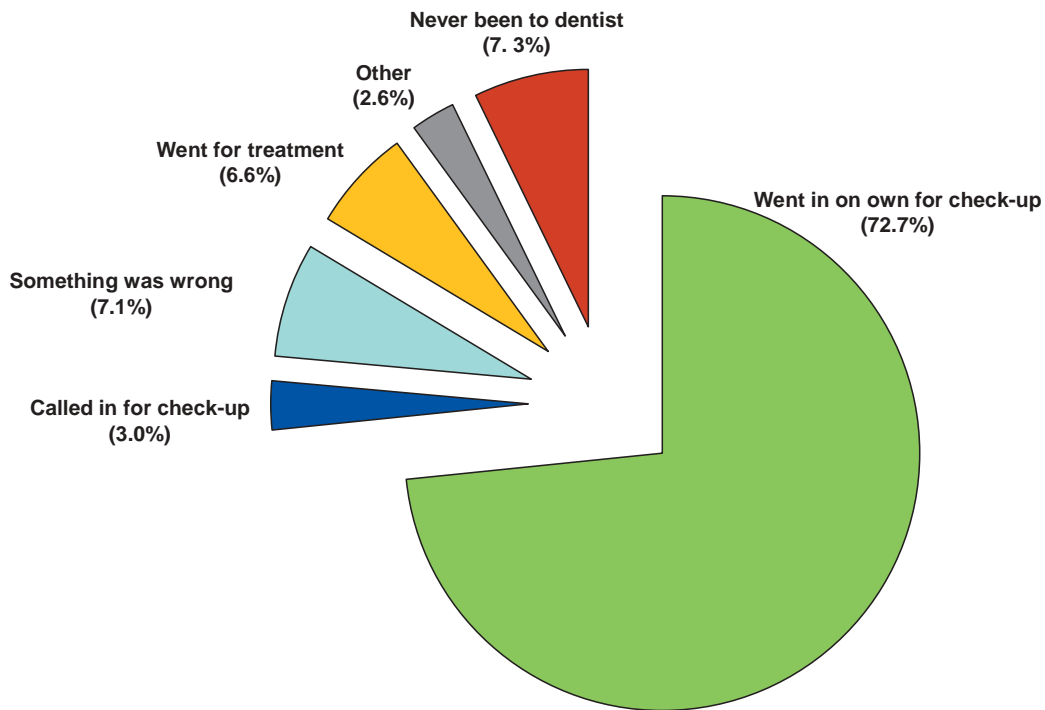
## KEY FINDING #5: MOST CHILDREN SEE THEIR DENTIST ANNUALLY

FIGURE 11 – TIME SINCE LAST DENTIST VISIT



Even though 84 percent of third graders had some form of dental insurance that would cover routine care, only 72.7 percent had seen their dentists even once in the past year. Based on a number of factors (including whether they had dental insurance at any time during the previous year), over 25 percent of third graders missed their biannual exams as recommended for children by the American Academy of Pediatric Dentistry.

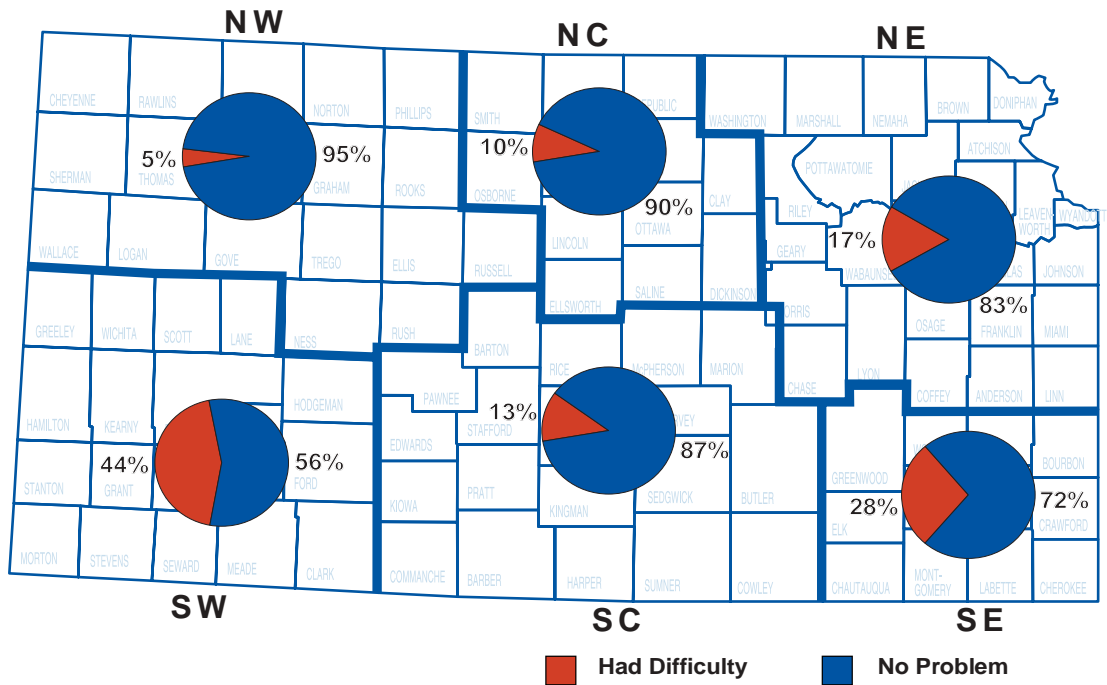
**FIGURE 12 – REASON FOR LAST DENTIST VISIT**



Among those children who saw a dental professional within the past year, the majority (almost 73 percent) were seen for a routine visit. This may indicate that if a child had a “dental home,” meaning that they had found a willing provider and considered that individual and their team to be responsible for their oral health care needs, they visited that “home” on a routine basis. When families lack insurance, live in an area with a limited number of dental care providers, or when dental care is unavailable based on the type of insurance accepted by a provider (private insurance, Medicaid, etc.), they may wait until there is a dental problem before seeking or receiving dental care.

## KEY FINDING #6: SOME CHILDREN HAVE DIFFICULTY GETTING DENTAL CARE

**FIGURE 13 – COULD NOT GET DENTAL CARE IN PAST 12 MONTHS  
BY REGION**



Between 5 and 44 percent of children in this study reported having had difficulty receiving dental care services during the previous 12 months. Third graders in the South West region, in particular, reported having problems in receiving care. This measure may reflect any number of issues including a shortage of dental professionals in this area, challenges for patients in accepting available appointments when offered, full patient panels among available dentists, unavailability of dentists who will accept Medicaid-insured patients, or difficulties in reaching a provider because of distance or transportation issues.

## KEY FINDING #7: SOME DISPARITIES CAN BE EXPLAINED BY URBAN/ RURAL AND INCOME DIFFERENCES

**FIGURE 14 – COMPARISON OF VARIABLES BASED ON COMMUNITY CHARACTERISTICS  
(SHADED AREAS INDICATE STATISTICALLY SIGNIFICANT FINDINGS)**

VARIABLE					INTERPRETATION
	Urban	Rural	Richer	Poorer	
% Urban			78	57	There were more higher-income schools in urban communities
% Richer	68	45			More urban communities were characterized by higher income
% Male	50	48	49	50	Gender-based differences were <u>not</u> present in this sample
% White, Non-Hispanic	78	89	88	72	White students were more affluent and were more likely to live in rural communities
% Black, Non-Hispanic	13	1	6	15	African-American students were less affluent and more likely to live in urban communities
% Hispanic	7	9	5	11	Hispanics were less affluent and more likely to live in rural communities
% Participating in the Free and Reduced-Price Lunch Program	40	46	25	63	A higher percent of children living in poor communities qualified for free and reduced-price lunches
% With Dental insurance	86	81	86	82	Rich or poor, urban or rural, most third graders had dental insurance
% Last visit within past year	72	74	79	63	Higher-income students were more likely to report having had a dental visit in the past year
% Trouble accessing dental care	18	16	10	27	Lower-income students were more likely to report having had trouble accessing dental care
% Caries experience	51	64	56	53	Treated and untreated dental decay occurred more frequently in rural communities
% Untreated decay	23	30	21	31	Untreated dental decay was greater in rural communities and among lower-income students
% Sealants	36	31	40	26	Higher-income students were more likely to have dental sealants than lower income students. Rural and urban students had essentially the same rate of dental sealants.



Each county was designated as an urban, semi-urban, densely settled rural, rural, or frontier area based on population density (see Appendix D). For this study, schools in urban and semi-urban counties were grouped together and designated as “urban,” and those in the other three categories were grouped together and designated “rural” (see Appendix D). Higher-income and lower-income schools existed in both urban and rural areas of the state, but higher-income schools more closely characterized the urban sample (68 percent) rather than the rural sample (45 percent).

Caries experience did not differ by gender, race, or socio-economic status, but students in rural counties were more likely to have had dental decay than those in urban counties.

Untreated decay was strongly associated with socio-economic factors and was observed more frequently in rural communities. So, while many of the children in this study (55 percent) had experienced dental decay at some point in time, more of those who attended schools with fewer students eligible for the free and reduced-price lunch program had better access to dental care, were more likely to have had a visit to a dentist, and more frequently had received treatment for dental decay than those who attended lower-income schools. The study results indicate socio-economic factors partially explain variations among the measures of oral health examined in this study.

Comparisons that included more than two variables were made. Each school was classified into high and low income based on the number of children who received free and reduced-priced lunches as well as whether the school was in a more urban or rural community. Because the availability of dental professionals is limited in rural communities and their availability was thought to be a limiting factor that might result in lower oral health status among children, rural communities including both low-income and high-income schools were studied to see if they predict poor oral health (for example, untreated dental decay). When both school income *and* rurality were considered together and analyzed with respect to untreated decay, only children who reported having trouble getting care were statistically more likely to have untreated decay.

## STRATEGIES, POLICIES AND PROMISING PRACTICES IN OTHER STATES

We examined strategies, policies, and interventions used among the states that report the best oral health indicators from their third-grade student oral health assessment projects. These states include: Vermont, Washington, Maine, and Maryland. Additional states that introduced novel approaches to improving oral health in children were included. Below we describe the policies, strategies, and interventions from each state that might be feasible for Kansas and provided at least one example from each state examined.

### Vermont

Vermont developed a school-based program called the “Tooth Tutor Dental Access Program,” with the main goal of linking every child to a “dental home.” The program provides to each participating school a list of dental hygienists who are able to serve as program providers, each serving to promote dental care through a curriculum. These participants work closely with the school nurse, health liaison, classroom teachers and community dentists to provide a dental home for children in the program. Primary funding for the dental hygienists is from the Medicaid Outreach Program with Early and Periodic Screening, Diagnosis and Treatment Program (EPSDT) funding.

### Washington

Bridging oral health and education is one of four strategies selected at the state level in Washington. School-related programs were targeted to integrate oral health into total health by working with school districts and school-based nurses to add oral health into the existing curricula.

Washington also is considering requiring that a percentage of patients be Medicaid clients as a condition for dental professionals’ relicensure.

## Maine

Maine has had significant and sustained legislative and policy initiatives to improve oral health. Maine offers a state-defined dental education loan and repayment program, and a subsidy for community-based agencies providing clinical services funded with tobacco master settlement dollars.

Maine has invested in developing an institutionalized capacity for monitoring and surveillance of oral health status—particularly children—through data collection, analysis, and dissemination at the state health agency.

Finally, Maine has worked in collaboration with the state Board of Dental Examiners to clarify the definition of “Public Health Supervision” for dental hygienists, which allows hygienists to provide preventive services in public health and certain other settings without a dentist being present, and has paved the way for Medicaid reimbursement of these services.

## Maryland

Some Maryland county health departments provide intake and eligibility for services, educational outreach, and match patients with a dentist’s office that is willing to see them. At least one health department also has an in-house telephone line for oral health information. Pediatricians and OB/GYNs who participate in their State Children’s Health Insurance Plan (SCHIP) educate parents about the importance of oral health.

Maryland also passed legislation providing state funding for a loan repayment program for dentists. A maximum of five dentists can receive up to \$70,000 in non-taxable loan repayment assistance over a three-year period. In return, dentists agree to provide oral health care services to a minimum of 30 percent (of their total patient population) Medicaid recipients for a minimum of three years of their full-time practice. Maryland’s program is unique as it does not focus on the placement of these dentists in health professional shortage areas, but recognizes professional shortage as a statewide problem. No other states have initiated a practice of this type.

## New Hampshire

New Hampshire has developed a comprehensive strategic plan to address oral health improvement. Among five key “principles” is the commitment to use public-private partnerships to improve the oral health of those who suffer disproportionately from oral diseases. One accomplishment is the creation of a statewide clearinghouse to provide information on oral health programs, technical support, funding consultation, and successful public health models.

## Alaska

In an effort to provide more dental services across the state, Alaska created a new dental provider type called a dental aide worker. These providers, with various levels of training, provide services ranging from dental education and application of topical fluorides to sealants, x-rays, restorations, stainless steel crowns, and extractions. Funds for the required training came from an Indian Health Service grant (\$265,000 per year for five years), and the program will remain financially sustainable through reimbursement from the Medicaid program.



## DISCUSSION AND IMPLICATIONS

Dental decay is largely preventable, but over 50 percent of students in this study already have experienced it. A variety of factors influence whether an individual will develop dental decay—the bacterial environment of their mouth, dental hygiene, and genetics, to name a few. Years of dental studies have shown that professional care makes a significant difference in whether decay progresses and causes permanent damage. Teeth are amazingly hard structures (stronger than bone), and are extremely durable. We know that when compromised by disease, teeth are less likely to last a lifetime. This oral health study of Kansas third graders gives us an indication of what their futures hold. The condition of their teeth at age 8 indicates that they will have health problems later in life.

Socio-economic factors, population density differences, and racial/ethnic disparities were identified in this study as contributing to poor oral health indicators. Children from lower socio-economic schools, children living in more rural communities, and children of color have worse oral health than their counterparts. Two major findings are that Hispanic children are less likely to have dental insurance and African-American children less likely to have dental sealants compared to other children. Both insurance status and sealants predict that these children may have unnecessary and preventable dental problems.

This study provides a preliminary finding that children who have a “dental home” and a dental care provider team are more likely to obtain care on a regular basis. Children who cannot find a “dental home” for any number of reasons (a shortage of providers in their community, providers whose patient panels are full, or providers who will not accept the type of insurance carried by a child) are more likely to have oral health problems.

# RECOMMENDATIONS TO IMPROVE THE ORAL HEALTH OF KANSAS CHILDREN

## **1. If every third-grade student in Kansas had a “dental home” and was encouraged to visit his/her provider regularly, oral health status would improve.**

For children who can access care when they need it or have a dentist, this study showed that most are seen for general check-ups (58 percent). By comparison, 49 percent of those who have trouble getting care see a dentist for general check-ups. This difference may exist because the children lack a regular dental care provider. Having a “dental home” helps ensure that problems are spotted early, that prevention and hygiene education can be delivered, and needed treatments can be provided.

## **2. Strategies to address the oral health care of rural children are needed.**

Rural communities face a variety of health care challenges. Dentists may not choose to practice in rural Kansas, leaving communities without adequate workforce resources. Dental hygienists can provide a set of dental care services, but they cannot provide a full range of dental services. Examining strategies to encourage dental professionals to take up practice in communities that need them may require financial incentives, such as educational loan repayment. Other states are considering or have adopted a care model that includes certifying a mid-level professional. The hope is that these individuals will fulfill the needs of small or rural communities without the requirement of a doctorate in dental surgery degree and the costs and time investment associated with it.

## **3. Children of lower socio-economic status, even with dental insurance, have poor oral health outcomes.**

Children who attend lower socio-economic schools, regardless of whether they live in rural or urban communities, have poorer oral health than other children. Limited financial resources impact the ways in which families address preventive care, routine care, and urgent/emergent care needs. If out-of-pocket expenses are involved, families may have to make hard decisions about the cost of care. National studies indicate that families are likely to delay care in these situations. When treatment for problems such as dental decay is delayed, the disease progresses.

As in the case of other “silent” health conditions such as high blood pressure, dental decay often proceeds without symptoms until it is in an advanced state. Undiagnosed dental diseases and treatment delays contribute to poor oral health outcomes.

#### **4. Dental sealants should be more widely encouraged.**

Dental sealants were found among 34 percent of Kansas third graders included in this study. This finding indicates that there is plenty of room for Kansas to improve. Particularly concerning is the significantly lower percent of non-Hispanic black children with dental sealants than would be expected by chance. Reasons for this disparity should be explored.

Sealants do not fully explain the oral health status of children included in this sample. Other factors, such as exposure to water fluoridation, oral hygiene practices, and use of preventive care services all contribute to the oral health profiles described in this report.

#### **5. Special efforts must be taken to address the ethnic and racial disparities noted in this study.**

Not all children in Kansas appear to have the same chance of maintaining a healthy dentition. Hispanic third graders are more likely to live in rural communities that may be challenged to meet their cultural and linguistic needs. Their dental providers may not have the training to communicate effectively, and they may not have access to translation or other services to meet the needs of these patients. Hispanic children in this study also are noted to have a lower level of dental insurance coverage than other children. This may be caused by cultural and linguistic barriers experienced by these families, as they may not fully understand the importance or use private or public insurance. Another factor may be that some children in the study are undocumented and therefore ineligible to receive public insurance benefits.

African-American third graders are more likely to live in urban communities and attend lower socio-economic schools. While these children have the highest percent of dental insurance, they more often report having difficulty accessing care. Even though Kansas Medicaid reimbursement for dental services is among the top 14 states nationally, some Kansas dentists do not accept patients with Medicaid or HealthWave coverage. We speculate that at least some of these children have Medicaid or HealthWave insurance coverage, and they may not be able to see a provider because some providers limit their practice to children with private insurance. Learning what the Medicaid barriers are from the providers' perspective seems like a critical step in finding dental care solutions for these children.





# METHODS AND RESEARCH DESIGN

## Research Design

Kansas replicated the research design used in other states to ensure state-to-state comparability. An electronic list of all public schools in Kansas was obtained from the Kansas Department of Education. Schools with 10 or more third-grade students were included in the pool for sampling (769 schools and 33,558 third-grade students; see Table 1, pg 33). All schools were placed into one of five peer groups based on their county's population density. Within each peer group, every school was listed in order of percent of children participating in the free and reduced-price lunch program. This was done to fairly distribute communities by socio-economic status because research has established that family income often predicts health status. Then, every ninth school on each peer group list was selected yielding a total of 80 selected schools. This sampling scheme is designed to produce proportionate stratified sampling, meaning that each school has an equal probability of being selected for the study, as well as being representative of the socio-economic composition and diversity of the state. If a school declined participation, the protocol was to substitute that school with the next (nearest in rank) school on the list.

More than half of the selected schools agreed to participate in the screening (N=49 schools). There were various reasons that prevented some schools from participating. For example, some schools declined because they were already involved in other school health screenings and they felt it would be too much of a burden to conduct another.

## Data Collection

In each final sample school, all third-grade students who returned the consent form from their parents or guardians were screened by a dental professional. The oral health screening process followed the protocols outlined in the Basic Screening Survey developed by the Association of State and Territorial Dental Directors (ASTDD). Technical assistance was provided by the ASTDD.

In the school environment, the examiner observed and recorded caries experience (treated and untreated decay), and sealants on permanent molars for each child on a standardized data



collection form. They also made a professional assessment of those children with observable problems on the urgency of their need for treatment. The consent form collected from parents contained information on the age and race of the child, dental insurance status, prior use of dental care services, and other demographic characteristics.

All of the data collected was handled confidentially. Only aggregate data were provided to the analytic team to reduce the number of individuals with direct access to personally identifiable data.

Table 2 (pg. 34) presents an overview of the characteristics observed among the participants in the project. The average age of the children in the study was 8.7 years (standard error of the mean = 0.02).

### **Data Entry and Analysis**

Data entry involved transcribing the information collected at each school into a database for analysis. The survey coordinator performed data input, and data checking occurred to ensure consistency of data entry. The data were analyzed using SUDAAN software to enable the sample to be appropriately weighted to ensure that analyses would not be skewed because of biases based on non-response or which schools participated from among the 769 possible schools in the sample pool. Weighting helps to reduce the influence of over sampling and to increase the representation of those under sampled so that the final sample more closely approximates the general population. For example, in this study, Hispanic/Latino children were over-represented (based on U.S. Census rates expected statewide) as were children who live in urban counties, while African-American children were under-represented. Using SUDAAN software allowed for statistical adjustment so that the oral health profiles developed would be representative of each sub-population's true contribution to the total health profile of Kansas third graders.

Both unweighted and weighted frequency distributions of each variable were plotted and compared with published data to evaluate the extent of potential biases. We decided to present only weighted percentage data throughout this paper to mitigate the impact of uneven response rates among various population density and income groups on the results.

Bi-variable cross tabulations with Chi-square tests of statistical significance among oral health screening data, demographic and access variables helped to identify relationships worthy of further investigation as well as confounding factors to be considered. For example, dental sealant findings were explored in a logistic regression model that included race, income, and a few other selected variables. While this exploration was instructive, the limitations of sample size in some of the analyses limited the construction of multivariate and multi-variable models to predict oral health status.

Schools located in counties identified by KDHE as urban or semi-urban counties were grouped together and labeled “urban” for this study. Schools located in densely-settled rural, rural, or frontier counties were labeled “rural.” (See Appendix D for the criteria and a complete list of counties.)

Schools were rank ordered based on the number of third-grade students that are eligible for the free and reduced-price lunch program. The median (42.1 percent) was used to group the above median schools into “high-income” schools and those below the median into “low- income” schools.

# DATA TABLES

**TABLE 1 – NUMBER OF SCHOOLS AND STUDENTS IN THE STUDY**

Total Possible Sample		Selected Sample		Final Project Sample	
Schools	Students	Schools	Students	Schools	Students
769	33,558	80	3,375	49 (61.3%)	1,062 (31.5%)

**TABLE 2 – CHARACTERISTICS OF THE STUDY PARTICIPANTS  
(95% CONFIDENCE INTERVAL)**

	Percent (95% CI)	Standard Error
<b>Demographic Characteristics</b>		
<i>Gender</i>		
Male	49.4 (44.7 - 54.1)	2.40
Female	50.6 (45.9 - 55.3)	2.40
<i>Race/Ethnicity</i>		
Non-Hispanic White	81.2 (76.7 - 85.0)	2.13
Non-Hispanic Black	9.5 (6.2 - 14.3)	2.02
Hispanic	7.2 (5.5 - 9.5)	1.01
Other	2.1 (1.3 - 3.3)	0.49
<i>Eligible for Lunch Program</i>		
Yes, eligible	42.1 (37.0 - 47.4)	2.67
No, not eligible	57.9 (52.6 - 63.0)	2.67
<i>Dental Insurance</i>		
Yes, child has dental insurance	84.3 (80.5 - 87.5)	1.79
No, child does not have dental insurance	15.7 (12.5 - 19.5)	1.79
<i>Socio-economic Status</i>		
Lower-income schools	39.37 (35.3 – 43.6)	2.10
Higher-income schools	60.6 (56.4 – 64.7)	2.10

*Population Density*

Frontier	3.4 (3.1 - 3.7)	0.15
Rural	10.3 (9.3 - 11.4)	0.55
Densely-Settled Rural	16.7 (15.0 - 18.5)	0.88
Semi-Urban	19.4 (17.2 - 21.7)	1.14
Urban	50.2 (47.3- 53.2)	1.53

<i>Region</i>		
North West	2.0 (1.8 - 2.2)	0.11
North Central	1.3 (0.8 - 2.2)	0.34
North East	53.4 (49.2 - 57.4)	2.09
South West	1.8 (1.34 - 2.2)	0.22
South Central	30.0 (26.7 - 33.6)	1.77
South East	11.5 (9.6 - 13.8)	1.07

**Access To Dental Care**

*Last Dental Visit*

Within last 12 months	72.7 (67.7 - 77.2)	2.42
1-3 years ago	15.0 (11.7 - 19.0)	1.88
More than 3 years ago	4.9 (3.01 - 7.9)	1.22
Never been to dentist	7.4 (4.7 - 11.6)	1.71

<i>Trouble Accessing Care</i>		
Yes, child had trouble accessing care	17.0 (12.8 - 22.0)	2.33

No, child did not have trouble accessing care	83.0 (78.0 - 87.2)	2.33
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*Caries Experience (treated or untreated)*

Yes	55.0 (50.2 - 59.6)	2.41
No	45.0 40.4 - 49.8	2.41

*Untreated Decay*

Yes	25.1 (21.4 - 29.3)	2.01
No	74.9 (70.7 - 78.6)	2.01

*Sealants*

Yes, child had at least one sealant	34.2 (30.0 - 38.7)	2.22
No, child did not have any sealants	65.8 (61.3 - 70.0)	2.22

*Treatment Urgency*

No obvious problem	74.7 (70.5 - 78.4)	2.01
Need restorative care	23.3 (19.7 - 27.4)	1.97
Urgent care (pain or swelling present)	2.0 (1.3 - 3.2)	0.49

# APPENDICES





**Parental Consent Form**

Please complete this form and return it to your child's teacher tomorrow. Thank you.

\_\_\_\_\_

Last	First	Age	Teacher
------	-------	-----	---------

Is your child eligible for the free or reduced lunch program? \_\_\_1. Yes \_\_\_2.No

Race (check all that apply): \_\_\_1.White \_\_\_2.Black/African American \_\_\_3.Asian  
\_\_\_4.Native Hawaiian/Pacific \_\_\_5.American Indian/ Alaska Native

Ethnicity: \_\_\_1.Hispanic \_\_\_2.Non-Hispanic

I am the parent or legal guardian of the child whose name appears below. I hereby give permission for such child to receive a dental screening as part of the *Smiles Across Kansas 2004* survey. I understand and agree that the dental screening is being conducted at no cost and that I am participating in this survey voluntarily. I hereby agree to release and discharge all parties involved, including without limitation the dental professionals who are conducting the screenings, from any and all liabilities, suits, costs or expenses in any way relating to the participation of the child below in this dental screening survey.

Parent or Legal Guardian (Print)\_\_\_\_\_

\_\_\_\_\_

Parent or Legal Guardian Signature	Date
------------------------------------	------

**Please answer the next questions to help us learn more about access to dental care.** Your answers will remain private and will not be shared. If you do not want to answer the questions, you may still give permission for your child to have his or her teeth checked.

1. About how long has it been since your child last visited a dentist? Include all types of dentists such as orthodontists, oral surgeons, and all other dental specialists, as well as dental hygienists.  
**(Please check one)**  
\_\_\_1. Within the last 12 months  
\_\_\_2. More than 1 year ago, but not more than 3 years ago  
\_\_\_3. More that 3 years ago  
\_\_\_4. Never has been to a dentist

**Please continue survey on back of page.**



2. What was the main reason that your child last visited a dentist? **(Please check one)**
- 1. Went in on own for check-up, examination or cleaning
  - 2. Was called in by the dentist for check-up, examination or cleaning
  - 3. Something was wrong, bothering or hurting
  - 4. Went in for treatment of a condition that dentist discovered at earlier check-up or examination
  - 5. Other
  - 6. Never has been to the dentist
3. Do you have any insurance that pays for some or all of your child's Dental Care? Include health insurance obtained through employment or purchased directly, as well as government programs like Medicaid?  1.Yes  2.No
4. During the last 12 months, was there a time when your child needed dental care but could not get at that time?  1.Yes (Please go to Question 5)  2.No ( You are done with the survey)
5. The last time your child could not get the dental care he/she needed, what was the main reason he/she couldn't get care? **(Please check one)**
- 1. Could not afford it
  - 2. No insurance
  - 3. Dentist did not accept Medicaid/Insurance
  - 4. Speak a different language
  - 5. Wait is too long in clinic/office
  - 6. Health of another family member
  - 7. Difficulty in getting appointment
  - 8. No way to get there
  - 9. Didn't know where to go
  - 10. No dentist available
  - 11. Not a serious enough problem
  - 12. Dentist hours are not convenient
  - 13. Don't like/believe in dentists
  - 14. Other reason

**Thank you for completing this survey. All information is confidential and will not have any names appearing anywhere in the collected data reports.**

Screener's Initials: **DH1**

Rec no:

Screen Date: \_\_\_\_\_

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

District: \_\_\_\_\_

# 3<sup>rd</sup> Grade Screening Form

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

Gender:

1. Male

2. Female

Age: \_\_\_\_\_

Untreated Cavities:

1. Yes

2. No

Caries Experience:

1. Yes

2. No

Sealants on Permanent Molars:

1. Yes

2. No

Treatment Urgency:

1. No Obvious Problem/Needs Routine Preventive Care

2. Needs Restorative Care

3. Urgent Care (Pain or Swelling Present)

*Please mark both.  
(check all that apply)*

Ethnicity:

1. Hispanic

2. Non-Hispanic

Race:

1. White

2. Black/African American

3. American Indian/Alaska native

4. Asian

5. Native Hawaiian/Pacific Islander

Comments:

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DENTAL SCREENING RESULTS

Child's Name: \_\_\_\_\_

Dear Parent or Guardian,

As part of the Smiles Across Kansas 2004 survey, your child received a dental screening at school. No x-rays were taken and the screening does not replace an in-office dental examination by your family dentist. The results of the screening indicate that:

- \_\_\_\_\_ Your child has no obvious dental problems but should continue to have routine examinations by your family dentist.
- \_\_\_\_\_ Your child has some teeth which should be evaluated by your family dentist. Your dentist will determine whether treatment is needed.
- \_\_\_\_\_ Your child has some teeth which appear to need immediate care. Contact your family dentist as soon as possible for a complete evaluation.

If you do not have a family dentist and you need help in obtaining dental care, you may contact

\_\_\_\_\_.

Comments:

\_\_\_\_\_  
\_\_\_\_\_



Date\_\_\_\_\_

Dear Parent/ Guardian:

Your child's school has been chosen to take part in the Kansas Department of Health and Education's **Smiles Across Kansas 2004** survey. The purpose of this survey is to gather information about the health of children's teeth in your county and across the state. This will allow us to create a plan to improve dental care for Kansas Children.

With your consent, a dental hygienist will check you child's teeth for tooth decay and other dental problems. The hygienist will wear gloves and use new disposable equipment for each child. Results of your child's screening will be added to those of other children, and your child will not be named in any Smiles Across Kansas 2004 report.

A healthy mouth is part of total health and wellness and makes a child more ready to learn. Your child will receive a toothbrush and a note to take home that tells you about the health of your child's teeth.

By letting your child take part in this dental assessment, you will help benefit all of Kansas's children.

**Please sign and complete the Parental Consent Form. This will allow your child to take part in the Smiles Across Kansas 2004 survey. Please return this form to your child's teacher tomorrow.**

Sincerely,

Janette Delinger, RDH  
Survey Coordinator



## Population Density Peer Groups and Regional Groups

For various demographic studies, it is useful to consider groups of counties with similar characteristics. “Peer groups” of counties, as used in this report, are defined as those with similar population density based on 2000 U.S. Census counts (see Table 3 and 4). “Frontier” counties are defined as those with fewer than 6.0 persons per square mile, “rural” counties as those with 6.0–19.9 persons per square mile, “densely-settled rural” counties as those with 20.0–39.9 persons per square mile, “semi-urban” counties as those with 40.0–149.9 persons per square mile, and “urban” counties as those with 150.0 or more persons per square mile. These definitions originated with the KDHE Office of Local and Rural Health, and should *not* be confused with the U.S. Census Bureau’s definitions of urban and rural areas.

The division of six regional groups of counties represents groupings made by the KDHE Office of Local and Rural Health based on the geographic location of each county. These groupings are used throughout this report and can be noted on the maps presented.



**TABLE 3 – POPULATION DENSITY PEER GROUPS**

<b>FRONTIER</b>	<b>RURAL</b>	<b>DENSELY- SETTLED RURAL</b>	<b>SEMI-URBAN</b>	<b>URBAN</b>
Barber	Anderson	Allen	Butler	Douglas
Chase	Brown	Atchison	Crawford	Johnson
Cheyenne	Chatauqua	Barton	Franklin	Sedgwick
Clark	Clay	Bourbon	Geary	Shawnee
Comanche	Cloud	Cherokee	Harvey	Wyandotte
Decatur	Coffey	Cowley	Leavenworth	
Edwards	Ellsworth	Dickinson	Lyon	
Elk	Grant	Doniphan	Miami	
Gove	Gray	Ellis	Montgomery	
Graham	Greenwood	Finney	Reno	
Greeley	Harper	Ford	Riley	
Hamilton	Haskell	Jefferson	Saline	
Hodgeman	Jackson	Labette		
Jewell	Kingman	McPherson		
Kearney	Linn	Neosho		
Kiowa	Marion	Osage		
Lane	Marshall	Pottawatomie		
Lincoln	Mitchell	Seward		
Logan	Morris	Sumner		
Meade	Nemaha			
Morton	Norton			
Ness	Ottawa			
Osborn	Pawnee			
Rawlins	Phillips			
Rush	Pratt			
Sheridan	Republic			
Smith	Rice			
Stanton	Rooks			
Trego	Russell			
Wallace	Scott			
Wichita	Sherman			
	Stafford			
	Stevens			
	Thomas			
	Wabaunsee			
	Washington			
	Wilson			
	Woodson			

**TABLE 4 – REGIONAL GROUPS**

<b>NORTH WEST</b>	<b>NORTH CENTRAL</b>	<b>NORTH EAST</b>	<b>SOUTH WEST</b>	<b>SOUTH CENTRAL</b>	<b>SOUTH EAST</b>
Cheyenne	Clay	Anderson	Clark	Barber	Allen
Decatur	Cloud	Atchison	Finney	Barton	Bourbon
Ellis	Dickinson	Brown	Ford	Butler	Chautauqua
Gove	Ellsworth	Chase	Grant	Comanche	Cherokee
Graham	Jewell	Coffey	Gray	Cowley	Crawford
Logan	Lincoln	Doniphan	Greeley	Edwards	Elk
Ness	Mitchell	Douglas	Hamilton	Harper	Greenwood
Norton	Osborne	Franklin	Haskell	Harvey	Labette
Phillips	Ottawa	Geary	Hodgeman	Kingman	Montgomery
Rawlins	Republic	Jackson	Kearny	Kiowa	Neosho
Rooks	Saline	Jefferson	Lane	Marion	Wilson
Rush	Smith	Johnson	Meade	McPherson	Woodson
Russell		Leavenworth	Morton	Pawnee	
Sheridan		Linn	Scott	Pratt	
Sherman		Lyon	Seward	Reno	
Thomas		Marshall	Stanton	Rice	
Trego		Miami	Stevens	Sedgwick	
Wallace		Morris	Wichita	Stafford	
		Nemaha		Sumner	
		Osage			
		Pottawatomie			
		Riley			
		Shawnee			
		Wabaunsee			
		Washington			
		Wyandotte			



## SCHOOLS INCLUDED IN THE SURVEY

Amanda Arnold, Manhattan  
Bethel Elementary, Kansas City  
Bonjour Elementary, Lenexa  
Caldwell Elementary, Caldwell  
Central Elementary, Lyons  
Chanute Elementary Charter School  
Custer Hill Elementary, Fort Riley  
Galva Elementary, Canton  
Garden Plain Elementary  
Garfield Elementary, Parsons  
Highland School, Columbus  
Garnett Elementary, Garnett  
Haddam Elementary, Haddam  
Inman Elementary, Inman  
Jackson Heights, Holton  
Katherine Carpenter Elementary, Overland Park  
Kathy Raymond Wineteer Elementary, Wichita  
Kingman Elementary, Kingman  
LaCygne Elementary, LaCygne  
Lincoln Central, Cherryvale  
Lincoln Elementary, Parsons  
Linwood Elementary, Linwood  
Madison Elementary, Madison  
Merriam Elementary, Shawnee Mission  
Midway Elementary, Denton  
Miller Elementary, Dodge City  
Oak Grove Elementary, Kansas City  
Oak Street Elementary, Goddard  
Oil Hill Elementary, El Dorado  
Oxford Elementary, Oxford  
Pawnee Elementary, Shawnee Mission  
Peabody Elementary, Peabody  
Phinney Elementary, Larned  
Pretty Prairie Elementary, Pretty Prairie  
R L Wright Elementary, Sedgwick  
Randall Elementary, Randall  
Roosevelt School, McPherson  
Severy Elementary, Severy  
South Central Elementary, Protection  
South Central Elementary, Protection  
St. Francis Elementary, St. Francis  
Stoney Point Elementary, Kansas City  
Tecumseh South Elementary, Tecumseh  
Towanda Elementary, Towanda  
Trego Grade School, WaKeeny  
Weir Elementary, Weir  
West Bourbon Elementary, Uniontown  
Wilroads Gardens Elementary, Dodge City  
Wilson Elementary, Wilson  
Woodrow Wilson Elementary, Manhattan







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