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Linda Alexander, EdD, Director of Graduate Studies

Adolescent Oral Health in Kentucky, 2007 National Survey of Childhood Health Analysis

CAPSTONE PROJECT PAPER

A paper submitted in partial fulfillment of the
requirements for the degree of
Master of Public Health in the
University of Kentucky College of Public Health

By
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Pikeville, Kentucky

Lexington, Kentucky
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Biographical Sketch

Kory Brinker, originally from Pikeville, Kentucky, received his Bachelor's degree in Agricultural Biotechnologies in 2012 from the University of Kentucky. In 2015, Kory graduated from the University of Kentucky with a Master's in Public Health. During his time with the College of Public Health, Kory worked as a graduate research assistant under Dr. Jamie Studts in the Department of Behavioral Science. As a graduate research assistant, Kory worked with the LuCaS group in the development of a lung cancer screening decision aid. During his graduate career, Kory also worked as a lab technician under Dr. Luke Moe in the Department of Plant and Soil Science. As a technician, Kory worked to identify genes responsible for antibiotic resistance in soil dwelling bacteria

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Abstract

Research indicates that children raised by their grandparents can have poorer health outcomes than their peers living in mother or father based households. There is, however, little research that indicates how childhood oral health is affected by grandparents raising grandchildren. This study investigated grandparent based family structures, and how this family structure affects oral health of Kentucky children. Using data from the 2007 National Survey of Children's Health, 113 Kentucky children were identified as living with a grandparent as a primary caregiver. Chi-Square analyses were utilized to assess the oral health status of these children, as well as what role grandparent based households play on oral health in Kentucky.

Introduction

Quality oral health is essential for maintaining good overall physical and mental health. Good oral health is required for normal oral functions like speech, eating, and swallowing, as well as the ability to generate facial expressions to show feelings and emotion.¹ Poor oral health, including tooth decay, gum disease, and oral cancers, can cause tremendous pain and disability². It can also diminish the overall health status of an individual, adversely affecting quality of life, illness, and chronic disease.

Poor oral health disproportionately affects Kentuckians, having some of the worst indicators, among all ages, nationally. Kentucky has the highest rate of toothlessness in the nation: 13% of Kentucky adults, ages 18 and older, are missing all of their teeth compared to 6% nationally.³ Overall, 26.6% of Kentuckians, of all ages, have lost 6 or more teeth, compared to 17% nationally.⁴ Kentucky adults rank 2nd in toothlessness among older populations, 65 years or older.⁵ In 2012, only 61% of Kentucky adults reported visiting a dental professional in the last 12 months, compared to 70% nationwide.⁶

Tooth decay is the most common chronic childhood disease nationally, and it can have dramatic effects on a child's physical, emotional, and educational development.⁷ Poor oral health dramatically affects Kentucky children. Despite Kentucky's high rates of water fluoridation, it still experiences high rates of untreated caries among its children.⁸ A 2012 state parent survey found that 1 in 3 Kentucky children have untreated tooth decay or cavities, making it the single most common chronic disease among Kentucky children, while more than one half of all Kentucky children have had dental caries in the past. The same study found that 1 in 6 parents reported being told that their child had decayed teeth or cavities.⁹

Childhood oral health can translate into adulthood, affecting health status throughout the life span. Outside of health implications, oral health can play a key role in a person's quality of life. Poor oral appearance may affect a person's physiological state, contributing to lower self-esteem or self-confidence, as well as their economic status.¹⁰ Those affected by poor oral health or toothlessness may experience difficulties finding employment or advancing in the workplace.¹¹ Oral health knowledge and hygienic practices, developed during adolescence, carries over into adulthood.¹² Access to care and regular dental visits are vital to maintain proper childhood oral health.¹³ Preventative adolescent dental care helps ensure teeth integrity into adulthood.

Environmental factors have been shown to contribute to and influence oral health outcomes.¹⁴ A growing number of social and physical environmental factors have been identified as childhood oral health determinants. Among other aspects, family composition has been identified as influencing children's oral health, both directly and

indirectly.¹⁵ One study demonstrated poorer oral health among children of single-parent and blended households.¹⁶ Caregiver status, including “both parents”, “single-parent”, “reconstituted households”, “skipped generation”, has significant association with children’s negative oral health outcomes.¹⁶

Although family composition is recognized as a factor contributing to adolescent oral health outcomes, little is known regarding the effects of skipped generation households on childhood oral health. Skipped generation families, as it applies to this context, implies a family structure in which grandparents raise children and parents are absent from the home.¹⁷ It is known that children under the care of grandparents have poorer health outcomes, but it is unclear whether skipped generation parental status affects adolescent oral health. This is of concern since skipped generation families are becoming a major component of the American family composition. Children living apart from either parent are more likely to be cared for by grandparents.¹⁸ In 2010, there were 2.7 million households where grandparents were responsible for raising a child.¹⁹ From 1991 to 2009, there was a 4% increase in the proportion of children under the care of grandparents.²⁰ The increase in grandparents raising grandchildren has been attributed to increased problems, (financial hardship, substance abuse, incarceration, divorce) among parents.²¹ Non-traditional family structures, grandparents raising grandchildren, are becoming more frequency in the state of Kentucky. In 2010, there were 54,000 (5.3% of all children) Kentucky children whose grandparents had primary responsibility for their care, a 1.1% increase from 2007.²² Compared to children from other family compositions, children from grandparents as primary caregivers

disproportionately suffer from physical and emotional health problems. These problems include asthma, depression, anxiety, and ADHD.²³

This study will examine the relation between Kentucky residence and its effect on oral health outcomes in children. Kentucky children have been shown to suffer adverse oral health conditions at unsettling rates, but how does the oral health status of Kentucky children compare nationally? Is Kentucky childhood oral health status comparable or worse than children from the rest of the nation? This study will also examine the impact of skipped generation family structures on the oral health outcomes of Kentucky children. National survey data, regarding children's health, will be used to analyze the effects of family composition on oral health, specifically addressing two questions: 1) Is the oral health status of these children worse than that of their one or two parent counterparts? 2) How does the oral health of children from skipped generation families within Kentucky compare to rest of the United States?

Methods

Data collection

To compare the oral health status among varying family structures, data specific to Kentucky was used from the 2007 National Survey of Children's Health. While more recent data has been collected, this version of the NSCH includes more comprehensive measures of oral health. The NSCH is a national survey that provides a broad range of information about children's health and well-being. Data was collected in a standardized manner, allowing national and state-to-state comparisons. The Maternal and Child Health Bureau of the U.S. department of Health and Human Services proved the primary funding for the 2007 NSCH.

The NSCH utilizes a cross-sectional observational research design via a telephone survey. Telephone numbers were called at random to identify households with one or more children under the age of 18. In each identified household, one child was randomly selected to be the subject of the interview.

There were 91,642 total surveys nationally, and between 1725-1932 surveys collected per state. The overall response rate for the 2007 NSCH was 46.7 percent. Additionally, among households in which eligible screening for the NSCH interview was completed, the interview completion rate was 66 percent.²⁴ Primary topics of this survey included; child and family demographics, early childhood specific information, health insurance status, coverage, and access, the use of healthcare services, child's physical and mental health status, as well as oral health status.

Measures

Family status was assessed through a series of questions used to identify who the interviewee was, in regards to the child, and what other adults lived within the household. First, the surveyor identified someone living in the household who was over the age of 17. The respondent was then asked about his/her relationship to the child. Response options included; mother or father (biological, step, foster, adoptive), Sister or brother (step, foster, half, adoptive), in-law relative of any type, aunt or uncle, grandparent, other family member, other non-relative, male or female guardian, don't know, refuse to answer.

Parental composition of the household was determined during the parental health section of the survey. The respondent was asked which parents lived in the household with the child. The respondent was asked whether the child had any other parents, or other people acting as their parent, living there. Response options included; mother or father (biological, step, foster, adoptive), Sister or brother (step, foster, half, adoptive), in-law relative of any type, aunt or uncle, grandparent, other family member, other non-relative, male or female guardian, don't know, refuse to answer.

Children who lived with grandparents as their primary care givers were identified through a combination of two separate variables, family structure and the respondent's relationship to the child in question (see Table 1a). Since the 2007 NSCH data does not specifically report which children were being raised by grandparents, these children were identified through the combination of two variables, family structure and respondent relationship to the child. Family structure was coded into four categories;

two parent (biological/adoptive), two parent (at least one step-parent), mother only, and all other family structures. Respondent relationship was coded into three distinct categories; mother, father, and all others. Households with grandparents as primary caregivers were assumed through the combination of those who were associated with both “all other family structures and “all other respondent relationship”. For this study, it was assumed that if the respondent wasn’t the child’s mother or father, and neither the father nor mother lived in the household, then the caregiver for that child was the child’s grandparent by default. It was assumed that it was more probable for a caregiver, who wasn’t a mother or father, to be grandparent than any other caregiver type.

Oral health of the child was assessed by five questions, one for each of following oral health outcomes; toothache, tooth decay/cavities, broken gums, bleeding gums, and received preventative dental visits. Respondent was asked, to the best of their knowledge, whether the child had experienced a toothache, decayed teeth or cavities, broken teeth, or bleeding gums. Each question was asked individually with the following answer choices; yes, no, don’t know, and refuse to respond. Using the four oral health measures (toothache, decay, bleeding gums, and broken teeth), an indicator of poor oral health was also created. This measure of oral health was used to identify those children who suffered one or more of all of the surveyed oral health measures.

Received preventive dental care was assessed through the utilization of services section of the survey. Respondents were asked how many times the child had seen a dentist for preventive dental care, such as check-ups and cleanings, in the past 12

months. Response answers included actually number of visits, didn't know, or refused to answer. Since the American Academy of Pediatric Dentistry (AAPD) recommends that children should see a dentist at least once every six months,²⁵ the individuals with two or more dental visits (per twelve months) were coded as having adequate dental visits while those with one or fewer were coded as inadequate dental visits.

Analytic Plan

This study examined the influence of family structure on the oral health of Kentucky children under the age of 18. Changes in the oral health status of the child, based upon family structure, were assessed by comparing the oral health outcomes of children from traditional families (at least one parent within the household) to non-traditional structures (skipped generation). All analyses were performed using SPSS version 22.0. The Institutional Review Board at the University of Kentucky waived review of study because of the use of publically available de-identified secondary data. To assess the influence associated with family structure on oral health outcomes, (reported toothache, decayed teeth/cavities, broken teeth, bleeding gums, composite oral health score), chi-Square tests of independence were utilized. To assess the influence associated with family structure on received preventive dental care, a chi-square test was also performed. Finally, chi-square test was used to explore the association between age, oral health, and family structure.

Results

There were a total of 1803 children who had Kentucky listed as their state of residence within the NSCH. The majority of children lived in a two-parent (biological or adoptive) household (63%) or a single mother, with no father of any type present, family structure (20%). Of the sampled children, 1681 (93%) belong to the referent group (mother or father as primary caregiver), while 113 children (6%) were identified as having a grandparent as a primary caregiver.

Of the sample children, 51% were male. Ages ranged from 0-17 and were categorized based on five year increments: 34% of children were ages 0-5 years, 33% ages 6-11 years, and 33% were between the ages of 12-17 years. Most surveyed children were white (84%) or black (8%) with a reported household income within 200-399% above the federal poverty line.

Childhood oral health status was assessed through four different oral health measures, reported toothaches, decay/cavities, bleeding gums, or broken teeth. In the twelve months preceding the survey, 4% of Kentucky children experienced a broken tooth, 19% had tooth decay or cavities, 3% suffered from bleeding gums, and 11% experienced a toothache. A composite variable, consisting of all four measures, was established to assess overall health status, with 26.5% of surveyed children experiencing one or more of the negative oral health measures. In addition, 51% of the surveyed Kentucky children saw a dentist never or only one time during the previous twelve months.

A chi-square test of independence was performed to examine the relationship between Kentucky residence and its effect on the oral health status of its children. The relationship between Kentucky vs National residence and children experiencing at least one negative oral health event (assessed through composite oral health score) was significant, ($\chi^2=4.639$, $df=1$, $P=.031$). Kentucky children, ages 0-17, were more likely to experience one or more of the oral health measures (broken teeth, decay/cavities, bleeding gums, or toothache) than children from other states (26.5% vs. 24.3% Kentucky vs National respectively). No significant difference was observed when each measure was individually assessed; Kentucky children were no more likely to experience any of the oral health conditions than children from all other states. Kentucky children were more likely to see a dentist fewer than twice a year, ($\chi^2=4.460$, $df=1$, $P=.035$): 51.0% of Kentucky children saw a dentist fewer than two times in twelve months, as compared to 48.5% for the rest of the United States.

Through bivariate analyses, family structure and its effect on childhood oral health, was assessed. Of the oral health measures tested, reported tooth decay and cavities of children from grandparent based households significantly differed than that of mother or father based caregiver homes ($\chi^2=4.856$; $df=1$; $P=.028$): 26.6% of children from grandparent based homes were reported as having tooth decay/cavities, compared to 18.1% of children from mother or father based caregiver homes suffered from tooth decay/cavities. Reported number of dental visits between grandparent based households and mother or father based caregiver homes also was significantly different ($\chi^2=6.883$; $df=1$; $P=.009$). In households with grandparents as primary

caregivers, 63.1% of these children reported seeing a dentist fewer than they recommended amount of one visit per six months. In mother or father based caregiver homes, only 50.2% of these children saw a dentist less than the recommended amount. No other difference, regarding oral health status, was observed between the two groups.

To further explore the association observed between family structure and reported tooth decay (Table 2a), the relationship between decay and family structure, as it relates to age, was assessed using stratified chi-square analysis. Results were statistically significant among children 0-5, but not in any of the older age groups ($\chi^2=12.854$, $df=1$, $P=.000$). Among children 0-5 years, (31%) of children, living with their grandparents as primary caregivers, experienced tooth decay, compared to 10% of children living in homes where a mother or father was the primary caregiver.

In addition, the relationship between inadequate dental visits and family structure, as it relates to age, was also assessed using stratified chi-square analysis. Results were statistically significant among children 12-17, but not in any of the younger age groups ($\chi^2=16.86$, $df=1$, $P=.000$). Among children 12-17 years, (67%) of children, living with their grandparents as primary caregivers, reported inadequate dental visits, compared to 38% of children living in homes where a mother or father was the primary caregiver.

Discussion

This study examined the effect of family structure on childhood oral health outcomes in Kentucky. It was hypothesized that children, under the care of their grandparents, would experience more adverse oral health outcomes than those children from more traditional family types where a mother or father was present. For the majority of the outcome measures assessed, children being raised by their grandparents were no more likely to experience these adverse oral conditions than children from family structures where a mother or father was present. No difference was observed between the grandparent based households and all other types regarding the incidence of broken teeth, bleeding gums, or toothaches. In addition, children from these households were no more likely to experience at least one of the outcomes (composite score) than children from mother or father based households.

A statistically significant difference was observed between family structure types and increased incidence of reported tooth decay or cavities. Children with grandparents as their primary caregivers were more likely to report experiencing tooth decay or cavities than children from other family structures. Similar results were observed regarding family structure and dental visits. A statistically significant difference was observed between family structure and decreased incidence of preventive dental visits. These results suggest that the children of grandparent based households are less likely to meet the ADA (American Dental Association) recommendation of one visit per six months.

These results, however, yielded exceptionally low effect sizes for both decay and dental visit variables (Phi and Cramer's $V=.053, .062$ respectively). Due to these low effect sizes, it is difficult to confidently say that tooth decay and inadequate preventive cares are observable issues among Kentucky children raised by their grandparents. It is more reasonable to assume that these differences were generated by their large sample size ($n=1803$).

To further explore how family structure may be associated with tooth decay and cavities, age was considered. Family structure and decay was examined by age levels within Kentucky. Age was divided into three separate, five year increments (0-5years, 6-11years, and 12-17 years). The results showed a significant difference among children 0-5, but not in either of the older age groups ($\chi^2=12.9, P<.05$): 31% of children, ages 0-5years, living with their grandparents suffered tooth decay, while just 9.5% of children from the same age group, but different family structures, suffered decay. These results may suggest that although decay among children 0-5years living with their grandparents is an issue, levels of decay between family structure types levels and becomes comparable in older ages. This may explain the initial association between family structure and tooth decay. The real relationship may only be limited to the youngest age population.

In addition, age and its relationships to inadequate dental visits and family structure, within Kentucky, were also assessed. Although no differences between family structures among the age group 0-5 existed, the percentages of reported inadequate

dental visits among family structures (ages 0-5), remained astoundingly high. (70%) of children, ages 0-5years, living with their grandparents reported inadequate dental visits, while (80%) of children from the same age group, but living with a mother or father, reported inadequate dental visits. Although these findings do not explain the differences observed between family structures regarding the age group 0-5years, these findings do indicate that a majority of Kentucky children do not see a dentist the recommended amount. Preventative dental care is essential for maintaining proper oral health, even among the “baby teeth” years. High rates of inadequate dental visits, across both family structure types, may be related to idea of these baby-teeth. Parents may be inclined to avoid dental care for their children if they believe that no adverse oral health outcomes are associated with poor dental care of baby teeth.

The general oral health of Kentucky children was also compared nationally. For all of the NSCH oral health measures, Kentucky children did not experience these adverse conditions at rates different than other children across the US. However, a significant difference regarding the oral health composite score (one or more adverse oral health condition reported) was reported between Kentucky children and children from other states. These findings suggest Kentucky children are more likely to experience at least one, or a combination of these conditions, at a rate greater than other American children. A difference between dental visits and state residence was also detected, suggesting children from Kentucky were also less likely to meet preventive dental recommendations. These differences did, however, carry low effect size values (Phi and Cramer’s V= .007, .007 respectively). Like family structure and its

effect on tooth decay and dental visits, the large sample size may be driving the state residence based differences among these oral health variables. An association between Kentucky residence and childhood oral health outcomes *may* exist, but with small effect sizes, it is difficult to declare with strong resolve.

Since it is well known that children under the care of their grandparents have poorer health outcomes, it is surprising that no difference was observed regarding family structure and oral health status. It would be assumed that children with grandparent primary care givers would suffer poorer oral health outcomes than those children from “traditional” family structures. The results from this study suggest that no such difference occurs, and that family structure does not play a significant role in oral health. The fact that no difference was observed may be explained by external, unforeseen forces. Oral health knowledge and hygiene is now highly emphasized in many schools. Since classroom based oral health education is disseminated equally to children, regardless of their family structure, oral health literacy among children may negate the differences otherwise experienced between family types. There are also several other existing oral health programs, like school-based sealants and free mobile clinics, that provide blanket dental protection for Kentucky children. These public programs may provide an oral health “safety net” that protects Kentucky children, regardless of their family structure. These external, unaccounted factors may explain why no difference is observed between children whose primary caregivers are their grandparents and those children with traditional caregivers. A difference may exist between the two groups, but they are masked by these seemingly protective forces.

Due to the limitations of this study, these results may be misleading, however. True differences may exist, but are masked by inadequate data collection. A major limitation facing this study exists in how family structure was determined. The assumptions used to generate grandparent based households (children who's respondent identified as someone other than their mother/father while living in a family type defined as "other") leaves out the possibility for those caregivers to actually be the child's aunt/uncle, older sibling, or other, potentially skewing results. Other studies that analyzed NSCH data, with regards to family structure, have also utilized similar methods when identifying those children who live with grandparent caregivers. An analysis of 2011-2012 NSCH data found that of those children who are not living with at least one parent, either biological or non-biological, approximately 75% of these children lived with their grandparents.^{26,27} Although justification for this assumption exists, it is important to acknowledge the potential for family structure misrepresentation. In addition to limitations associated with study design, it is important to note that income was not controlled for. Income, for both family structures, may exist as a confounding variable related to presence of adverse oral health conditions in children.

Other limitations associated with this study exist in our inability to predict and control for biases. Several factors could influence respondents to underreport adverse oral health conditions. Social desirability could be a strong influencing factor associated with oral health. Poor oral health in children can often be stigmatized in American culture.²⁸ These stigmas may include, but are not limited to, reduced financial and social standings, as well as fear of be perceived as a neglectful parent. Caregivers, in an

attempt to shield themselves from these perceived stigmas, may underreport the adverse oral health conditions experienced by their children. In addition, recall bias, if underreporting does exist within this data set, may be a contributing factor.

Respondents were asked questions based on a previous twelve month period, some caregivers, especially if they have multiple children, may find it difficult to recall accurate amounts of dental episodes experienced.

It is also important to note that this study may suffer from misclassification bias. From this study, it is difficult to say that the differences observed were actually caused by the grandparent family structure. Since children who live with their grandparents can often come from non-ideal household environments and living conditions, it is possible that these grandparents “inherited” these *existing* oral health problems. It is possible that these oral health conditions arose before the child was ever placed in the care of the grandparent, thus attributing false responsibility on that grandparent.

Poor oral health among Kentucky’s children is well documented. With this in mind, it is interesting that no significant differences were observed between the oral health status of Kentucky children and those children from all other states. This may suggest that although Kentucky children still suffer, oral health still remains a significant problem nationally. Oral health as a national issue may explain why no difference is observed between state residency and oral health outcomes. In addition, since Kentucky adults are disproportionately affected by poor oral health outcomes, it is not unreasonable to assume Kentucky children would experience adverse oral health

conditions at higher rates than children from other states. As this study suggests, no such difference exists. What causes this gap between the oral health status of Kentucky children and adults? Why are adverse oral health conditions more prominent in adults, but not in children? Several factors may contribute to this phenomenon. Adulthood comes with increased accessibility to substances that are known to contribute to poor oral health. For example, tobacco consumption among Kentuckians remains astonishingly high. In 2010, over 26% of Kentuckians were cigarette smokers, compared to an 18% national prevalence rate.²⁹ Smoking rates, in addition to other factors (poor diet, alcohol consumption, substance abuse), may help explain why Kentucky adults experience adverse oral health conditions at greater rates than Kentucky children. The differences observed between Kentucky adults and adults from other states may also be related to cultural differences that exist within the state. It is possible that these cultural norms within Kentucky have adverse effects on oral health outcomes.

These results indicate that oral health remains not only a Kentucky level issue, but a national priority. This study is significant in that the results generated suggest that family structure may not critically influence oral health status. Although previous studies have shown that children raised by their grandparents tend to suffer worse health outcomes, this study has demonstrated that, at least in Kentucky, these children are no more likely to experience adverse oral health than their peers. Public health effort should continue working towards improving the oral health status of all Kentucky children. Grandparent based households, as it appears, is not the target population to promote increased oral health.

Further research, with more current data, should be conducted to verify the findings of this study. No association between grandparents raising grandchildren and oral health of the grandchild may exist in Kentucky in 2007, but this may not be the case in other states presently. It is this author's suggestion that further research utilize direct questions when assessing family structure. Survey instruments should include questions in which primary caregiver status can clearly be assessed. Further research must also assess the validity of the oral health measures utilized. Reliability of these measures must be confirmed in order to ensure the questions used are appropriate tools to determine oral health status. In addition, more work should to be done to better understand the oral health gap that exists between Kentucky children and adults. What seemingly protective factors contribute to nationally comparable oral health measures in Kentucky children? What factors facing Kentucky adults contributes to such poor rates of oral health?

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TABLE 1a-Primary Caregiver Status of Kentucky Children: National Survey of Children's Health, 2007

Family Structure	
Two-Parent (biological/adoptive)	1,170 (61.6%)
Two-Parent (at least one step-parent)	154 (9.3%)
Mother Only (no father of any type present)	300 (19.8%)
All other family structures	170 (9.3%)
Respondent Relationship	
Mother (biological, step, foster, adoptive)	1298 (72.0%)
Father (biological, step, foster, adoptive)	342 (19.0%)
All Others	163 (9.0%)
Primary Caregiver Status	
Mother/Father Caregiver	1681 (93.2%)
Grandparent Caregiver	113 (6.3%)

TABLE 1b-Baseline Description of Kentucky Children (n=1803): National Survey of Children’s Health, 2007

Demographics	
Gender	
Male	945 (51.3%)
Female	856 (48.7%)
Age	
0-5 years	518 (33.9%)
6-11 years	557 (32.5%)
12-17 years	728 (33.7%)
Race/Ethnicity	
White, non-Hispanic	1,481 (83.6%)
Black, non-Hispanic	110 (7.9%)
Hispanic	84 (3.0%)
Others, non-Hispanic	103 (5.5%)
Household Income (above/below Federal Poverty Line FPL)	
0-99% FPL	297 (23.0%)
100-199% FPL	340 (22.3%)
200-399% FPL	611 (32.7%)
400% FPL or greater	555 (22.0%)

TABLE 1c-Oral Health Status of Kentucky Children: National Survey of Children's Health, 2007.

Kentucky Oral Health Measures	%
Broken Teeth	3.9%
Decay or cavities	18.7%
Bleeding Gums	3.2%
Toothache	10.9%
Composite Oral Health Score (One or more of the above measures)	26.5%
Inadequate Dental Visits (One or fewer dental visits in past 12 months)	50.8%

TABLE 2a-Oral Health Status of KY Children vs All Other States: National Survey of Children’s Health, 2007

Oral Health Outcome	State Residence		X ² statistic	p value
	Children from all other states besides Kentucky (n=89839)	Only Kentucky Children (n=1803)		
Broken Teeth	1646(3.1%)	67(3.9%)	4.095	.129
Decay/Cavities	1393(17.6%)	320(18.7%)	1.745	.418
Bleeding Gums	1658(2.8%)	5.4(3.2%)	1.018	.601
Toothache	1521(2.0%)	187(18.7%)	4.222	.121
Composite Oral Health Score (one or more adverse oral health measure experienced)	1250(24.3%)	451(26.5%)	4.639	.031
Dental Visits (one or fewer visits in past 12 months)	881(48.5%)	916(51.0%)	4.460	.035

TABLE 2b-Family Structure as an Indicator of Oral Health in Children: National Survey of Children's Health, 2007

	Family Structure			
	All Family Types (mother/father) (n=1681)	Grandparent as Primary Caregiver (n=113)		
Oral Health Outcome	N (%)	N (%)	X ²	p value
Broken Teeth	61(3.8%)	5(4.6%)	.164	.686
Decay/Cavities	289(18.1%)	29(26.6%)	4.856	.028
Bleeding Gums	50(3.1%)	3(2.8%)	.042	.837
Toothache	173(10.9%)	11(10.2%)	.049	.825
Composite Oral Health Score (one or more oral health measure experienced)	413(26.0%)	35(32.7%)	2.292	.130
Inadequate Dental Visits (one or fewer visits in past 12 months)	842(50.2%)	70(63.1%)	6.884	.009

TABLE 2c-Tooth Decay and Family Structure by Age: National Survey of Children's Health, 2007

	Family Structure and Reported Tooth Decay among Kentucky Children			
	Children living with grandparents, suffering from tooth decay	Children living with mother/father, suffering from tooth decay		
Age	(%)	(%)	X ²	p value
0-5 years	(31%)	(10%)	12.854	.000
6-11 years	(27%)	(25%)	.158	.691
12-17 years	(24%)	(19%)	.829	.362

Table 2d-Inadequent Dental Visits and Family Structure by Age: National Survey of Children’s Health, 2007

	Family Structure and Inadequate Dental Visits among Kentucky Children			
	Children living with grandparents, reporting inadequate dental visits	Children living with mother/father, reporting inadequate dental visits		
Age	(%)	(%)	X²	p value
0-5 years	(70%)	(80%)	2.116	.146
6-11 years	(46%)	(38%)	.585	.444
12-17 years	(67%)	(38%)	16.86	.000