2005 Smile Survey Summary

King County and Seattle Surveys

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Public Health
Seattle & King County
HEALTHY PEOPLE. HEALTHY COMMUNITIES.

Introduction

Dental disease in children is a common, chronic problem that impacts their ability to eat, sleep and attend to learning, according to the 2000 Surgeon General's Report on Oral Health. The report highlights that dental problems are more prevalent in certain racial/ethnic and socio-economic groups.

In 2005, as part of an oral health assessment conducted every five years, the Washington State Department of Health conducted a statewide oral health Smile Survey of approximately 8,900 preschool, elementary school, and Native American children. About half of Washington preschool and elementary school children were found to have cavities and/or fillings. Additionally, the state survey showed that children from low income families, children of color and children who do not speak English are more likely to experience dental disease.

In addition to the statewide report, the 2005 Smile Survey was also conducted locally. This report details oral health findings from the King County and Seattle 2005 Smile Survey. Overall, King County children experience less dental disease compared to the children in the rest of the state. However, as was found in the statewide report, dental disease continues to disproportionally affect children from low-income families, children of color and children whose first language is not English.

The oral health information from these surveys is intended to help communities understand the impact that dental disease has on children, and provide information that can be used to establish programs and create systems to address identified problems.

Key Findings – King County and Seattle Surveys

- Children eligible for Free/Reduced Lunch program (a proxy for low-income status) are at least twice as likely to have untreated dental disease as children not eligible for the program.
- Children of color are at least twice as likely to have untreated dental disease.
- Preschool children of color are at higher risk for Early Childhood Caries (ECC).
- Third grade students in schools with school-based dental sealant programs in King County and Seattle have higher rates of dental sealants.
- King County and Seattle children have significantly higher rates of no dental caries experience than children in other areas of the state. Water fluoridation in King County and Seattle likely contributes to the lower prevalence of dental disease.

Methods

In 1996, the Washington State Department of Health (DOH) conducted its first statewide survey to help monitor the trends of dental disease in children. In 2000, as part of the second statewide survey, Public Health –Seattle & King County (Public Health) conducted its first random sample survey of 2nd and 3rd grade students throughout King County. In 2005, Public Health participated in the third Smile Survey, conducting a county wide random survey of 2nd and 3rd grade students, along with a random survey specific to Seattle students. In addition to the elementary school surveys in 2005, DOH also surveyed children in Head Start and Early

Childhood and Education Assistance Program (ECEAP). Public Health conducted a random sample of preschool sites throughout the county.

Sites for the King County and Seattle samples were selected using methods used for the statewide Smile Survey. The following excerpt is taken from the Methods section in the state Smile Survey report:

> *An electronic data file of all elementary schools in Washington was obtained from the Office of Superintendent of Public Instruction (OSPI). The data file, which was for the 2003-2004 school year, contained the following information for each school – district, county, total enrollment, 2nd and 3rd grade enrollment, and percent of children participating in the free or reduced lunch program. All schools with at least 25 children in second and/or third grade were included in the sampling frame (1,059 schools and 142,504 students) Implicit stratification by percent of children eligible for the free or reduced price lunch (FRL) program was used to select a probability sample of 67 schools. Selecting a sample using implicit stratification assures that the sample is representative of the state's schools in terms of free/reduced lunch participation. If a school refused to participate, a replacement school within the same sampling strata was randomly selected. If the sample school plus two replacement schools refused to participate, no data were collected in that sampling stratum. Of the 67 stratums, data is available for 66.*
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> *Data entry and analysis was completed using EPI INFO Version 3.2.2. EPI INFO is a public access software program developed and supported by the Centers for Disease Control and Prevention. The data were adjusted for non-response within each school. For the non-responsive sampling weight, the number of children enrolled in each school was divided by the number of children screened. Unless otherwise noted, all of the data presented in this report have been adjusted for non-response (EPI INFO Complex Sampling, weight variable = weight, primary sampling unit = school name.)*

The elementary school sample of the King County survey included 19 schools with 1758 children participating, for a response rate of 80%. A random sample specific to Seattle was also selected which included 13 schools with 1022 children participating for a response rate of 77%. The Seattle sample included some schools also drawn for the King County sample.

Sites had the option of participating with positive consent, or passive consent. Positive consent is where parents sign their children up to participate, whereas passive consent is when children are screened unless parents indicate otherwise. Sites that were also participating in a dental sealant program by Public Health used positive consent for 2nd grade students and passive consent for 3rd grade students. The same survey information and criteria were used regardless of the type of consent. Calibrated dental professionals using gloves, a penlight and a dental mirror conducted screenings on site. This type of dental screening underreports dental disease.

Demographic variables included gender, race/ethnicity, language spoken at home, and for elementary students, eligibility for free and/or reduced price lunch program (FRL) as a proxy for overall socioeconomic status. Oral health indicators included untreated caries (decay), treated caries, rampant caries (decay on seven or more teeth), dental sealants and treatment urgency. Data was entered and analyzed using the EPI-INFO program from the Centers for Disease Control and Prevention (CDC). Detailed information on methodology is available in the state

report, Smile Survey 2005: The Oral Health of Washington's Children, on the web at http://www.doh.wa.gov/cfh/Oral_Health/index.htm.

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General Results

King County and Seattle children are significantly more likely to have lower rates of caries experience when compared to children in the state outside of King County. Caries experience is defined as having treated and/or untreated decay. King County and Seattle children also have significantly lower rates of treated decay (fillings) when compared to children in the rest of the state. The rates of untreated disease, rampant decay (caries experience on seven or more teeth), dental sealants (a preventive treatment to protect teeth from decay), and urgent treatment needs (abscesses and/or pain) do not show any statistically significant differences among the state, King County and Seattle groups. *(See Table One: Comparison of children's oral health -- Washington State, King County and Seattle)* Complete data tables are listed in the Appendix to this report.

Table One: Comparison of 2nd and 3rd grade Children's Oral Health -- Washington State, King County and Seattle

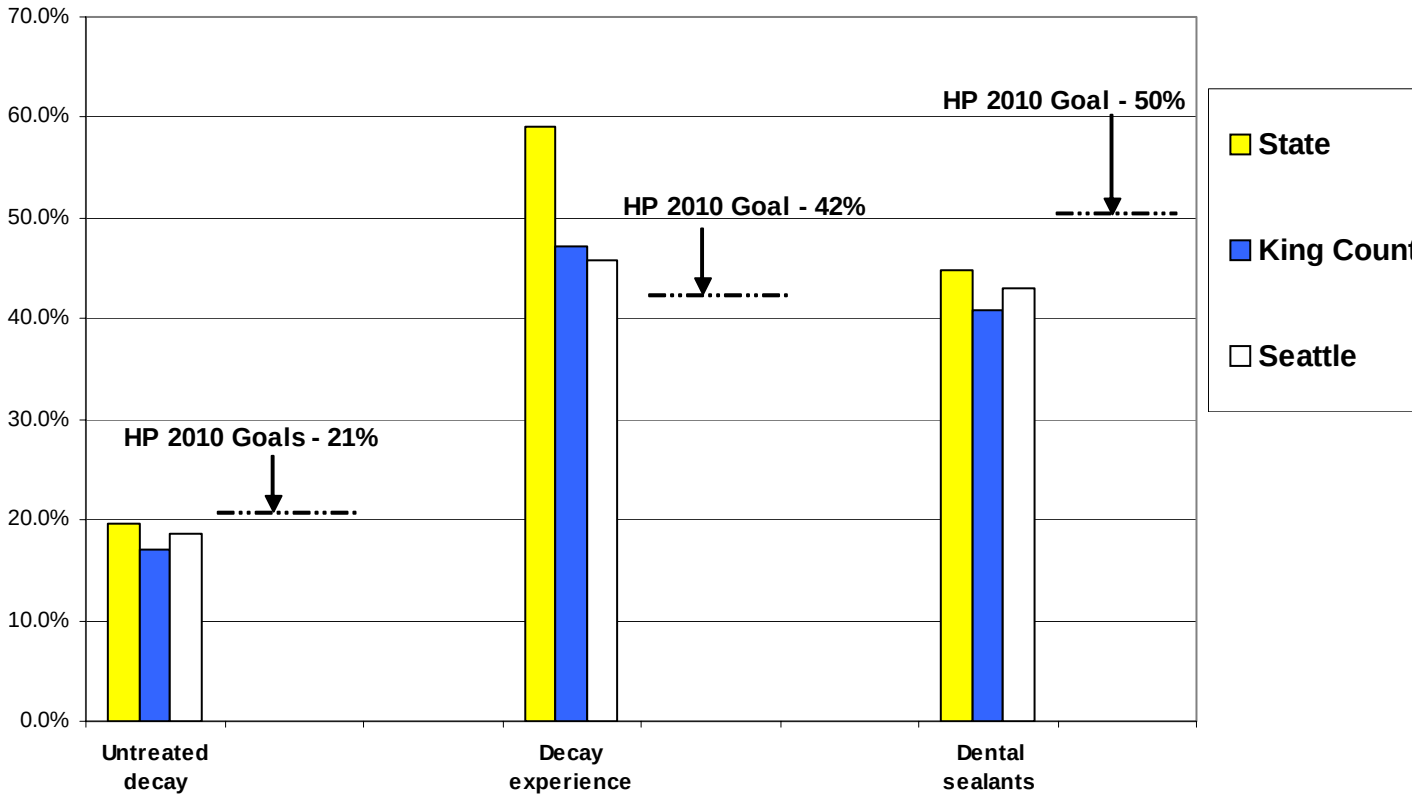
Oral Health Measure	WA State Outside of King County (n=5531)	King County (n= 1758)	Seattle (n=1022)
% caries free (no treated or untreated)	40.1%	52.9%	54.1%
% with caries experience	59.5%	47.1%	45.9%
% with treated decay	51.7%	38.6%	36.3%
% with untreated decay	19.5%	17.0%	18.6%
% with rampant decay	20.5%	18.8%	12.9%
% with dental sealants	46.0%	40.9%	43.1%
% needing urgent treatment	2.9%	3.7%	2.1%

Three specific oral health goals from the national Healthy People 2010 objectives are:

21-1 *Reducing* the proportion of children who have dental caries experience to 42%
21-2 *Reducing* the prevalence of untreated tooth decay to 21%
21-8 *Increasing* the proportion of children who have dental sealants to 50%

2005 Smile Survey results indicate that the second goal has been met in the state, King County and Seattle samples. The percentage of children with untreated tooth decay is lower in all three samples than the Healthy People 2010 goal. The Healthy People 2010 goals of reducing the proportion of children who have experienced decay and increasing the percentage of children with dental sealants were not met by any of the three samples. *(See Graph One: Smile Survey 2005 and Healthy People 2010 Goals.)*

Graph One: Smile Survey 2005 and Healthy People 2010 Goals



Disproportionate Burden of Disease

The survey recorded information on race/ethnicity, language spoken at home and participation in Free/Reduced Lunch programs. Findings from the survey show that children from low income families, children from families of color, and immigrant/refugee families are significantly more likely to suffer from dental disease.

Poverty

Participation in the Free and/or Reduced Lunch program (FRL) is often used as a proxy for low income. Based on this measure, results indicate that King County and Seattle children from low-income families have higher rates of dental disease. *(See Table Two: Oral Health Measures Stratified by Free/Reduced Lunch Eligibility.)*

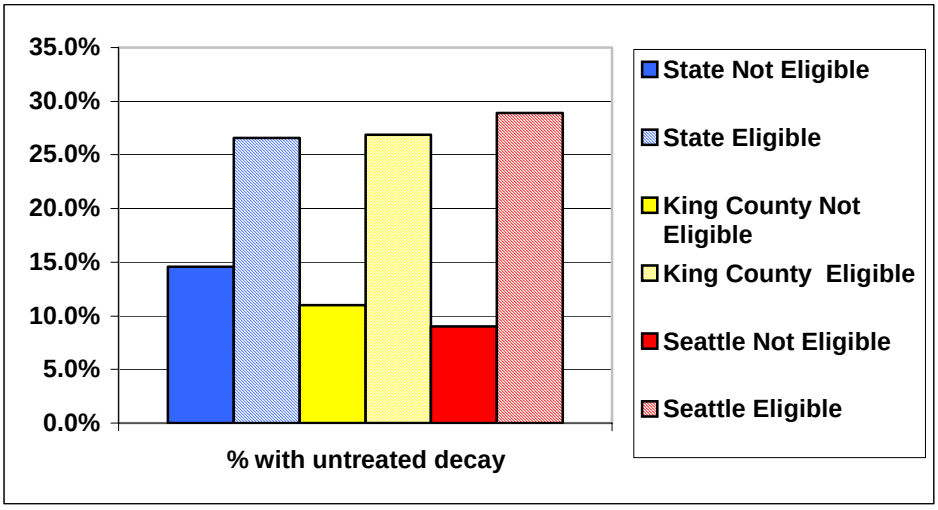
Table Two: Oral Health Measures Stratified by Free/Reduced Lunch Eligibility

Variable	WA State*	State	King County	King County	Seattle	Seattle
	Not Eligible (n=4118)	Eligible (n=2538)	Not Eligible (N=1150)	Eligible (n=597)	Not Eligible (N=587)	Eligible (n=433)
% with caries experience	50.8%	70.5%	37.3%	64.4%	30.9%	63.3%
% with untreated decay	14.6%	26.6%	11.0%	26.9%	9.6%	28.9%
% with rampant caries	15.8%	29.1%	13.2%	28.8%	9.3%	17.2%

(* State sample includes King County and Seattle.)

Students eligible for FRL programs in King County are at least twice as likely, and in Seattle, three times as likely, to have untreated decay when compared to students not eligible for FRL programs within the same samples. *(See Graph Two: Eligibility for Free Lunch Program and Untreated Decay.)*

Graph Two: Eligibility for Free Lunch Program and Untreated Decay



Note on data collection: FRL information was obtained through school districts' nutritional services departments. For the data collected statewide, information on FRL participation was missing for eight percent of the students, as some school districts chose not to share the information. For the King County and Seattle samples, FRL information was missing for less than one percent of the students.

Race/Ethnicity

In all three samples, dental disease impacts children of color at a significantly higher rate. For the categories of caries experience and untreated disease, white children show statistically

significant lower rates. *(See Table Three: Comparison of Rates of Caries Experience by Race/Ethnicity.)* The King County and Seattle samples were not statistically significantly different from each other

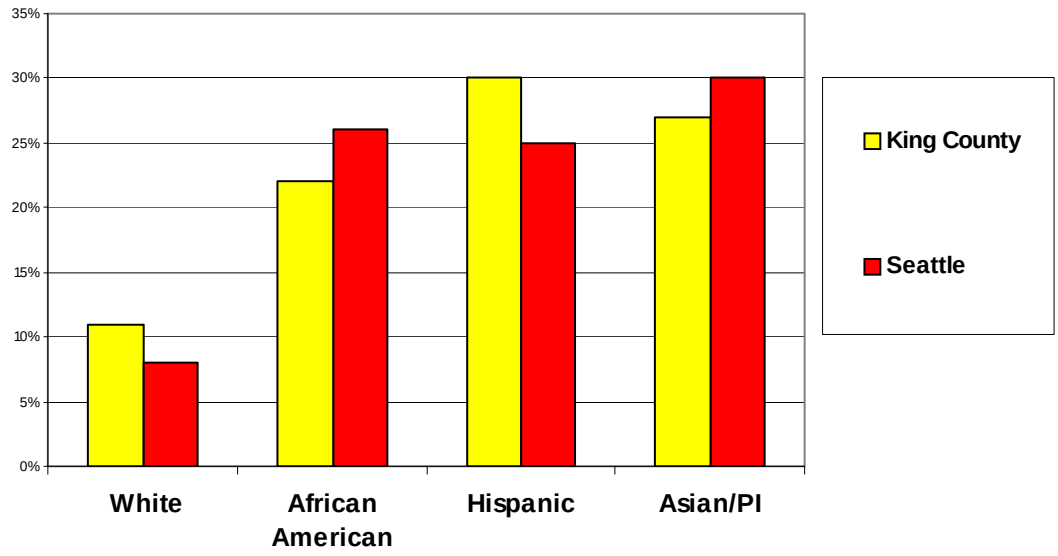
Table Three: Comparison of Rates of Caries Experience by Race/Ethnicity

Area	White	African American	Hispanic	Asian/PI	Native American
WA State	55%	60%	72%	68%	77%*
King County	37%	55%	58%	67%	*
Seattle	29%	55%	57%	66%	*

(*Note on data collection: The state survey included Native American students that were surveyed through the Indian Health Services (IHS) and tribal dental clinics. The King County and Seattle samples do not include information from surveys completed by IHS or tribal dental clinics. Rates for Native Americans in King County or Seattle are not reported because, with relatively small numbers of Native Americans in these samples, the confidentiality promised to survey respondents could be compromised and the numbers are not large enough to report reliable rates.)

The most statistically significant differences are shown in rates of untreated decay, with King County children of color twice as likely and Seattle children of color are three times as likely to have the condition. *(See Graph Three: Comparison of Untreated Decay Rates by Race.)*

Graph Three: Comparison of Untreated Decay Rates By Race



Language

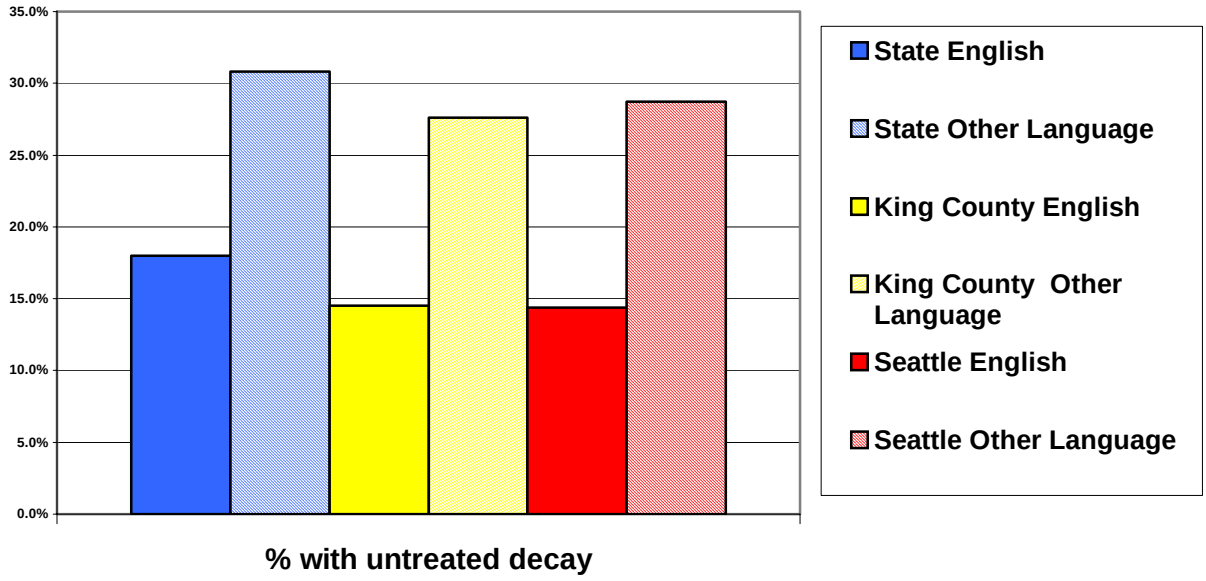
All three samples (state, King County, and Seattle) indicate a difference in caries experience between students with English as a primary language and those indicating another language spoken at home. There are no statistically significant differences among the three survey samples. *(See Table Four: Oral Health Measures Stratified by Language for 2nd and 3rd Grade Students.)*

Table Four: Oral Health Measures Stratified by Language for 2nd and 3rd Grade Students

Variable	WA State	WA State	King County	King County	Seattle	Seattle
	English (n=6290)	Other Language (n=986)	English (n=1441)	Other Language (n=314)	English (n=752)	Other Language (n=269)
% with caries experience	56.7%	73.6%	42.7%	65.8%	37.6%	66.0%
% with untreated decay	18.0%	30.8%	14.5%	27.6%	14.4%	28.7%

Students whose primary language is not English are more likely to have caries experience. Of more immediate concern, they are also more likely to have untreated decay.

Graph Four: Untreated decay by primary language



Students were asked what language was spoken at home to determine language. The data mixes both students newly arrived in the United States and those who have been living in the country for a longer period. Students speaking languages other than English may face additional barriers in getting care. Primary languages spoken may also reflect cultural beliefs that affect the

prevalence of dental disease. Examining these aspects of primary languages spoken are beyond the scope of this survey.

Protective Measures - Fluoridation and Dental Sealants

Water fluoridation and dental sealants are proven strategies to prevent the development of caries. Water fluoridation is a likely contributing factor for why over 10% more children in King County and Seattle have no decay experience compared to the rest of the state. *(See Table Five: Children Without Caries.)* Water fluoridation began in Seattle in the 1970's; about 75% of the population in King County currently enjoys the benefits of water fluoridation. Statewide, about 50% of the population has access to fluoridated water systems.

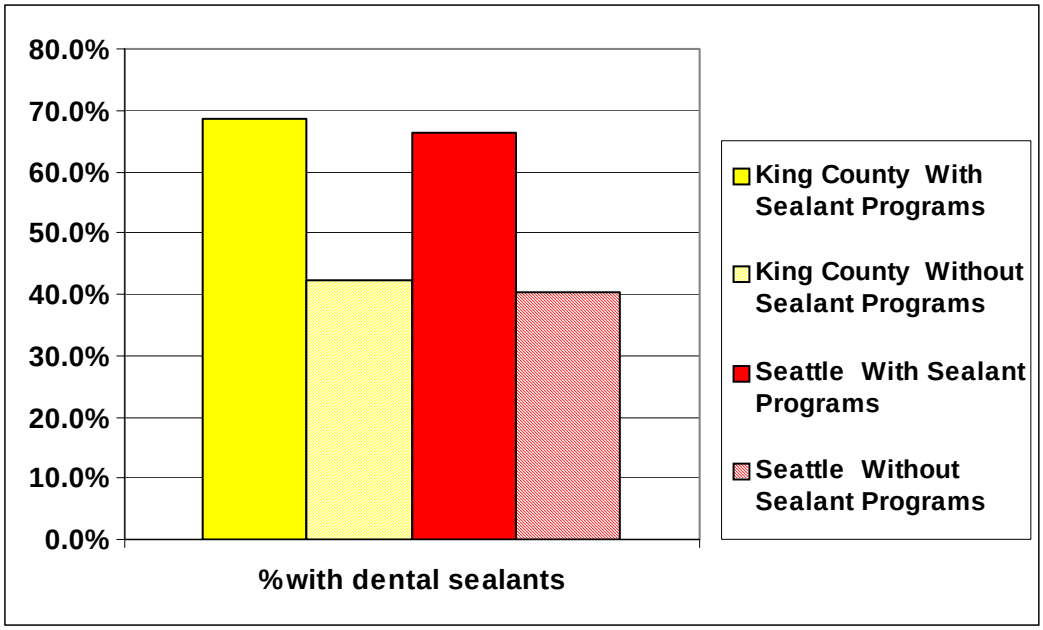
Table Five: Children Without Caries

Oral Health Measure	WA State (n=5531)	King County (n= 1758)	Seattle (n=1022)
% caries free (no treated or untreated)	40.1%	52.9%	54.1%

Dental sealants are another evidence-based strategy to prevent dental decay. Dental sealants are protective coatings applied to the grooves and pits of permanent molars; these tooth areas have been shown to be the most vulnerable to decay. There is no statistically significant difference among the state (46.0%), King County (40.9%), and Seattle (43.1%) sample groups; all fall below the Healthy People 2010 goal of 50% of students with dental sealants. *(See Table One.)*

School-based dental sealants programs began in the Seattle School District in 1986. Currently, 32 Seattle elementary schools and 26 King County elementary schools have school-based dental sealants programs provided by Public Health – Seattle & King County. 3rd Grade students from schools with dental sealant programs are significantly more likely to have dental sealants by third grade. (*See Graph Five: Relationship of Student Dental Programs to Sealant Use.)*

Graph Five: Relationship of Student Dental Sealant Programs to Sealant Use



Comparison – 2000 & 2005 Smile Survey

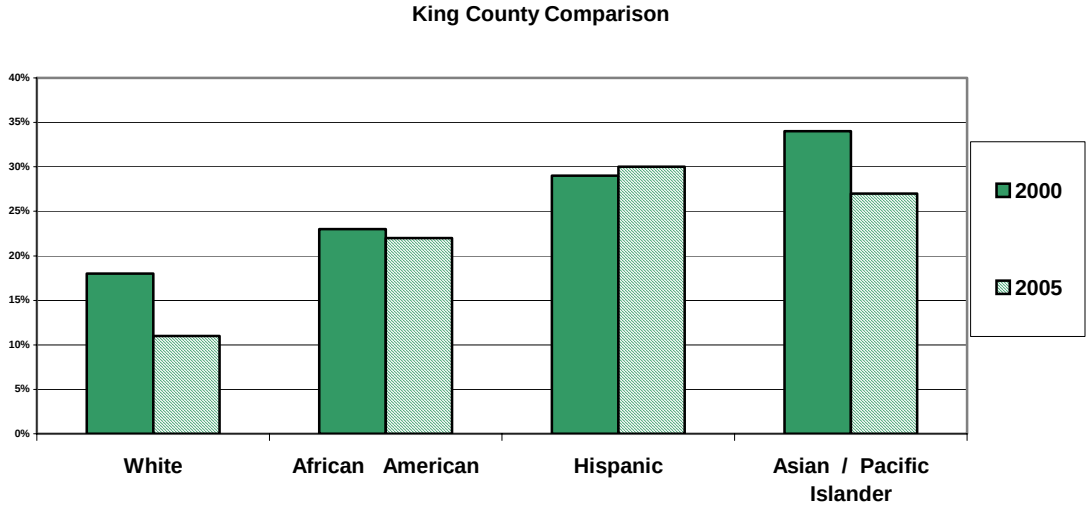
Comparisons between the 2000 and 2005 Smile Surveys should be done cautiously since the types of surveys and sampling strategies varied. In both the state and King County surveys, there has been an increase in rampant decay (cavities experience on seven or more teeth), which includes both treated and untreated cavities. It is believed that many tooth colored fillings, which have recently have become more common, went undetected in the 2000 survey. Consequently, the increase in rampant decay from 2000 to 2005 may represent the better detection of tooth colored filling materials. From 2000 to 2005, there is no statistically significant difference in the King County rates of untreated disease. While the rates of dental sealants declined slightly in the state sample, there is no statistically significant difference in the dental sealant rates in the King County surveys from 2000 to 2005. *(See Table Six: Comparison of 2005 and 2000 Smile Surveys, Washington State and King County.)*

Table Six: Comparison of 2005 and 2000 Smile Surveys, Washington state and King County

Oral Health Measure	WA State 2000 (n=2699)	WA State 2005 (n=7289)	King County 2000 (n= 1337)	King County 2005 (n= 1758)
% caries free	44%	41%	56%	53%
% with caries experience	56%	59%	44%	47%
% with untreated decay	21%	20%	15%	17%
% with rampant decay	15%	21%	8%	19%
% with dental sealants	47%	45%	44%	41%

In King County, disparities in oral health continue to exist, with children of color having statistically significant higher rates of dental disease. White and Asian/Pacific Islander groups are the only groups that statistically showed a decrease in rates of untreated decay.

Graph Six: Untreated Decay by Race/Ethnicity in King County, 2000 and 2005



Preschool Survey – Head Start/ECEAP Programs

The preschool portion of the survey included 18 Head Start/ECEAP sites in King County with 605 children participating for a response rate of 78%. The survey included seven sites from Seattle Head Start/ECEAP program and 11 sites from the Puget Sound Educational School District program. Sites were randomly selected through the state survey method. All screenings were conducted by calibrated dental professionals who had attended a survey training session sponsored by DOH. Data analysis was done using the EPI-INFO program produced by the CDC.

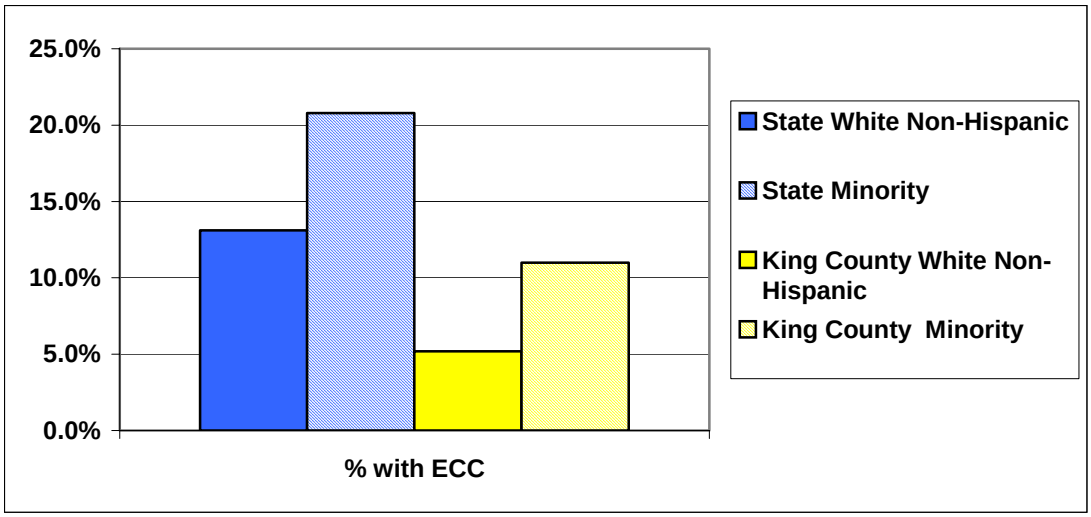
Preschool children in King County have significantly lower rates of dental disease when compared to preschool children in other areas of the state. *(See Table Seven: Comparison of Preschool Smile Survey Findings, Washington State and King County.)* The Healthy People 2010 goals for children from two to four years of age are 11% for caries experience and 9% for untreated decay. As the age range in the King County sample was three to five years old children, direct comparisons should be made with caution.

Table Seven: Comparison of Preschool Smile Survey Findings, Washington State and King County

Variables	WA State (n=1172)	King County (n=605)
% with caries experience	45.1%	26.6%
% with untreated decay	25.0%	14.2%
% with rampant decay	15.3%	6.1%
% with Early Childhood Caries (ECC)	17.7%	9.6%

Early Childhood Caries (ECC) is characterized by dental decay on maxillary front teeth. It is associated with a virulent form of decay-causing bacteria and has been linked to particular infant feeding practices, especially bottle feeding during sleep time. In the both the state and King County samples, there are significant differences between white non-Hispanic preschool children and preschool children from minority groups in the prevalence of ECC.

Graph Seven: Comparison of ECC Prevalence Between White and Minority Children



Conclusions

Dental decay is a preventable disease that affects children's ability to eat, sleep and attend to learning. The findings of the 2005 Smile Survey for King County and Seattle indicate that children continue to be negatively impacted by dental disease, and also suggest avenues to preventing disease and improving the health of this vulnerable population.

Key findings from the 2005 King County and Seattle Smile Survey include:

1. Children from low-income families are at least twice as likely to have untreated dental disease.

    Children eligible in Free/Reduced Lunch programs in the King County sample are twice as likely to have untreated dental disease and children from low-income families in the Seattle sample are three times as likely to have untreated dental disease compared to children not eligible for Free/Reduced Lunch programs. Eligibility in Free/Reduced Lunch programs is used as a proxy for income status in surveying school children.

    The King County region has a range of dental programs and services offered to low-income families, including private dental offices, community dental clinics, Public Health dental clinics, the University of Washington Dental School and other dental programs. Despite these opportunities for care, the 2000 and 2005 Smile Survey show that children from low-income families continue to have elevated rates of dental disease compared to the general population. This suggests that barriers to child dental care extend beyond finding a provider.

2. Children of color are at least twice as likely to have untreated dental disease.

    Children of color in King County are twice as likely to have untreated dental disease and children of color in Seattle are three times as likely to have untreated dental disease. The disproportionate burden of dental disease along racial lines continues to be a significant problem, as comparison between the 2000 and 2005 King County surveys indicates no change in this pattern.

3. Preschool children of color are at significantly higher risk for Early Childhood Caries (ECC).

Usually associated with infant feeding practices, ECC refers to the decay of the top front teeth. Understanding cultural differences in feeding infants and toddlers could help providers working with families address practices that increase the incidence of ECC.

4. School-based dental sealant programs in King County and Seattle significantly increases the chances that 3rd Graders will have dental sealants.

Since 1986, Public Health has offered the school-based dental sealant program to targeted Seattle schools with children at high risk for dental disease. The program expanded to include targeted King County schools in 1994. Data from both the 2000 survey and the 2005 survey indicate that children participating in school-based sealant programs are more likely to have the protective benefits of dental sealants.

5. King County and Seattle children have lower rates of dental disease when compared to children in other areas of the state.

In King County, approximately 75% of the population benefit from access to fluoridated water systems. Seattle's water supply has been fluoridated since the 1970's. In comparison, it is estimated that about 50% of the state population benefits from access to fluoridated water systems. Fluoridation of the local water supply is a likely contributing factor to the lower rate of dental disease recorded in King County and Seattle children when compared to other areas of the state.