

## **Nevis Oral Health Survey: Sample of Children Ages 6-8**



**Area of Technology and Health Services Delivery  
Health Services Organization  
Regional Oral Health Program**

**July 2004**





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## **1. Executive Summary and Recommendations**

This report documents the results of an oral health survey of children between the ages of 5 and 8 on the island of Nevis. The sample consisted of 207 children in five parishes, St. Georges', St. James', St. John's, St. Paul's, and St. Thomas. Because only nine five-year olds were surveyed, this age group was dropped from the sample, leaving a total of 198 children in the sample.

This survey covers young children who are still experiencing the process of losing deciduous teeth and having permanent teeth grow in. Surveys of children at ages 12 and 15 would complement this survey and, particularly by age 15, when children have had their permanent teeth for some time, the assessment of caries prevalence is considered more meaningful than at younger ages.

Generally younger children are surveyed to quantify caries prevalence in the deciduous teeth. But a survey at younger ages can also help to identify early trends, as well as prevention and treatment needs. And, if the children can be educated preventively and receive treatment at an earlier age, further decay may be slowed if not entirely prevented.

### ***Main findings:***

1. In the primary or deciduous dentition, 196 children had an average dmf of 2.94. The average for decayed teeth was 2.54 and the average for untreated decay was 2.42. The trend was a declining one in that children had a higher dmf at age 6, where the dmf was 3.04, than at age 8 where the dmf was 2.80. This is to be expected since they are losing their temporary teeth.
2. Given the young age, the average DMF for the permanent dentition is not surprising: 0.80. The average for decayed teeth for the 196 children was 0.72, while untreated decay was 0.70. For the permanent dentition, a trend contrary to that in the permanent teeth, can be seen the DMF is increasing from 0.47 at age 6 to 1.25 at age 8.
3. More than one-fourth of the children in each age group had a DMFT of between 1 and 3. That proportion increased with age.
4. Caries prevalence in the permanent dentition increased 53% between the ages of 6 and 7 and 61% between the ages of 7 and 8.
5. The data collected on 196 children showed that only 9, or 4.6%, were found to have mild or moderate fluorosis. Of the remaining 187, 81% or 159 did not show any signs of fluorosis and 14.3 % or 28 showed signs of questionable or very mild fluorosis.

### ***Recommendations***

1. The survey shows that needs are going untreated. Thus, government should explore ways to increase and maximize the number of oral health personnel for providing preventive and curative services.
2. Surveys should be done of children in the 12- and 15-year age groups to assess the prevalence of dental caries in the population.



3. Given the increase in caries prevalence with age, a strategy of intervening by sealing first primary molars with glass ionomer sealants, such as that used in the atraumatic restorative treatment (ART) approach, might be a simpler, practical, high quality, and cost savings approach compared to other dental materials or approaches.

## 2. Introduction

The population of St. Kitts and Nevis was estimated at about 41,000 in 1998<sup>1</sup>. Approximately 9,000 persons live on Nevis. The oral health infrastructure consists of about nine dentists or 1.9 per 10,000.<sup>2</sup> The most recent oral health survey was conducted in 2002. Previously, surveys were conducted in 1976, 1979, and 1983. These surveys revealed the following conditions among 6-12-year olds. The mean DMFT among 12-year-olds was 9 in 1976 and 5.4 in 1979. The percentage of caries free 12-year-olds ad from 23.6% in 1976, 9.1 in 1979, and 69.4 in 2000.<sup>2</sup> The Pan American Health Organization (PAHO) country health profile for St. Kitts and Nevis states that government-sponsored dental services in St. Kitts and Nevis are delivered by a team of oral health personnel that includes dentists, dental auxiliaries, and dental hygienists. Shortages of personnel in the public sector seem to limit preventive services and the majority of services provided are extractions. Patients receiving services in 1992 numbered 8,699, resulting in 1,547 extractions of deciduous teeth and 2,311 extractions of permanent teeth.<sup>3</sup> By 1994 these numbers were down by more than 50%, when 4,903 patients were seen with 863 extractions of deciduous teeth and 1,290 extractions of permanent teeth.<sup>3</sup>

## 3. Survey Design and Demographics

A total of 207 children in five parishes were selected. The children range in age from 5 years to 8 years, the smallest group being nine five-year olds. Owing to the size of the latter group, the nine five-year olds surveyed were excluded from the analysis. The group of the remaining 198 children was evenly divided between females (50%) and males (49.75%) in all age groups (Table 1). Most of the analyses and findings were based on 196 children because of missing data for some of the children. The ethnic composition of the sample is 97% percent black and 3% East Indian (Table 2). Sixty-four percent of the children surveyed live in rural areas, 31% in urban, and 5 % in periurban areas. The sample included children from five parishes, St. Georges, St. James, St. John's, St. Paul's, and St. Thomas. Table 3 demonstrates the distribution of children by parish.

**Table 1. Nevis: Sample of Children Ages 6-8 and Distribution by Gender \***

Age	Sex				
	Male	Percentage (%) of Age Group	Female	Percentage (%) of Age Group	Total
<b>6</b>	39	52.70	35	47.30	74
<b>7</b>	31	45.59	37	54.41	68
<b>8</b>	29	52.73	26	47.27	55
Total	99		98		197

\*Out of the total sample of 198, one child was not identified by sex.

**Table 2: Ethnic Composition of Nevis Sample**

<b>Ethnic Group</b>	<b>Number</b>	<b>Percent (%)</b>
<b>Black</b>	192	96.97
<b>East Indian</b>	6	3.03
<b>Total</b>	198	100

**Table 3: Children in the Nevis Sample, by Parish**

<b>PARISH</b>	<b>Frequency</b>	<b>Percent</b>
<b>St Georges</b>	48	24.24
<b>St James</b>	33	16.67
<b>St Johns</b>	59	29.80
<b>St Pauls</b>	28	14.14
<b>St Thomas</b>	30	15.15
<b>Total</b>	198	100.00

Data collection was conducted using the WHO Oral Health Assessment Form (1997).<sup>4</sup> The data were stored in Microsoft Access. A hierarchical database was created with the major portion of the data stored in a principal data collection form. Several tables were created for additional data and were linked to the primary database by different identification variables. For the data concerning treatment needs the identifier was not linked to the principal database. Consequently, a meaningful analysis of the treatment needs was not possible because it could not be linked to the demographic and caries prevalence data.

There is no survey report describing how the sample for the survey was chosen. Nor is information available about the examiners and any exercise conducted to calibrate them in preparation for conducting the survey. In addition, the survey only covers young children who are generally of interest with relation to the level of caries in the deciduous or temporary dentition. (Check this) WHO recommends surveying children at 5, 12, and 15 years of age. By age 12 most of the “permanent teeth except third molars have erupted.”<sup>4</sup> By age 15 the “permanent teeth have been exposed to the oral environment for 3-9 years” and the assessment of caries prevalence is considered “more meaningful than at 12 years of age.”<sup>4</sup>

#### **4. Number of Teeth and Molars**

Tables 4 and 5 provide information about the mean number of primary and permanent teeth per child in each age group. The group of children who were six years old had an average of 15 primary teeth, while the eight-year olds had a mean of about 11 teeth. On average the six-year old group had 17 permanent teeth while the eight-year olds had an average of 20 permanent teeth.

**Table 4: Mean Number of Primary Teeth per Child by Age (n= 196)**

Age	N	Mean	Std. Dev.	Minimum	Maximum
6	73	15.22	2.93	10	20
7	67	12.43	2.60	0	18
8	56	10.80	3.26	0	15

**Table 5: Mean Number of Permanent Teeth per Child by Age (n=196)**

Age	N	Mean	Std. Dev.	Minimum	Maximum
6	73	16.63	2.87	12	22
7	67	19.36	2.75	10	31
8	56	20.48	3.23	14	30

The four primary permanent molars grow in between ages 6 and 7. In the Nevis sample approximately 15 percent of the six-year olds did not have any of the first permanent molars, while 61 percent of the six-year olds had all four molars. In the eight-year-old group there were no children whose first permanent molars had not yet begun to grow in. Ninety-one percent of the eight-year olds had all four first permanent molars.

**Table 6. Number of Molars per Child by Age**

AGE (% of age group)	Number of Molars					Total number of children in age group
	0	1	2	3	4	
6	11 14.86	2 2.70	9 12.1	7 9.46	45 60.81	74
7	2 2.94	0 0.00	2 2.94	1 1.47	63 92.65	68
8	0 0.00	1 1.79	1 1.79	3 5.36	51 91.07	56
<b>Total</b>	13	3	12	11	159	198
<b>%</b>	6.57	1.52	6.06	5.56	80.30	100.00

## 5. Prevalence and Severity of Dental Caries

### 6. Primary Dentition

Prevalence of caries in the primary dentition decreased from a dmft 3.04 at age 6 to a dmft of 2.80 at age 8 as the children lost their primary *teeth owing to decay* as well as the permanent teeth growing in. The average number of teeth with untreated decay fell slightly between the ages of 6 and 8. Nonetheless, it appears from this group that practically two thirds of the treatment needs were not being met at age 8.

**Table 7. Mean Number of Decayed, Filled, Missing, and Untreated Decayed Primary Teeth per Child by Age, Mean dmft**

Age	N	Decayed	Std Dev	Filled	Std Dev	Missing	Std Dev	Untreated Decay	Std Dev	dmft	Std Dev
6	73	2.69	2.74	0.33	0.97	0.11	0.46	2.60	2.63	3.04	3.07
7	67	2.65	2.83	0.16	0.57	0.18	0.79	2.78	2.78	2.94	3.09
8	56	2.19	2.10	0.64	1.19	0.18	.64	1.98	1.96	2.80	2.67
<b>Total Ages 6-8</b>	196	2.54	2.60	0.36	0.94	0.15	0.63	2.42	2.51	2.94	2.95

### Permanent Dentition

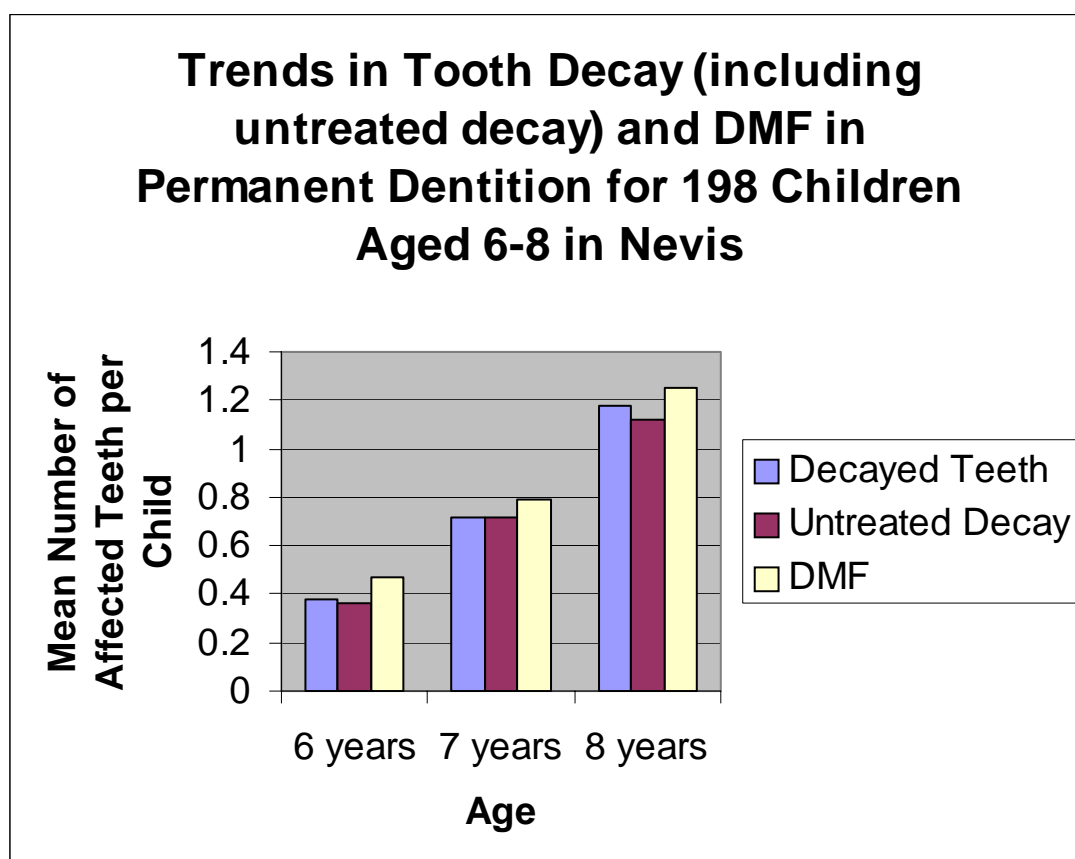
Contrary to the trend in temporary teeth, the prevalence of caries in the permanent dentition was much lower than in the temporary teeth, 0.38 decayed teeth per child at age 6, although it was marked by a steady rise between the younger and older children, 0.72 at age 7 and 1.18 at age 8 (Table 7).

**Table 8. Mean Number of Decayed, Filled, Missing, and Untreated Decayed Permanent Teeth, and DMF per Child by Age (Nevis)**

Age	N	Decayed	Std Dev	Filled	Std Dev	Missing	Std Dev	Untreated Decay	Std Dev	DMF	Std Dev
6	73	0.38	0.75	0.01	0.12	0.08	0.52	0.36	0.72	0.47	0.97
7	67	0.72	1.15	0.03	0.24	0.04	0.37	0.72	1.15	0.79	1.21
8	56	1.18	1.30	0.07	0.32	0.05	0.23	1.12	1.29	1.25	1.39
<b>Total Ages 6-8</b>	196	0.72	1.11	0.04	0.23	0.06	0.4	.70	1.09	.80	1.22

The lower prevalence of decay at age six is probably related to the fact that the permanent teeth are growing in and it is at this age that the first permanent molars are beginning to erupt. By ages seven and eight, the children have acquired most of their molars. Chart 1 illustrates the trend in decay in the permanent teeth for the children in the sample. Most notable is the jump in caries prevalence as the children get older. The increase between ages 6 and 7 is 53% and the increase between ages 7 and 8 is 61%. As with the temporary teeth, it seems that the children's needs are not being met in terms of preventive and curative services because the amount of untreated decay is close to the number of decayed teeth per child. The combination of the rapid rate of increase in caries prevalence at such a young age and insufficient preventive and curative services is cause for concern regarding the oral health status that these children will experience as they get older.

**Chart 1**



**Table 9. DMF, Proportion of the Children within three levels of Caries Severity (WHO Criteria) in Permanent Dentition of Children Ages 6-8 (n=196)**

Age (%)	DMFT = 0	1=< DMFT =< 3	4=< DMFT =< 6	Total
6	53(72.60)	18(24.66)	2 (2.74)	73
7	41(61.19)	23(34.23)	3(4.48)	67
8	26(46.43)	27(48.22)	3(5.36)	56

As can be seen in Table 9, more than one-fourth of the children in each age group had a DMFT of between 1 and 3. And that proportion increased with age.

## 7. Treatment Needs

While WHO survey form includes treatment needs and the data were collected in this survey, the database was set up in such a way that treatment needs and caries prevalence and demographic information were not linked. Consequently it is not possible to analyze the specific treatment needs observed by the children in the sample. Nonetheless, the survey data show that the children are not receiving services for their current needs and unless this changes, these needs may increase. This seems to be owing to the reduction in dental care services in St. Kitts and Nevis in general.

## 8. Enamel Fluorosis

According to data collected on 196 children for enamel fluorosis using Dean's index criteria,<sup>5</sup> 159 or 81.1 % of the children appeared to be normal, not showing any signs of fluorosis. Another 28 or 14.3% were evaluated as having questionable/very mild fluorosis while 9 or 4.6% were found to have mild/moderate fluorosis. In each age group, a majority of the children were evaluated as normal, 84.9% among the six year olds, 79.7% among the seven year olds, and 78.5% among the eight year olds. The reliability of this data is open to question in view of the lack of data about the assessment of reproducibility of the data (inter- and intra-examiner consistency)

**Table 10. Percentage of Children Affected by Enamel Fluorosis by Age Group**

	Normal		Questionable/ Very Mild		Mild/Moderate		
Age	N	%	N	%	N	%	Total
6	62	84.9	10	13.7	1	0.1	73
7	53	79.7	10	15	4	.05	67
8	44	78.5	8	14.2	4	.07	56
<b>Total Ages 6-8</b>	159	81.1	28	14.3	9	4.6	196

## 9. Temporomandibular Joint Assessment

The children in the sample showed little or no signs of temporomandibular joint symptoms. Only 12% or 6% were positive for temporomandibular clicking.

**Table 11: Temporomandibular Joint Assessment, by age group**

	Symptoms	Clicking		Tenderness	Reduced Jaw Mobility
	Negative	Negative	Positive	Negative	Negative
<b>6</b>	74	69	5	74	74
<b>7</b>	66	61	5	66	66
<b>8</b>	54	52	2	54	54
<b>Total</b>	194	182	12	194	194

## 10. Extra-Oral Examination

Of 197 children assessed, 98% were evaluated as having a normal extra-oral appearance.

**Table 12: Extra-Oral Examination, by Age Group**

	Normal extra-oral appearance		Ulceration, sores, erosions, fissures (head, neck, limbs)		
	N	%	N	%	N
<b>AGE</b>					
<b>6</b>	72	97.3	2	2.7	74
<b>7</b>	65	97.0	2	3.0	67
<b>8</b>	56		.	.	56
<b>Total</b>	193	98.0	4	2.0	197

## 11. Enamel Opacities/Hypoplasia

Data were collected on enamel opacities and hypoplasia using a modified developmental defects of enamel (DDE)<sup>6</sup> index. The data available was for a total of 184 children, 179, excluding the five-year olds. The lack of information about tests of inter- and intra-examiner reliability raise questions about whether enamel opacities/hypoplasia might have been mistaken for fluorosis or vice-versa.

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## References

<sup>1</sup> CAREC

<sup>2</sup> PAHO. Health Conditions in the Caribbean, Scientific Publication No. 561. Washington, D.C.; 1997.

<sup>3</sup> PAHO, Saint Kitts and Nevis: Basic Country Health Profiles, Summaries 1999, <http://www.paho.org/English/SHA/prflskn.htm>.

<sup>4</sup> WHO. Oral Health Surveys: Basic Methods, 4<sup>th</sup> Edition. Geneva; World Health Organization; 1997

<sup>5</sup> Dean HT. The investigation of physiological effects of the epidemiological method. In: Moulton FR, ed. *Fluoride and dental health*. Washington, D.C., American Association for the Advancement of Science, 1942 (Publication No. 19):23-31

<sup>6</sup> FDI Commission on Oral Health, Research and Epidemiology. A review of the developmental defects of enamel index (DDE Index). *International dental journal*, 1992, 42:411-426.