

# **Snohomish County SMILE Survey, 2005**

**June, 2006**



# **Acknowledgements**

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Snohomish School District

Stanwood School District

HeadStart/ECEAP Programs of Snohomish County

## **Key Findings for the Snohomish County 2005 Smile Survey**

- Tooth decay in Snohomish County children exceeds the Healthy People 2010 health objectives for the Nation for children ages 2-4 and 6-8 years.
- Children that are low income are more likely to have untreated dental disease.
- Children that are low income may have improved access to dental treatment from 2000 to 2005.
- Children with more rampant disease are less likely to receive or complete dental treatment
- The use of preventive dental sealants appears to be declining in Snohomish County.
- Snohomish County children that were Non-White/Hispanic or that speak a language other than English have more untreated dental disease and more rampant disease than those that were white/non-Hispanic and speak English.
- Snohomish County has more children that are caries free than Washington State. Water fluoridation for 75% of class A public water systems in Snohomish County contributes to lower prevalence of dental disease.

# 2005 Smile Survey Results

## Snohomish County

### **Introduction**

The June 2000 Surgeon General's Report on Oral Health states that dental disease in children is a common, chronic problem and infectious disease. Dental disease impacts ability to eat, sleep and attend to learning. Dental caries begin in early childhood and continues throughout life. It is the single most common chronic disease of childhood. It is five times more common than asthma.<sup>1</sup>. Children in 2<sup>nd</sup> and 3<sup>rd</sup> grade are at the height of dental caries experience in the primary teeth. Evaluation of the prevalence of tooth decay in primary teeth is an indicator of risk for tooth decay in the permanent teeth that are just now beginning to come into the mouth.

In 2005, Snohomish Health District conducted a survey of 2<sup>nd</sup> and 3<sup>rd</sup> graders comparable to the Washington State Department of Health (DOH) 2005 Smile Survey. Like the DOH survey, Snohomish Health District (SHD) surveyed children in HeadStart and Early Childhood Education and Assistance Programs (ECEAP). Dental disease continues to disproportionately affect children in Snohomish County as it does throughout Washington State. The oral health information from these surveys helps communities understand the disproportionate affect dental disease has on children from low-income families, children from minority groups and children from immigrant/refugee families. The purpose of this report is to compare the oral health of children in Snohomish County with children in Washington State for 2005.

([http://www.doh.wa.gov/cfh/Oral\\_Health/Documents/SmileSurvey2005FullReport.pdf](http://www.doh.wa.gov/cfh/Oral_Health/Documents/SmileSurvey2005FullReport.pdf)) The report will also highlight similarities and differences in the oral health of Snohomish County children between the 2000 and 2005 SMILE Surveys.

### **History of Oral Health Surveillance**

In 1996, the Washington State Department of Health (DOH) conducted a statewide survey to help monitor the trends of dental disease in children.

In 2000, the DOH conducted a second statewide survey of 2<sup>nd</sup> and 3<sup>rd</sup> grade, HeadStart and Native American children.

In 2000, Snohomish County (Snohomish Health District/SHD) used the Washington State survey methodology to survey 2<sup>nd</sup> and 3<sup>rd</sup> grade students in Snohomish County.

In 2005, the DOH conducted a third statewide survey of 2<sup>nd</sup> and 3<sup>rd</sup> grade, HeadStart and Native American children.

In 2005, SHD conducted a second survey of 2<sup>nd</sup> and 3<sup>rd</sup> grade and included a survey of HeadStart and ECEAP children.

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<sup>1</sup> Edelstein B, Douglass C. Dispelling the cavity free myth. Public Health Reports 1995, 110:522-30.

# **Snohomish County SMILE Survey 2005**

## **Methods**

The 2005 Snohomish County SMILE Survey used the same methodology as the 2005 Washington State SMILE Survey. An electronic data file of all elementary schools in Snohomish County was obtained from the Washington State Office of the Superintendent of Public Instruction (OSPI). Demographic Oral Health Measures included age, gender, race, language spoken at home, and for elementary students, eligibility for free and/or reduced price lunch program (low income). Data on race were reported by parents to each school and recorded on the data entry form from class lists of children at each school. At the time of the screening, each child was asked what language their family usually speaks at home with the responses categorized as English, Spanish or other language.

Schools had the option of participating with positive consent or passive consent. All Snohomish County schools elected to use passive consent, although a choice of consent was offered. Licensed and registered dental professionals attended calibration training in the fall of 2005. Examiners used gloves, a penlight and a dental mirror to look at the children's teeth at the school. This type of dental screening underreports dental disease. Oral health indicators recorded for the survey included untreated caries, treated caries, rampant caries (decay on seven or more teeth), dental sealants (one or more on permanent teeth) and treatment urgency (none, early, urgent).

## **Sampling**

In order to increase the reliability of results for Snohomish County, additional schools were selected in the county using the same sampling methodology as Washington State. Schools with at least 25 children in the second and third grade were included in the sampling frame. In Snohomish County there were 114 eligible schools with 15,488 children. Schools were stratified or ordered by the level of participation in Free and Reduced Lunch Programs (FRL) and then systematically selected within each strata. This ensured a representative sample of schools by income. If a school refused to participate, a replacement school within the sampling strata was randomly selected. If the sample school plus two replacement schools refused to participate, no data were collected in that sampling stratum.

Combining the statewide and additional county sample, a total of 20 schools was selected of which 18 schools participated. Of the 18 participating schools, 8 schools with an enrollment of 1,361 were part of the original statewide sample and 10 schools with an enrollment of 1,806 were from the Snohomish County over sample.

**Table 1**  
**Smile Survey Participants**  
**Snohomish County**  
**2<sup>nd</sup> and 3<sup>rd</sup> grades**  
**Smile Survey, 2005**

	<b>Number of Schools</b>	<b>2<sup>nd</sup> &amp; 3<sup>rd</sup> Grade Total Enrollment</b>	<b>Number Participating</b>	<b>Response Rate</b>
Participating Schools <sup>2</sup>	18	3,167	2,458	77.6%

The Snohomish County elementary survey sample included 2,458 children participating for a response rate of 77.6%.

FRL data were obtained from OSPI Child Nutrition Program staff using a random code number assigned to each child to maintain confidentiality of his Free and Reduced Lunch eligibility. Code numbers were reported on the data collection form and on a class list. The class list was sent to the Child Nutrition Program at each school. The Child Nutrition Program identified and returned the code numbers for those children that participated in the low income program and recorded the code number on the data collection form after the oral assessment. Examiners did not know the income status of individual children. The FRL program data is a useful proxy for low income because children whose families are at 185% of the federal poverty level qualify for this program and it is routinely reported Office of the Superintendent of Public Instructions (OSPI). The Medicaid Program also has a sharing agreement with OSPI to assure that children with Medicaid coverage are enrolled in FRL programs. This percent of children eligible for the FRL program was used to select a probability sample of 18 schools with an enrollment of 3,167. The term ‘low income’ will refer to participants that participated in the FRL in this survey analysis.

**Data entry and analysis**

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. Additional analysis using STATA software confirmed statistical significance. The data were not adjusted for non-response. In all of the analyses, the Washington State results do not include the 10 over sampled schools. It should be noted that the Washington State sample was kept intact as originally identified; therefore, all results for the state include the eight Snohomish County schools. An analysis found that exclusion of the Snohomish County schools did not significantly affect the statewide results.

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<sup>2</sup> Out of the initial sample of 20 schools, 6 declined participation. Four of these schools were replaced with other randomly selected schools. Enrollment in the 18 schools was larger than the 20 originally selected.

## Comparisons with Washington State and Snohomish County

Confidence Intervals (CI) are the range of numbers that indicate the accuracy of the percents reported. A 95% CI tells the probability that the “true” estimate will be within the CI 95% of the time. When comparing two proportions for Snohomish County data, the confidence interval of the smaller sample, or category was used, as it will have the greater variability. When Snohomish County is compared to Washington State, the Snohomish County 95% CI is used. If the compared percent falls inside of the 95 percentile, it is not statistically different. If it falls outside the 95% range, the two percents are statistically different.

Chi-square testing compared Snohomish County to Washington State or Snohomish County 2000 and Snohomish County 2005 to confirm statistical difference. A  $p$  value of less than .05% is statistically significant. If Washington State data had been available without the influence of Snohomish County schools, chi-square testing may have identified other similarities or differences.

## Representation

**Table 2**  
**Demographics**  
**Snohomish County**  
**2<sup>nd</sup> and 3<sup>rd</sup> grades**  
**N=2458**

<b>Oral Health Measure</b>	<b>Snohomish County 2<sup>nd</sup>/3<sup>rd</sup> Total Enrollment* N=15,488</b>	<b>Percent</b>	<b>Snohomish County 2<sup>nd</sup>/3<sup>rd</sup> Participants N=2,458</b>	<b>Percent</b>
Grade				
2 <sup>nd</sup>	7,769	50.1%	1,232	51.0%
3 <sup>rd</sup>	7,719	49.8%	1,182	49.0%
Unknown/Missing			44	-
Gender				
Male	7,852	50.7%	1,241	50.7%
Female	7,636	49.3%	1,207	49.3%
Unknown/Missing			10	-
Free/Reduced Lunch Eligibility (Low Income)				
Not eligible	40,138	69.5%	1,539	62.6%
Eligible	17,611	30.5%	650	26.4%
Unknown/Missing	0		269	-
Language Spoken at Home				
English			2,079	85.1%
Spanish			208	8.5%
Other			171	-
Race				
White	11,652	75.2%	1899	78.0%
Black	605	3.9%	72	3.0%
Hispanic	1,376	8.9%	256	10.5%
Asian	1,413	9.1%	162	6.7%
American Indian/Alaska	355	2.3%	18	0.7%
Native		<0.1%	11	0.5%
Pacific Islander	7	<0.1%	16	0.7%
Multiracial	78	<0.1%	24	<0.1% %

\*OSPI 2004-2005 School Year Data Reports Race by Grade using Form P-705.

The children who participated were not different compared with county enrollment for 2<sup>nd</sup>/3<sup>rd</sup> grade, gender and income.

Race	Snohomish County Total Enrollment	Percent	Snohomish County Sample	Percent	<i>p</i> value
White Non-Hispanic	11647	75.2%	1917	78%	
Non-White/Hispanic	3841	24.8%	540	22%	<i>p</i> =.002

The participants were more likely to be White or non-Hispanic. Thus the results are generally representative but may under represent those who are Non-White/Hispanic.

No comparable information was available for language spoken at home in the county wide enrollment data. At the time of the screening, each child was asked what language their family usually speaks at home with the responses categorized as English, Spanish or other language.

### Participation in FRL

**Table 3**  
**Enrollment and Free/Reduced Price Lunch Program**  
**Snohomish County**  
**2<sup>nd</sup> or 3<sup>rd</sup> Grade**

	2 <sup>nd</sup> & 3 <sup>rd</sup> Grade Enrollment	Percent Low Income
Snohomish County Schools with 2 <sup>nd</sup> and/or 3 <sup>rd</sup> Grade (n=114)	15,488	29.4%
Participating Schools (n=18)	3,167	29.3%

The low income data indicate that enrollment of the sample schools selected for the Snohomish County SMILE Survey are representative of Snohomish County overall.

### Age

**Table 4**  
**Age**  
**2<sup>nd</sup>/3<sup>rd</sup> grade**  
**Smile Survey 2005**

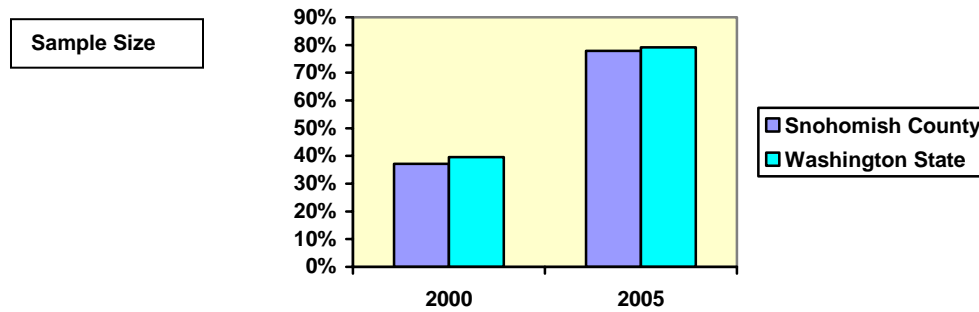
	Snohomish County Enrollment	Snohomish County Participants
Mean (Standard Deviation)	Not Available	8.0 (sd=0.8)
Range		6 – 10 yrs

The average age of the participants was 8 years.

## Comparison of Smile Surveys 2000 and 2005

Comparisons between the 2000 and 2005 Smile Surveys should be done cautiously since the types of surveys, sample sizes, sampling strategies, response rates and dental technology varied.

**Table 5**  
**Sample Size**  
**2<sup>nd</sup> and 3<sup>rd</sup> grades**  
**Smile Surveys 2000 and 2005**



In 2000, both the State and Snohomish County surveys used positive consent requiring families to return a consent form to the school for their child to participate. Positive consent tends to over represent children with dental caries experience and unmet dental treatment as parents perceive the screening as an opportunity to learn about their child's oral health. Thus, differences found when comparing the two years may be due to sample differences or bias and not reflect true differences.

In 2005, a passive consent methodology was used for both surveys. Parents return the consent form only if they do not wish their child to participate. Passive consent results in larger participation. (77.6%/79.2%) A larger participation of selected children results in improved representation of overall oral health status of the targeted population.

In past years, dental filling materials were predominantly silver/amalgam materials that are easily detected. The trend has been to fill decay with tooth colored materials that are more difficult to detect and may have biased the collected data toward improvements in treated tooth decay simply because the newer fillings could not be seen.

## The Oral Health of Snohomish County Children General Results

**Table 6**  
**Snohomish County**  
**2<sup>nd</sup> and 3<sup>rd</sup> Grade Children**  
**SMILE Survey, 2005**

Oral Health Measure	Percent N=2458	95% CI
Caries free (no decay or fillings)	43.7%	41.8, 45.7
Caries experience (treated OR untreated decay)	56.3%	54.3, 58.2
Treated decay	47.8%	45.8, 49.8
Untreated decay	19.8%	18.2, 21.4
Rampant caries (7+ teeth with caries experience)	20.1%	18.5, 21.7
Dental sealants		
2 <sup>nd</sup> and 3 <sup>rd</sup> grade	49.5%	47.5, 51.5
3 <sup>rd</sup> grade only	54.6%	51.7, 57.4
Treatment need		
no obvious problem	81.2%	79.6, 82.7
early dental care	16.4%	15.0, 18.0
urgent dental care	2.4%	1.8, 3.1

Tooth decay affects over 56.3% of Snohomish County children in 2<sup>nd</sup> and 3<sup>rd</sup> grade and close to one in every six children in Snohomish County has cavities that have not been filled. There is variation in the severity of tooth decay. A smaller proportion (20.1%) of all 2<sup>nd</sup>/3<sup>rd</sup> grade children has more rampant tooth decay.

**Table 7**  
**Rampant Caries and Dental Treatment**  
**2<sup>nd</sup>/3<sup>rd</sup> grade**  
**Smile Survey, 2005**

	No Untreated Caries	Percent	Yes Untreated Caries	Percent	Totals*	<i>p</i> value
Not rampant	2277	67.8%	439	13%	3016	
Rampant	411	12.2%	233	6.9%	644	<i>p</i> <.0001
Totals	2688	80.0%	672	20%	3360	

Children who have rampant tooth decay are far less likely to have dental treatment or to complete dental treatment if initiated when compared to children that do not have rampant decay.

## Disproportionate Burden of Disease in Snohomish County

Children from minority families, low-income families, or immigrant/refugee families are significantly more likely to suffer from dental disease.<sup>3 4</sup>

### Poverty

**Table 8**  
**Snohomish County 2<sup>nd</sup> and 3<sup>rd</sup> Grade Children**  
**Comparison by Eligibility for the Free or Reduced Price Lunch Program**  
**SMILE Survey, 2005**

<b>Oral Health Measure</b>	<b>Low Income (n=650)</b>	<b>Not Low Income (n=1,538)</b>	<b><i>p</i> value</b>
Caries experience	67.5%	53.0%	<i>p</i> < 0.001
Untreated decay	28.8%	17.4%	<i>p</i> < 0.001
Rampant caries	30.3%	17.4%	<i>p</i> < 0.001
Dental sealants	41.7%	52.0%	<i>p</i> < 0.001
Needing urgent treatment	4.5%	1.8%	<i>p</i> < 0.001

There are significant differences on the impact of dental disease associated with socio-economic status in Snohomish County.

<sup>3</sup> Oral Surgeon Report on Oral Health, 2000

<sup>4</sup> Snohomish County SMILE Survey, 2000

**Race/Ethnicity**

**Table 9**  
**Comparisons by race/ethnicity**  
**Snohomish County's 2<sup>nd</sup> and 3<sup>rd</sup> Grade Children**  
**SMILE Survey, 2005**

<b>Oral Health Measure Percentage</b>	<b>White/Non-Hispanic (n=1,899)</b>	<b>Non-White/Hispanic (n=535)</b>	<b><i>p</i> value</b>
With caries experience	53.1	67.7	<i>p</i> < 0.001
With untreated decay	16.6	31.0	<i>p</i> < 0.001
With rampant caries	17.6	28.4	<i>p</i> < 0.001
With dental sealants	52.0	41.5	<i>p</i> < 0.001
Needing urgent treatment	1.6	5.4	<i>p</i> < 0.001

Dental disease impacts Non-White/Hispanic at a significantly higher rate in Snohomish County as it does for Washington State. Non-White/Hispanics were significantly more likely to have caries experience, untreated tooth decay, rampant tooth decay and less likely to benefit from dental sealants.

**Table 10**  
**Comparison of race/ethnicity and low income**  
**Snohomish County 2<sup>nd</sup> and 3<sup>rd</sup> grades**  
**N=2168**

<b>White/Non-Hispanic and Low Income (n=365)</b>	<b>Non-White/Hispanic and Low Income N=275</b>
22.1%	53.3%

A larger proportion of Non-White/Hispanic children were low income. Data comparing White and Non-White populations should be interpreted cautiously

## Language

**Table 11**  
**Comparisons by language spoken at home**  
**Oral Health of Snohomish County's 2<sup>nd</sup> and 3<sup>rd</sup> Grade Children**  
**SMILE Survey, 2005**

Oral Health Measure	English (n=2,079)	Other Language (n=359)	P-value
Caries experience	53.6%	71.9%	$p < 0.001$
Untreated decay	17.2%	34.3%	$p < 0.001$
Rampant caries	17.3%	35.7%	$p < 0.001$
Dental sealants	51.6%	38.6%	$p < 0.001$
Urgent treatment needed	1.6%	7.0%	$p < 0.001$

Students whose primary language is not English are significantly more likely to have experienced decay, more untreated decay, more rampant decay and more likely to have urgent dental needs than other populations surveyed. There are significant differences between those that have English as a primary language and those indicating another language spoken at home.

For the purposes of this survey, students were asked what language was spoken at home. Many families in the Snohomish County area retain cultural traditions even after several generations of living in the area. Therefore, this data mixes both students that are newly arrived in this country and those whose families choose to maintain cultural traditions that are associated with higher rates of tooth decay.

**Table 12**  
**Language spoken at home and that are low income**  
**Snohomish County 2<sup>nd</sup> and 3<sup>rd</sup> grades**  
**SMILE Survey, 2005**

	English at Home	Other Language at Home
Low Income	23.8%	60.1%

The proportions of children who speak a language other than English at home were more likely to be low income. The data on language spoken at home needs to be interpreted cautiously.

**Comparison with Washington State  
Washington State and Snohomish County  
SMILE Surveys, 2005**

**Table 13  
Washington State and Snohomish County Comparison  
2<sup>nd</sup> and 3<sup>rd</sup> Grade Children  
Smile Surveys, 2005**

<b>Oral Health Measure</b>	<b>Washington State Participants Percent (95% CI)</b>	<b>Snohomish County Participants Percent (95% CI)</b>	<b><i>p</i> value</b>
Caries free (no cavities or fillings)	41.7% (40.1-43.3)	43.7 % (41.8, 45.7)	<i>P</i> =0.017
Caries experience (treated or untreated decay)	58.3% (56.7-59.9)	56.3% (54.3, 58.2)	<i>p</i> =0.017
Treated decay	48.7% (47.0-50.3)	47.8 % (45.8, 49.8)	
Untreated decay	20.5% (19.2-21.9)	19.8% (18.2, 21.4)	
Rampant caries (7+ teeth with caries experience)	21.4% (20.1-22.8)	20.1% (18.5, 21.7)	
Dental sealants 2 <sup>nd</sup> and 3 <sup>rd</sup> grade	38.9 (37.3-40.5)	49.5 % (47.5, 51.5)	<i>p</i> <0.001
3 <sup>rd</sup> grade only		54.6% (51.7, 57.4)	
Treatment need			
% with no obvious problem		81.2 % (79.6, 82.7)	
% needing early dental care	15.8% (14.6-17.0.2)	16.4% (15.0, 18.0)	
% needing urgent dental care	3.3 (2.8-4.0)	2.4 % (1.8, 3.1)	<i>p</i> =0.046

*Overall, Snohomish County has better oral health and access to dental care than children in Washington State.*

Snohomish County has more caries free children as compared to children in the Washington State SMILE Survey, 2005.

Snohomish County children also have significantly lower rates of caries experience compared to children in the State sample.

Fewer children in Snohomish County need urgent dental care as compared with Washington State.

The use of dental sealants (a preventive treatment to protect teeth from decay) was better for Snohomish County than for Washington State.

Rampant decay (caries experience on 7 or more teeth) remains similar to the Washington State sample that may reflect improved access to dental care. (The survey method under represents untreated tooth decay not visible with the screening method.)

**Comparisons between SMILE Surveys 2000 and 2005  
Snohomish County Only  
2<sup>nd</sup> and 3<sup>rd</sup> grade children**

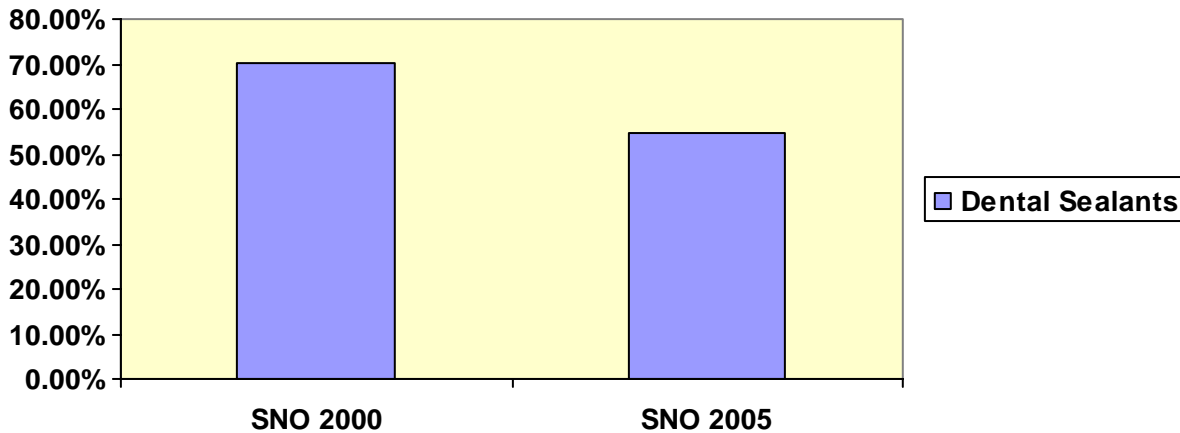
**Table 14  
General Results  
Comparison  
Snohomish County SMILE Survey 2000 and 2005  
2<sup>nd</sup> and 3<sup>rd</sup> Grade Children**

<b>Oral Health Measure</b>	<b>2000 N=747 Percent 95% CI</b>	<b>2005 N=2,458 Percent</b>	<b><i>p</i> value</b>
Caries free (no cavities or fillings)	45.4%	43.7% (41.8, 45.7)	
Caries experience (treated and/or untreated)	54.9% (49.1,60.5)	56.3% (54.3, 58.2)	
Treated decay		47.8% (45.8, 49.8)	
Untreated decay	26.2% (21.3,31.1)	19.8% (18.2, 21.4)	<i>p</i> <0.001
Rampant caries (7+ teeth with caries experience)	18.9% (14.2,60.6)	20.1% (18.5, 21.7)	
Dental sealants 2 <sup>nd</sup> and 3 <sup>rd</sup> grade	58.1% (52.6, 63.5)	49.5% (47.5, 51.5)	<i>p</i> <0.001 <i>p</i> <0.001
3 <sup>rd</sup> grade only	70.2% (63.2,76.4)	54.6% (51.7, 57.4)	
Treatment need			
No obvious problem		81.2% (79.6, 82.7)	<i>p</i> =0.01
Needing early dental care	24.2% (17.5, 30.9)	16.4% (15.0, 18.0)	
Needing urgent dental care	2.0% (0.9, 4.7)	2.4% (1.8, 3.1)	

Since 2000, access to dental care for children seems to have improved for dental treatment. Although as stated before, the positive consent required for the 2000 Smile Survey may have over represented children that needed dental care. However, the number of children receiving dental sealants, another measure of access to dental care, declined substantially from the 2000 survey.

**Dental Sealants  
3<sup>rd</sup> grade children only  
Snohomish County Smiley Surveys 2000 and 2005**

**Table 15  
Dental Sealant Utilization  
Comparison  
Snohomish County Smile Survey 2000 and 2005**

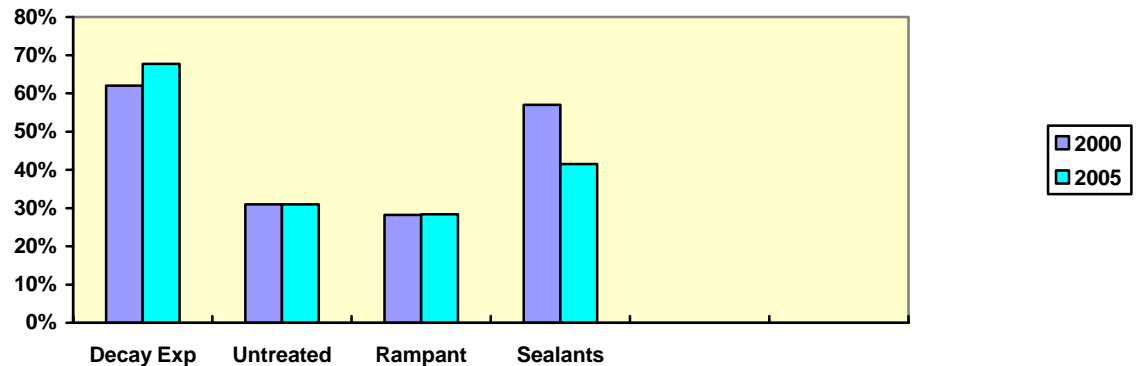


*There was a significant ( $p < .001$ ) decline in dental sealant use in Snohomish County since SMILE Survey 2000.*

- Dental sealants seemed to decrease more in 3<sup>rd</sup> graders than for the combined grades (22.2% decrease versus 14.8%, respectively). Dental sealant use declined for those that were both high and low income and White/Non-Hispanic or Non-White/Hispanic. Only those that spoke a language other than English appear to have no change in their already low sealant utilization. ( $p=0.276$ ). Since dental sealants seem to be declining, an increase in dental caries may be expected in the future

**By Race/Ethnicity  
2<sup>nd</sup> and 3<sup>rd</sup> grade children  
Snohomish County Smiley Surveys 2000 and 2005**

**Table 16  
Race=Non-White only  
Comparison  
Snohomish County Smile Survey 2000 and 2005  
2<sup>nd</sup>/3<sup>rd</sup> grade children**

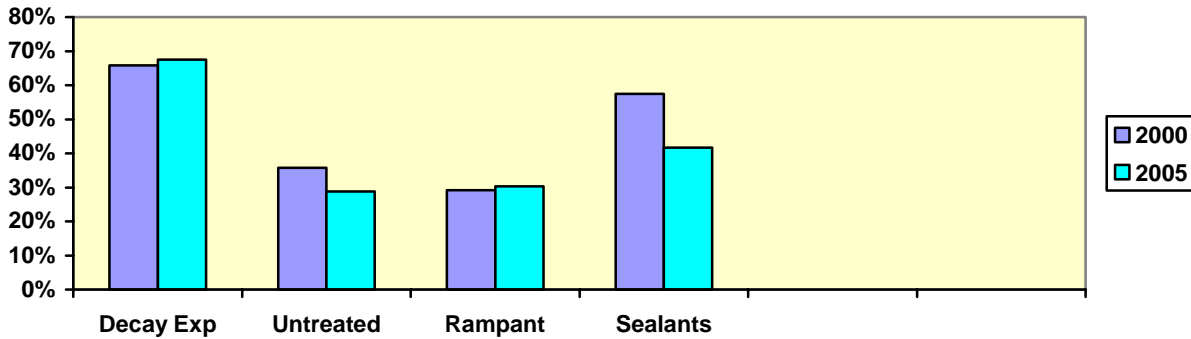


*Disparities in oral health by race/ethnicity for children do not appear to have changed since 2000.*

- There was no statistical change in decay experience ( $p>0.10$ ), untreated tooth decay, rampant tooth decay for children that were Non-White/Hispanic from 2000 to 2005 Smile Surveys.
- Dental sealant utilization declined. ( $p=0.001$ ). This may indicate a decline in preventive dental care for Non-White/Hispanic communities

**Table 17**  
**Poverty-Low Income**  
**Comparison**  
**Snohomish County Smile Survey 2000 and 2005**  
**2<sup>nd</sup>/3<sup>rd</sup> grade children**

**Snohomish County Smile Survey 2000 and 2005**  
**Low Income Children Only**

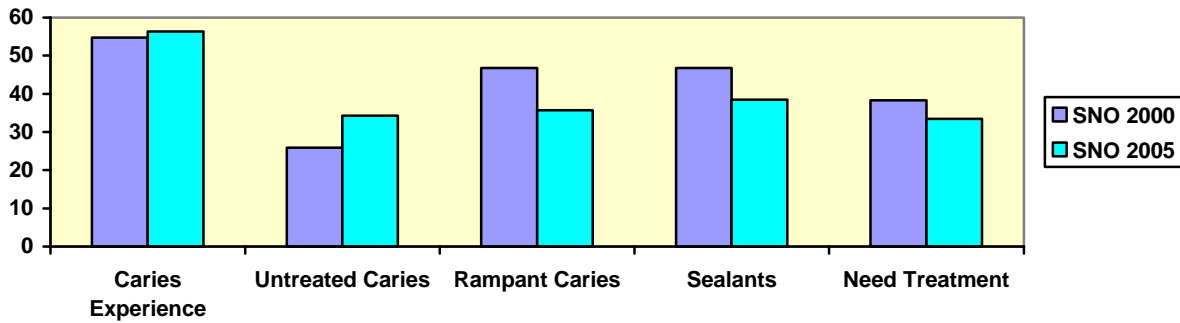


- *Access to dental treatment for low income children does not appear to have improved since 2000 and access to preventive dental sealants has decreased.*

In Snohomish County, there seems to be no change in overall caries experience for low income children since 2000. A decline was noted in dental sealant use (p=0.001) that may indicate a decline in preventive treatment for low income children or may be due to differences in response rates or sampling methodology. It seems that if access to dental care had improved, there would have been an increase in dental sealants

**Snohomish County Smile Survey 2000 and 2005  
2<sup>nd</sup> and 3<sup>rd</sup> Grade Children Non-English at Home Only**

**Table 18  
Language Spoken at Home=Not English  
Comparison  
Snohomish County Smile Survey 2000 and 2005  
2<sup>nd</sup>/3<sup>rd</sup> grade children**



- *Access to dental care for children that speak a language other than English has not changed since 2000 and access to dental sealants has not statistically changed.*

There was no change from 2000 to 2005 in the oral health for children from families that speak a language other than English at home. However, unlike other groups, children that spoke a language other than English did not demonstrate a statistical decline in dental sealants. This may reflect targeting of school based dental sealant programs or may be due to differences in response rates or sampling methodology.

## The Oral Health of Children in Snohomish County HeadStart/ECEAP Programs

HeadStart and Early Childhood, Education and Assistance Program (ECEAP) provide early learning opportunities for families with limited family incomes, generally <175 of the federal poverty level. HeadStart and ECEAP have written policy addressing oral health care for the children and families enrolled in their programs. This survey was not intended to be representative of all Snohomish County children. Improvements in earlier preventive services may be demonstrated in changes in dental access or improvements in oral health status in children enrolled in HeadStart and ECEAP

An electronic data file of all HeadStart and ECEAP programs in Washington was developed by the Washington State Department of Health. The data file, which was for the 2003-2004 school year, contained the following information for each program – site name, program type (ECEAP, HeadStart and Early HeadStart), contact information and funded enrollment. A random sample of 39 HeadStart/ECEAP sites was selected from the 494 sites in Washington. No Snohomish County sites were selected in the Washington State sample.

All Snohomish County HeadStart and ECEAP sites that were identified on the electronic data file from Washington State Department of Health were contacted for participation in the Snohomish County survey.

The survey included all HeadStart/ECEAP programs in Snohomish County listed in the State survey database. All screenings were conducted by a dentist or dental hygienist who had attended a survey training session sponsored by DOH. Data analysis was done using the EPI-INFO program produced by the CDC and cross checked by the Snohomish Health District Health Statistics and Assessment program using STATA. Because the response rates were consistently high across all of the preschool sites, the data were not adjusted for non-response.

All children enrolled and present on the day of screening were examined unless a parent/guardian returned a consent form specifically requesting that the child not take part in the survey. A dentist and dental hygienist completed the screenings using gloves, penlights, and disposable mouth mirrors. The diagnostic criteria outlined in the Association of State and Territorial Dental Director's publication *Basic Screening Surveys: An Approach to Monitoring Community Oral Health*. The screeners attended a full-day training session which included a didactic review of the diagnostic criteria along with a hands-on calibration session.

Information on age, language spoken at home obtained from the child and/or teacher while gender and race were determined by the screener and/or teacher.

## HeadStart/ECEAP Participants

**Table 19**  
**Snohomish County SMILE Survey, 2005**  
**HeadStart Children**  
**Enrollment, Number Participants and Response Rate in Snohomish County**

	<b>Enrollment</b>	<b># Participated</b>	<b>Response Rate</b>
Snohomish County HeadStart/ECEAP Programs (n=25)	1,175	952	80.3%
Washington State HeadStart/ECEAP (n=39)	1,433	1,182	82.5%

The preschool portion of the Snohomish County survey included 25 HeadStart/ECEAP schools in Snohomish County with 1,175 children enrolled and 952 children participating for a response rate of 80.3%. The age range in the Snohomish County, as well Washington State samples, was 2-6 years old. A response rate of 80.3% was similar ( $p=0.33$ ) to the response rate for Washington State

### Age

**Table 20**  
**HeadStart ECEAP Participants**  
**Washington State and Snohomish County**  
**Smile Survey, 2005**

<b>Age</b>	<b>Washington State N=1,182</b>	<b>Snohomish County N=952</b>
Mean (Standard Deviation)	4.13 yrs (.65)	4.2 yrs (0.6)
Range	1-6	1 - 6

HeadStart/ECEAP participants in Snohomish County were similar in age and age range compared with children in the Washington State sample.

## Demographics

**Table 21**  
**HeadStart/ECEAP Participants**  
**Washington State and Snohomish County**  
**Smile Survey, 2005**

<b>Demographics HeadStart/ECEAP</b>	<b>Washington State 2005 Number of Children</b>	<b>Washington State 2005 Mean or Percent</b>	<b>Snohomish County 2005 Number of Children</b>	<b>Snohomish County 2005 Mean or Percent</b>
Gender				
Male	593	50.2%	494	52.1%
Female	589	49.8%	454	47.9%
Language Spoken at Home				
English primary	783	66.3%	613	64.4%
English secondary	322	27.3%	234	24.6%
Other	76	6.4%	105	11.0%
Race/Ethnicity				
White	499	42.5%	477	50.1%
Black	128	10.9%	47	4.9%
Hispanic	364	31.0%	298	31.3%
Asian	51	4.3%	46	4.8%
American Indian/Alaska Native	74	6.3%	14	1.5%
Other	59	5.0%	70	7.4%

Snohomish County HeadStart/ECEAP children are similar to children in Washington State, although HeadStart children are more likely to be White/Non-Hispanic than other children in Washington.

## General Results Snohomish County HeadStart/ECEAP

**Table 22**  
**Snohomish County Smile Survey 2005**  
**HeadStart/ECEAP children**

Oral Health Measure	All Children (1-6 yrs) (n=952)		3-5 Year Olds Only (n=946)	
	Percent	(95% CI)	Percent	(95% CI)
Caries free %	55.2%	(50.2, 58.4)	58.1%	(54.9, 61.3)
Caries experience	44.8%	(41.6, 48.0)	41.9%	(38.7, 45.1)
Treated decay	24.0%	(21.3, 26.8)	24.2%	(21.5, 27.0)
Untreated decay	25.1%	(22.4, 28.0)	25.3%	(22.5, 28.2)
Rampant caries	11.8%	(9.8, 14.0)	11.9%	(9.9, 14.1)
ECC	16.6%	(14.3, 19.1)	16.7%	(14.4, 19.2)
White spot lesions	23.3%	(20.6, 26.1)	23.3%	(20.7, 26.2)
Treatment need				
No obvious problem	74.9%	(72.0, 77.7)	74.8%	(71.9, 77.5)
Needing early dental care	23.1%	(20.4, 25.9)	23.2%	(20.6, 26.1)
Needing urgent dental care	2.0%	(1.2, 3.1)	2.0%	(1.2, 3.1)

The following results are restricted to the 946 children that range in age from 3-5 years. Forty two percent of children had decay experience (untreated or fillings) and 25 percent had untreated decay at the time of the screening<sup>5</sup>. Children with decay on 7 or more teeth are considered to have rampant tooth decay. Twelve percent of Snohomish County HeadStart/ECEAP children had rampant tooth decay. Seventeen percent of the children in the survey had early childhood caries. Early childhood caries is tooth decay that begins before age two and is measured by any decay in the upper front teeth.

<sup>5</sup> The percent of children with untreated decay is assumed to be an under estimation because radiographs (x-rays) were not taken.

**Race/Ethnicity Snohomish County HeadStart/ECEAP**

**Table 23  
Snohomish County SMILE Survey 2005  
HeadStart/ECEAP Children – (3-5 Year Olds Only)**

<b>Oral Health Measure</b>	<b>Snohomish County White/Non-Hispanic (n=471)</b>	<b>Snohomish County Non-White/Hispanic (n=475)</b>	<b><i>p</i> value</b>
Caries experience	35.6%	48.1%	<i>p</i> < 0.001
Untreated decay	20.0%	30.6%	<i>p</i> < 0.001
Rampant caries	8.2%	15.6%	<i>p</i> < 0.001
ECC	10.7%	22.7%	<i>p</i> < 0.001
White spots	19.2%	27.6%	<i>p</i> < 0.01
Needing early care	18.6%	27.9%	<i>p</i> < 0.01
Needing urgent care	1.5%	2.6%	<i>p</i> = 0.24

There were significant differences between White/Non-Hispanic preschool children and preschool children that are Non-White/Hispanic in the prevalence of ECC in Snohomish County.

Children that were Non-White/Hispanic were more likely to have caries experience, untreated decay, white spot lesions and need dental care. They were almost twice as likely to have early childhood caries and rampant tooth decay.

Only in needing urgent/emergent dental care were there no differences.

**Comparison of Washington State and Snohomish County  
HeadStart/ECEAP  
SMILE Survey, 2005**

**Table 24  
General Results  
HeadStart/ECEAP children  
Washington State and Snohomish County 2005**

<b>Oral Health Measures Percentages</b>	<b>Washington State (n=1172)</b>	<b>Snohomish County (n=984)</b>	<b><i>p</i> value</b>
Caries free	54.9%	57.8%	
With caries experience	45.1%	42.2%	
With untreated decay	25.0%	25.3%	
With rampant decay	15.3%	12.4%	<i>p</i> =0.06
With Early Childhood Caries (ECC)	17.7%	16.9%	
With Urgent dental needs	3.4%	2.2%	<i>p</i> =0.05

Preschool children in Snohomish County do not have significantly lower rates of dental disease when compared with preschool children in the state sample. The difference was very close for children with rampant caries and urgent dental care.

**Race=White/non-Hispanic Only  
HeadStart/ECEAP 2005**

**Table 25  
Race-White/non-Hispanic  
Washington State and Snohomish County Comparison 2005  
HeadStart/ECEAP children**

<b>Oral Health Measure</b>	<b>Washington State, 2005 White/Non-Hispanic Percent 95%CI (N=499)</b>	<b>Snohomish County, 2005 White/Non-Hispanic Percent 95% CI (n=471)</b>	<b><i>p</i> value</b>
Caries experience	38.7 % (34.4-43.1)	35.6%	<i>p</i> =0.168
Untreated decay	20.8% (17.4-24.7)	20.0%	
Rampant caries	13.6% (10.8-17.0)	8.2%	<i>p</i> =0.007
ECC	13.1% (10.3-16.6)	10.7%	<i>p</i> =0.344
White spots	18.4% (15.1-22.3)	19.2%	
Needing early care	18.2 % (15-22.0)	18.6%	
Needing urgent care	3.4 % (2.1-5.5)	1.5%	<i>p</i> =0.004

Snohomish County HeadStart/ECEAP children that are White/Non-Hispanic were less likely to need urgent care than Washington State or to have rampant tooth decay.

**Race = Nonwhite/Hispanic Only  
HeadStart/ECEAP 2005**

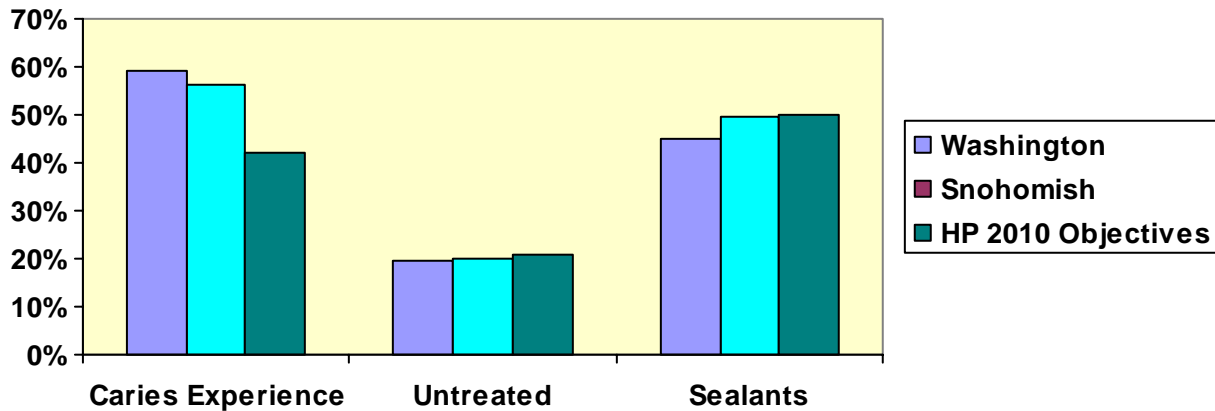
**Table 26  
Race = Non-white/Hispanic Only  
Washington State and Snohomish County Comparison 2005  
HeadStart/ECEAP Children**

<b>Oral Health Measure</b>	<b>Washington Non-White/Hispanic N=676</b>	<b>Snohomish Non-White/Hispanic (n=475)</b>	<b><i>p</i> value</b>
Caries experience	49.5% (45.6-53.3)	48.1%	
Untreated decay	27.9 % (24.6-31.5)	30.6%	<i>p</i> =0.137
Rampant caries	16.4 % (13.8-19.5)	15.6%	
ECC	20.8% (17.8-24.2)	22.7%	
White spots	26.0% (22.7-29.6)	27.6%	
Needing early care	23.8 % (20.7-27.2)	27.9%	<i>p</i> =0.11
Needing urgent care	5.2% (3.7-7.2)	2.6%	<i>p</i> <0.01

Snohomish County children that were Non-White/Hispanic were no different than Non-White/Hispanic children in Washington State to need early dental care. They were less likely to need urgent dental care. This may reflect improved access to urgent dental care or less severe tooth decay as compared with children in the Washington State sample.

## Healthy People 2010 Objectives 6-8 year olds

**Table 27**  
**Comparison of Washington State and Snohomish County**  
**General Results**  
**Healthy People 2010 Objectives for 6-8 year olds**  
**SMILE Survey, 2005**

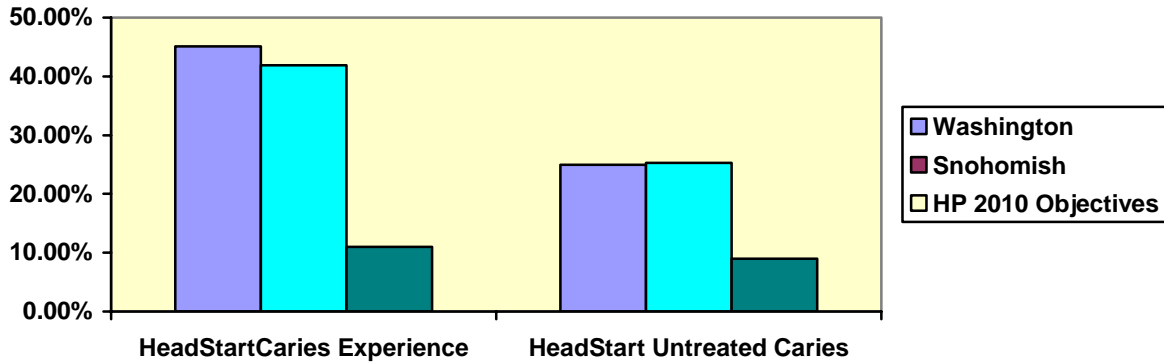


Three specific objectives for children 6-8 years old from the Healthy People 2010 objectives are:  
 21-1 reducing the proportion of children who have dental caries experience (42%)  
 21-2 reducing the prevalence of untreated tooth decay (21%)  
 21-8 increasing the proportion of children who have dental sealants (50%)

- Neither Washington State nor Snohomish County is meeting the objective for caries experience. Snohomish County is doing better than Washington State.
- In both Washington State and Snohomish County the percentage of children with untreated tooth decay has met the HP 2010 objective.
- Snohomish County, but not Washington State, is meeting the HP2010 objective for dental sealants by third grade (54.6%) and just barely for 6-8 years olds (49.5%).

## Healthy People 2010 Objectives 2-4 year olds

**Table 28**  
**Washington State, Snohomish County**  
**HP 2010 Objectives – Children 2-4 years old**



There are two specific HP 2010 objectives for children 2-4 years old, which is slightly younger than children in the Snohomish County sample of HeadStart/ECEAP.

- 21-1a. Reduce the proportion of young children with dental caries experience in primary teeth to 11%
- 21-2a. Reduce the proportion of young children with untreated dental decay in their primary teeth to 9%.

Children in HeadStart/ECEAP programs are not meeting the Health People 2010 Objectives in either Snohomish County or Washington State.

## Protective Measures in Snohomish County

### Water Fluoridation

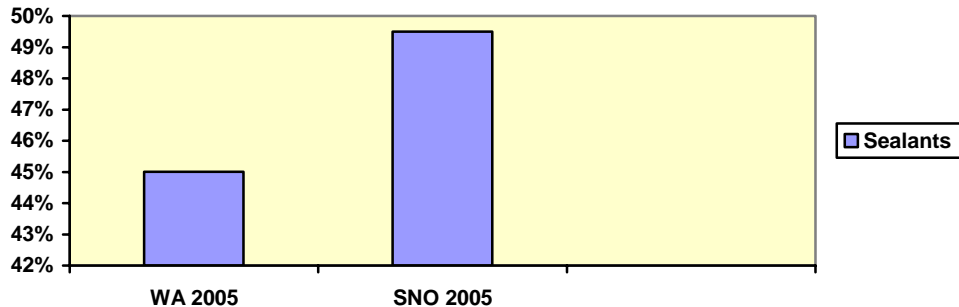
Water fluoridation prevents tooth decay when available in drinking water at a level of .7ppm to 1.2ppm. Water fluoridation began in Snohomish County in 1993 and currently about 75% of the population served by class A water systems<sup>6</sup> in Snohomish County benefit from water fluoridation as compared to the state average of about 60%. Data collected by the SMILE Survey does not include information on children's residence or length of time having lived in a fluoridated community that would be needed for demonstrating improvements directly related to water fluoridation.

<sup>6</sup> Class A public water system provides water for human consumption to at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days out of the year. (CDC)

## Protective Measures in Snohomish County

### Dental Sealants

**Table 29**  
**Comparison of Snohomish County 2005 and Washington State 2005**



Dental sealants are protective coatings applied to the grooves and pits of permanent molars which have shown to be the most vulnerable to tooth decay. Dental sealants have strong clinical evidence for efficacy for individuals and populations. The Centers for Disease Control and the US Task Force consider school-based dental sealants programs second only to water fluoridation for improvements in community health.<sup>7</sup>

While dental sealants are slightly higher in Snohomish County than in Washington, the difference is not statistically significant. Neither has met the HP 2010 objective in 2005 with 50% with dental sealants between ages 6-8 year of age. Children that were targeted for the SMILE survey are slightly older than the HP 2010 measure. Second grade students are usually 7-8 years old, while 3<sup>rd</sup> grade students are 8-9 years old. The data on dental sealants, like Washington State, indicates that future dental caries experience may not be prevented or that children are not receiving adequate preventive care.<sup>8</sup>

<sup>7</sup> Oral Health. Guide to Community Preventive Services Website. Centers for Disease Control and Prevention. [www.thecommunityguide.org/oral/](http://www.thecommunityguide.org/oral/). Last updated: 06/14/2005. Accessed on: 8.29.2006.

<sup>8</sup> It should be noted that the Smile Survey, 2005 was not designed to be representative of 6-8 year old children; however, the average age of children participating in both the Washington State and Snohomish County surveys was 8 years.

## Protective Measures in Snohomish County

### Snohomish Health District School-based Dental Sealant Programs

School based dental sealants programs began in Snohomish County in 1992. Currently 8 schools in Snohomish County have school based dental sealant programs. The same indicators collected for the SMILE Survey are used to assess the oral health status of these schools. The schools were prioritized and selected for participation by the number of children in second grade, participation in the FRL program, race and the proportion of 2<sup>nd</sup> grade children without dental sealants. These community risk factors are associated with higher dental needs.

**Table 30**  
**Comparison**  
**Snohomish County School-Based Sealant Programs and SMILE Survey 2005**  
**2<sup>nd</sup> grades only**  
**School Year 2004-2005**

Oral Health Measure 2 <sup>nd</sup> grade students	Snohomish County Dental Sealant Program Schools 2 <sup>nd</sup> Grade only 2005 (n= 543 )	Snohomish County All Schools 2 <sup>nd</sup> Grade Only 2005 (N=1232)
Low-Income	65.6%	30.2%
Non-White/Hispanic	50.3%	21.2%
Language-not English	32.1%	15%
Caries experience	65.7%	54.4%
Untreated decay	35.2%	20.0%
Rampant caries	29.6%	19.3%
<b>Dental sealants</b>	<b>32.2% *</b>	<b>45.6%</b>

The proportion of children receiving sealants that are Non-White or speak a language other than English or are low income were higher in the school-based dental sealant program than in SMILE Survey 2005. Schools selected for the dental sealant program had a higher percentage without dental sealants. By design, the Snohomish County Dental Sealant Program selected schools that had high numbers of children that were low income, more Non-White/Hispanic and less likely to speak English at home. This indicates that targeting of the programs is consistent with selection of schools with highest Snohomish County and Washington State dental needs.

**Table 29**  
**School-based dental sealant programs**  
**2<sup>nd</sup> grade children, Snohomish County**  
**School Year 2004-2005**

Oral Health Measure 2 <sup>nd</sup> grade students	Snohomish County Dental Sealant Program Schools 2 <sup>nd</sup> Grade only 2005 (n= 543 )	Snohomish County All Schools 2 <sup>nd</sup> Grade Only 2005 (N=1232)
Dental sealants BEFORE program	32.2% *	45.6%
Dental sealants AFTER program	92.8%	45.6%

Children in schools less likely to have received dental sealants are targeted for dental sealant programs. Children who attend schools that participate with a school-based dental sealant program are more likely to receive dental sealants.

### Access to Dental Care in Snohomish County<sup>9</sup>

Access to preventive dental care and dental treatment can influence rates of tooth decay. In April of 2004, Snohomish County Health District surveyed dental practices to determine the availability of dental care. In areas with insufficient providers, untreated dental caries rates would be expected to be higher. In areas with adequate providers, overall dental caries experience may be expected to be improved. If there are sufficient providers and yet dental caries experience remains unchanged, then preventive or restorative services that are provided may need to be examined more closely.

In Snohomish County there is a significant disparity in access to care for individuals with lower incomes.

- Not all providers accept all dental coverages. There are restrictions by age and types of service delivered. Some do not accept payment by third party providers.
- Only 3% of the dentists accept new Medicaid patients without restrictions.
- Only Community Health Centers in Snohomish County offer dental care on a sliding fee scale for children with low family incomes.
- Children and families with extensive dental needs may find dental care impossible to afford.
- Preventive dental care does not begin early enough for those at highest risk for developing tooth decay.

<sup>9</sup> Health Professional Shortage Areas Survey, Access to Dental Care in Snohomish County, Snohomish Health District, 2005

## Conclusions

Dental decay is a preventable infectious disease that continues to disproportionately affect children in Snohomish County. Untreated dental disease affects children's ability to eat, sleep and attend to learning.

- Snohomish County children have lower rates of dental disease when compared to children in other areas of the State.
- Children from low-income families are more likely to have untreated dental disease.
  - As with other health issues, children from low-income families are disproportionately impacted by dental disease.
  - Snohomish County and the Seattle area have more private dental offices, and community dental clinics to provide dental care, than many other Washington counties.
  - The proportion of dental providers serving families with low incomes continues to decline in Snohomish County.
- Non-White/Hispanic children are at least twice as likely as compared to White/Non-Hispanic children to have untreated dental disease.
  - The disproportionate burden of dental disease along racial lines continues to be a problem.
- Preschool Non-White/Hispanic children are at significantly higher risk for Early Childhood Caries and rampant dental caries.
  - Early Childhood Caries refers to the decay of the top front teeth usually associated with infant feeding practices. Understanding cultural differences in feeding infants and toddlers could help providers in Snohomish County address practices that increase the incidence of ECC.
- Dental sealant rates have declined dramatically in Snohomish County.
  - Snohomish Health District continues to offer school-based sealant programs to targeted Snohomish County schools with children at high risk for tooth decay. Participation of Non-White/Hispanic, low income and children that speak a language other than English have increased in SHD sealant programs.
- In Snohomish County, approximately 75% of the population benefit from access to fluoridated water systems.
  - In comparison, it is estimated that about 60% of the State population benefits from access to fluoridated water systems.

## Appendix 1

### Response Rate and Low Income Percent at the Participating Elementary Schools in Snohomish County

County	School	Number Enrolled	Number Participated	Response Rate	FRL Percent
Snohomish	Cascade Elementary	178	146	82.0	39.2
Snohomish	Cedar Valley Elementary	132	117	88.6	68.8
Snohomish	Cedarhome Elementary	168	133	79.2	21.4
Snohomish	<b>Chainlake Elementary School*</b>	263	146	55.5	18.6
Snohomish	<b>Cougar Creek Elementary</b>	138	120	87.0	28.5
Snohomish	<b>Dutch Hill Elementary</b>	143	121	84.6	13.5
Snohomish	Elger Bay Elementary	167	137	82.0	26.2
Snohomish	Emerson Elementary	215	184	85.6	49.4
Snohomish	Frank Wagner Elementary School	208	159	76.4	56.7
Snohomish	Martha Lake Elementary	174	130	74.7	30.8
Snohomish	<b>Pioneer Elementary</b>	175	52	29.7	20.7
Snohomish	<b>Seattle Hill Elementary</b>	216	175	81.0	10.6
Snohomish	<b>Sherwood Elementary</b>	109	79	72.5	23.8
Snohomish	<b>Silver Firs Elementary</b>	167	145	86.8	9.8
Snohomish	Skyline Elementary	195	165	84.6	30.8
Snohomish	Sunnyside Elementary	197	166	84.3	25.9
Snohomish	Utsalady Elementary	138	113	81.9	17.4
Snohomish	<b>Woodside Elementary</b>	184	170	92.4	35.9

\***Bold** = School data in State Sample

## Appendix 2

### **HeadStart/ECEAP Programs Participating in Snohomish County**

Alderwood  
Arlington  
Cedar Valley Community Schools  
Children's Village  
College Place  
Darrington Kid's Place  
Deer Creek  
DollFin Day Care  
Everett Community College  
Everett Co-op / Casino Early Learning Center  
Gingerbread House Childcare  
Hillcrest  
Josephine Sunset Home  
Lakewood  
Marysville - Shoultes  
Monroe  
Mukilteo  
North County  
Sauk-Suiattle  
Snohomish  
South Everett  
Sultan  
Tomorrow's Hope 2  
Tomorrow's Hope/Edmonds Community College  
VOA  
Whispering Pines