

**PENNSYLVANIA ORAL HEALTH NEEDS ASSESSMENT**

**FINAL REPORT**  
**Contract Number ME98-001**

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## Executive Summary

Under contract with the Pennsylvania Department of Health (ME98-001), the University of Pittsburgh conducted over the course of nearly two years, from September 1, 1998 until May 30, 2000, a scientifically-based and representative sample of child and adult residents within each of the Dental Health Districts. The oral health status and dental needs of Commonwealth children were the subject of this needs assessment. A sampling strategy was used to ensure that valid and representative samples were examined.

This report provides answers to the specific questions posed in the proposal for the Pennsylvania Oral Health Needs Assessment (OHNA) project. This information can be used to evaluate present oral health status and to develop new policies and programs to improve the oral health of schoolchildren in Pennsylvania and its six Health Services Districts.

### Results

Dental caries remain a significant condition among Pennsylvania's children. Caries (decay) rates show a steady increase with age and significant variation among health districts. Untreated dental caries remains a serious problem for many children. The Healthy People 2000 objectives for untreated decay was exceeded for Pennsylvania's 6-8 year olds by 7%.

Urgent treatment needs were also significant and varied dramatically by health district. A three fold difference in the rate of "urgent" unmet dental needs existed from the highest (Philadelphia) to lowest (Southcentral) districts. More untreated (caries) individuals were found in the northern Health Districts and in Philadelphia and Pittsburgh, when compared with the southern Health Districts. The underlying causes of these disparity in health status were not determined by this study.

Although the rate of children's annual dental visits were quite high (87%), those children that did not visit the dentist had much higher rates of untreated dental disease than those children who had a dental visit in the previous 12 months (39% versus 18% respectively). Children from disadvantaged economic backgrounds had the most dental disease and the most untreated dental disease. The most troubling finding from this study was the significant economic gradient that existed for dental caries. Children from the poorest families had three times more dental caries and two time more untreated dental caries than children from the wealthiest families. This strongly suggests that access to preventive and restorative dental care is lacking for these poor children.

Water fluoridation still reaches a minority of Pennsylvania's children. This study found that water fluoridation was associated with a 22% reduction in caries rates among children.

Dental sealants were present in 25% of Pennsylvanian children age 8 and 14, half of the Healthy People 2000 objective, which calls for sealants to be placed on 50% of children in these age groups.

School nurses reported that they deal on average with one or two dental emergencies per week. However, in certain schools, dental emergencies are a very serious problem, occurring at a rate of at least one emergency per day.

# PENNSYLVANIA ORAL HEALTH NEEDS ASSESSMENT

## FINAL REPORT Contract Number ME98-001

### 1. PURPOSE AND INTENT OF THE ASSESSMENT

Act 87 of 1996 calls for the Pennsylvania Department of Health (DOH) to "apportion this Commonwealth into Dental Health Districts, administered by a public health dentist within the Department, who shall implement dental health policies and programs for the various communities and political subdivisions within this Commonwealth." The proposed Needs Assessment provides the DOH, and specifically, the Commonwealth's Public Health Dentist, the information necessary for the development of appropriate dental policies and programs. Over the course of nearly two years, from September 1, 1998 until July 31, 2000, a scientifically-based and representative sample of children and their parents was assessed within each of the Dental Health Districts. The oral health status and dental needs of Commonwealth residents were the subject of this Oral Health Needs Assessment (OHNA) proposed by the Center for Public Health Practice (CPHP) of the Graduate School of Public Health, University of Pittsburgh.

The results reported herein respond to the following Statements of Work:

- What is the oral health status of Commonwealth residents, particularly as it relates to the baseline and health status objectives of the Oral Health Section of Healthy People 2000?
- How does oral health vary within and among the Commonwealth's Dental Health Districts?
- To what extent do Commonwealth children lack access to fluoridated water?
- To what extent do Commonwealth children have access to necessary dental care?
- What policies and programs should be adopted to address the oral health needs of Commonwealth children?
- What is the extent and severity of dental fluorosis?

### 2. OBJECTIVES

This assessment was designed to address the following Healthy People 2000 objectives: 13.1 (a-d), 13.2 (a-d), 13.8, 13.9, 13.10, 13.12, and 13.16. These objectives were accomplished through a clinical epidemiological assessment of a representative sample of public school children (grades 1, 3, 9, and 11, generally covering ages 6-9, and 14-17). This assessment determined the:

- prevalence of treated and untreated dental caries,
- presence of dental sealants
- prevalence of missing permanent teeth, and
- prevalence of dental fluorosis
- orthodontic status
- evidence of anterior tooth trauma
- presence of other dental conditions requiring care

### 3. PERSONNEL

The following were the key individuals in creating and analyzing the data for this report

<b>Principal Investigator:</b>	Dr. Robert Weyant
<b>Study Coordinators:</b>	Dr. Patricia Corby Ms. Vicki Zajack
<b>Dental Hygienists/Examiners</b>	Mary Fran Cummings Mikki Frear Tracye Moore Louise Schulhoff Jayme Zovco
<b>Biostatistician</b>	Dr. Mike Manz (University of Michigan)
<b>Survey Consultant:</b>	Dr. Eugenio Beltran (CDC) Steven Manners
<b>Study Consultant:</b>	Dr. Charles Ludwig

### 4. METHODS

#### 4.1 Sampling

A sampling strategy was used to ensure that valid and representative samples were examined. The sample design for this survey was a PPS (probability proportional to size) selection of districts from the public school systems of Pennsylvania. The survey included a full sample of grade levels 1, 3, 9, and 11. Grade levels 1, 3, 9, and 11 were chosen in order to assess oral health at important stages of development and to evaluate the Pennsylvania population of children on specific objectives cited in the Healthy People 2000 document, which requires assessments of children at ages 6-8, 14, and 15.

The selection stages included in sequence: the selection of school districts; schools within school districts; and classes within schools. Variables believed to be associated with the oral health outcome variables of interest and used in designing the sample for this survey are the Dental Health District of the state and the urban/rural status as indicated by the number of children enrolled in the school system. Other variables believed to be associated with the outcome variables of interest include socioeconomic status (SES) as indicated by the percentage of children in a school system which are eligible for the free and reduced lunch program, racial/ethnic status, and fluoridation status of community water supplies. The number of first stage Primary Sampling Unit (PSU) selections precludes the use of more than two stratification variables in the sample design but the variables used in sample design are believed to be related to the other variables of interest. The resulting sample should provide for valid evaluation of these other variables not used in the sample design..

#### 4.1.1 1st Stage of Selection

School district enrollment information for the 1997-1998 school year was obtained from the Pennsylvania Department of Education. From this information a sampling list was generated arranging the Pennsylvania public school districts for the sampling procedure. The list was first sorted by Dental Health District. Within each Dental Health District the school districts were

ordered by enrollment size. Generally, district enrollment size is well correlated with urban/ rural status for the school systems. A selection of 60 PSUs was completed in the first stage of sampling. Based on Census population figures for the state of Pennsylvania, Philadelphia and Pittsburgh were oversized PSUs and were therefore treated as separate strata for sampling.

The first stage selections were made from the Pennsylvania school districts other than Philadelphia and Pittsburgh. These PSUs were school districts sampled with probability proportional to size. Dental Health Districts of the state and urban/ rural status are of greatest interest and believed to be related to the other primary survey variables, therefore making them logical stratification variables to use. With the list ordered by Dental Health District and enrollment size within Dental Health District, school district sizes were listed along with a cumulative enrollment total running through all school districts from the beginning to the end of the list. The selection interval for selection of school districts was determined by dividing the total enrollment on the list by the number of selections to be made. A random number between 0 and the selection interval was obtained and used to make the first selection. The selection interval was then added to the random number and repeated until all selections were made.

#### 4.1.2 2nd Stage of Selection

Lists were then prepared for each selected school district, one for grades 1 and 3, and one for grades 9 and 11. All schools in the school district that have one or more of the survey grades were included in the list for that index group. One school was selected with probability proportional to size from each index grade group list for each school district. The school selected from a list is chosen by using the cumulative total for the estimated index grade group school enrollments. After the total index grade group enrollment for a list was determined, a random number between 1 and the total for that list is generated.

#### 4.1.3 3rd Stage of Selection

At the final stage of selection, one class equivalent was chosen from each selected school. Where possible, one class from each index grade group in the school was randomly selected. Other situations required means necessary to select 25 children representing a random sample of children for the grade in the school. The assumption of an average approximate class size of 25 was used.

#### 4.1.4 Philadelphia and Pittsburgh

The Philadelphia and Pittsburgh school districts were oversized PSUs and therefore sampled with certainty at the first stage of selection. Philadelphia was found to be about eight times and Pittsburgh about two times the sampling interval used for the rest of the state school districts. To provide proportional representation for these school districts, eight PSU equivalents would be selected for Philadelphia and two PSU equivalents for Pittsburgh. However, because there was particular interest in precise estimates of oral health for the two major cities of Pennsylvania, the decision was made to select ten PSU equivalents for Philadelphia, and five PSU equivalents for Pittsburgh.

The method of making the selections in these districts was a systematic sampling from an ordered listing of schools within the district. To provide a representative sampling of the schools from these cities, the schools were ordered according to zip codes arranged geographically by location within the cities using a serpentine pattern of zip code ordering from one extreme location of the city (e.g. the northwest corner) to the other (e.g. the southeast corner). The schools and their index grade enrollments were listed along with a cumulative total enrollment for the list. For Philadelphia, schools were listed by school clusters (elementary schools tied in

with high schools). In Pittsburgh, elementary schools are not tied with specific high schools, separate lists and selections were made for elementary schools (for grades 1 and 3) and high schools (for grades 9 and 11). The selection interval for selection of schools was determined by dividing the total enrollment on the list by the number of selections to be made (ten for Philadelphia, five for Pittsburgh). A random number between 0 and the selection interval was obtained and used to make the first selection. The selection interval was then added to the random number and repeated until all of the selections were made. Once school clusters were selected in Philadelphia an additional selection step was required to select a specific elementary school within the cluster. One class equivalent was selected at random for each index grade in each selected school.

#### 4.1.5 Sample Size

In this survey, as is the case with multi-stage cluster sample designs, the number of districts and schools that can be visited for assessments is more important in determination of sample size than a calculation of a desired number of children to be examined. A total of 60 districts, in addition to Pittsburgh and Philadelphia, was seen as a logistically feasible number to be included in this undertaking. In order to obtain uniform and consistent representation from the school districts, and to maximize the number of first stage selections of school districts, one class equivalent from each index grade level was included.

With 60 PSU equivalents selected plus the 15 PSU equivalents from Pittsburgh and Philadelphia, four index grade levels for each PSU, and one class of 25 students for each index grade level, the expected number of students to be selected for the survey was 7,500. However, due to nonresponse at the district, school and child levels, the final sample size was actually 6040.

Probability of selection for a child in this survey equals the product of the probability of selection for the school district, school within the district, and class within the index grade level. The probability of a child being examined in the survey is the product of the probability of selection and the response rate in the class of the child. The weight for a child to be used in analysis of survey results was, therefore, the inverse of the probability of being examined in the survey.

## 4.2 Clinical Assessment

### 4.2.1 Clinical and Questionnaire Assessments

The assessment consisted of a clinical epidemiological oral screening and a questionnaire survey of a representative sample of children in each of the Dental Health Districts. Clinical assessments of children were conducted in the schools, using portable dental equipment by a dental hygienist, often accompanied by an assistant. Children ages 6-8 14, and 15 were targeted to provide a basis for comparison with Healthy People 2000 objectives. A subsample of parents (n=1200) were assessed with a telephone questionnaire.

#### 4.2.1 Examiner/Recorder Training and Calibration

This study used five examiners in three teams. Each team included a Registered Dental Hygienist (RDH) who either conducted examinations alone or with an assistant. All RDHs and recorders operated under the supervision of the Principal Investigator, a licensed dentist in Pennsylvania. Examiner calibration was conducted by a team of epidemiologists from the

University of Pittsburgh, the University of Michigan, and the U.S. Public Health Service's Centers for Disease Control and Prevention (Atlanta, Ga.).

Each hygienist was trained at the University of Pittsburgh. The training consisted of an initial familiarization of the examiners and recorders in all aspects of the clinical screening. After the examiners (RDHs) and the assistants were familiar with the clinical screening process, a formal calibration process was employed. This process consisted of repeated screening of volunteer patients until intra- and inter-examiner repeatability of all clinical measures exceeded 90% agreement.

#### 4.2.2 Recalibration

We employed standard repeated measures of a few subjects periodically during the course of this study to ensure that examiner calibration remained consistent. When drift was detected, retraining occurred. This was necessary only once, during the summer hiatus between years one and two.

#### 4.2.3 Data recording

Data were recorded on laptop computers via direct data entry at the time of the clinical screening or via paper data collection forms.

#### 4.2.4 Infection control/subject protection

Strict infection control guidelines recommended by CDC (Bloodborne Pathogens Standard), OSHA, and the American Dental Association was observed at all times. Institutional Review Board clearance was obtained prior to initiation of this survey. Additionally, all subject level data are being kept strictly confidential and will be destroyed after aggregate summaries are made and the DOH is in no further need of analysis.

#### 4.2.5 Consent Form

The parent or guardian of each child selected for this program received a consent form approved by the University of Pittsburgh's Institutional Review Board. Prior to participation in this assessment consent was obtained from a parent/guardian for each child.

#### 4.2.6 Rationale for Selection of the Specific Oral Health Assessment Methodologies

The overall selection of screening protocols was based on a need for measures that were: 1) valid and reliable, 2) comparable to measures used in other population-based studies (e.g., NIDR adult survey, Healthy People 2000 Objectives), and 3) easily completed within a reasonable time (approximately 10 minutes), with high patient acceptability and 4) non-invasive manner. Since this assessment focuses on oral disease in children, concern was not with detailing periodontal attachment loss which would require a more invasive examination. Finalization of examination protocols was done in collaboration with the contract's consulting staff from the University of Michigan (Dr. Manz) and the USPHS Centers for Disease Control and Prevention (Dr. Beltran).

The procedures selected in all cases permit prevalence measures and valid comparisons with other important studies (e.g., NIDR Children's survey) and reference objectives (e.g., Healthy People 2000 Oral Health Objectives) to be made.

## 5. RESULTS

This report provides answers to the specific questions posed in the proposal for the Pennsylvania Oral Health Needs Assessment project. This information can be used to evaluate present oral health status and to develop new policies and programs to improve the oral health of schoolchildren in Pennsylvania and its six Health Service Districts. The oral health information included in this report comes from surveys conducted over a two year period from July 1, 1998 to July 31, 2000. The survey information was drawn from a scientifically based sample of Pennsylvania public schoolchildren and their families which is representative at the state and health district levels. Rather than selecting children of all grade levels, index grades were chosen providing for more precise information at important stages in oral health development and to provide for evaluation related to Healthy People 2000 objectives. Results in this report generally include statewide estimates, Health Service District estimates, and estimates for grades 1, 3, 9, and 11. Results for Philadelphia and Pittsburgh schoolchildren are reported separately from their respective Health Service District. For comparisons to Healthy People 2000 objectives, an appropriate subsample was used based on ages stated in the objectives.

An oral health screening was completed on 6,040 Pennsylvania schoolchildren. Children were screened for the presence of untreated dental caries, dental fillings, missing permanent teeth, pit and fissure sealants, dental fluorosis, signs of anterior tooth trauma, orthodontic needs, and other urgent and non-urgent dental care needs. Family socioeconomic status, perceived need for dental care and other issues were addressed in questionnaire survey of parents of a subsample of examined children. General survey findings and results specifically addressing Health People 2000 objectives for these various components of oral health are provided in the following text and tables.

### 5.1 Oral Health Status of Commonwealth Children

The first two Work Statements are addressed in Tables 1 –10, 14, 17, and 22 below.

- ◆ *What is the oral health status of Commonwealth children, particularly as it relates to the baseline and health status objectives of the Oral Health Section of Healthy People 2000?*
- ◆ *How does oral health vary within and among the Commonwealth's Dental Health Districts??*

#### 5.1.1 Dental Decay Experience

Tables 1-4 display the average amounts of past and present dental decay expressed in the form of decayed, missing, and filled teeth for the primary and/or permanent teeth. The tables provide: the actual number of children screened (Sample Size); the number of Pennsylvania schoolchildren represented (Weighted Size); the estimated total number (e.g. of decayed teeth) in the represented population (Total); the estimated mean number (e.g. of decayed teeth) per child in the represented population (Mean); and the standard error of the estimated mean (SE Mean). Note that table 4 includes incipient lesions (small questionable carious lesions) that may or may not progress and require dental restorative treatment. While there is a fair amount of variation, the trend generally would seem to be for more caries experience and untreated caries in the northern districts and the two cities, with lower rates seen in the southern districts (excluding Philadelphia and Pittsburgh). These trends suggest a gradient of disease related to residence, with worse disease found in the most rural and urban areas as compared to suburban populations.



Table 1. Decayed and Filled Primary Teeth by health district and by grade.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
DFT (all grades)					
Total	6040	464379.57	430598.82	0.93	0.05
Northwestern	490	41116.18	54447.29	1.32	0.14
North Central	383	28998.30	34336.94	1.19	0.15
Northeastern	611	61364.03	64825.49	1.06	0.15
Southeastern	1428	113096.24	85037.40	0.75	0.07
South Central	945	67561.70	64139.93	0.95	0.17
Southwestern	841	76928.21	56677.32	0.74	0.11
Philadelphia	881	63232.61	60151.05	0.95	0.15
Pittsburgh	461	12082.30	10983.40	0.91	0.08
DFT (for grade 1)					
Total	1808	125865.47	215665.39	1.71	0.09
Northwestern	133	11690.34	30126.06	2.58	0.23
North Central	88	6747.50	18301.29	2.71	0.30
Northeastern	198	16017.43	31332.96	1.96	0.41
Southeastern	431	29912.52	38830.79	1.30	0.12
South Central	315	19819.19	30784.39	1.55	0.17
Southwestern	250	19750.88	27242.45	1.38	0.24
Philadelphia	247	18436.07	33800.93	1.84	0.27
Pittsburgh	146	3491.55	5166.52	1.48	0.14
DFT (for grade 3)					
Total	1768	129009.13	210514.29	1.63	0.07
Northwestern	133	11332.11	24194.59	2.14	0.15
North Central	89	7752.77	15540.03	2.00	0.27
Northeastern	186	18392.25	33324.23	1.81	0.28
Southeastern	432	31002.72	45552.81	1.47	0.13
South Central	308	21336.77	32865.36	1.54	0.18
Southwestern	258	19899.76	27997.88	1.41	0.17
Philadelphia	244	16019.47	25268.49	1.58	0.19
Pittsburgh	118	3273.29	5740.90	1.75	0.33
DFT (for grade 9)					
Total	1350	114653.31	2290.12	0.02	0.01
Northwestern	116	9373.58	0.00	0.00	0.00
North Central	103	7339.53	203.86	0.03	0.02
Northeastern	116	14159.64	168.30	0.01	0.01
Southeastern	330	29086.99	552.59	0.02	0.01
South Central	183	13616.16	434.75	0.03	0.02
Southwestern	171	20347.46	751.92	0.04	0.02
Philadelphia	214	17568.56	118.96	0.01	0.01
Pittsburgh	117	3161.39	59.74	0.02	0.01
DFT (for grade 11)					
Total	1114	94851.65	2129.02	0.02	0.01
Northwestern	108	8720.16	126.64	0.01	0.01
North Central	103	7158.50	291.76	0.04	0.03
Northeastern	111	12794.71	0.00	0.00	0.00
Southeastern	235	23094.01	71.20	0.00	0.00
South Central	139	12789.58	55.43	0.00	0.00
Southwestern	162	16930.12	685.08	0.04	0.01
Philadelphia	176	11208.51	882.68	0.08	0.05
Pittsburgh	80	2156.07	16.24	0.01	0.01

Table 2. Decayed, Missing and Filled Permanent Teeth by Health District and by Grade.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
<b>DMFT (all grades)</b>					
Total	6039	464340.56	480071.33	1.03	0.05
Northwestern	490	41116.18	59478.04	1.45	0.17
North Central	383	28998.30	30107.71	1.94	0.19
Northeastern	611	61364.03	69786.53	1.14	0.18
Southeastern	1428	113096.24	94192.92	0.83	0.11
South Central	945	67561.70	57756.35	0.85	0.09
Southwestern	841	76928.21	82259.70	1.07	0.11
Philadelphia	880	63193.60	73268.83	1.16	0.11
Pittsburgh	461	12082.30	13221.24	1.09	0.09
<b>DMFT (for grade 1)</b>					
Total	1808	125865.47	17618.75	0.14	0.02
Northwestern	133	11690.34	2616.21	0.22	0.04
North Central	88	6747.50	1207.27	0.18	0.08
Northeastern	198	16017.43	2548.28	0.16	0.05
Southeastern	431	29912.52	3878.78	0.13	0.04
South Central	315	19819.19	2474.74	0.12	0.05
Southwestern	250	19750.88	2360.15	0.12	0.03
Philadelphia	247	18436.07	2467.48	0.13	0.05
Pittsburgh	146	3491.55	65.84	0.02	0.02
<b>DMFT (for grade 3)</b>					
Total	1767	128970.12	44927.11	0.35	0.03
Northwestern	133	11332.11	6298.80	0.56	0.13
North Central	89	7752.77	1563.42	0.20	0.08
Northeastern	186	18392.25	7753.27	0.42	0.09
Southeastern	432	31002.72	8963.69	0.29	0.04
South Central	308	21336.77	7097.42	0.33	0.05
Southwestern	258	19899.76	5868.27	0.29	0.07
Philadelphia	243	15980.46	6292.15	0.39	0.11
Pittsburgh	118	3273.29	1090.08	0.33	0.07
<b>DMFT (for grade 9)</b>					
Total	1350	114653.31	199794.38	1.74	0.11
Northwestern	116	9373.58	19918.35	2.12	0.42
North Central	103	7339.53	11288.02	1.54	0.39
Northeastern	116	14159.64	25637.56	1.81	0.41
Southeastern	330	29086.99	41311.21	1.42	0.20
South Central	183	13616.16	22350.69	1.64	0.29
Southwestern	171	20347.46	37919.81	1.86	0.32
Philadelphia	214	17568.56	35348.83	2.01	0.19
Pittsburgh	117	3161.39	6019.90	1.90	0.23
<b>DMFT (for grade 11)</b>					
Total	1114	94851.65	217731.08	2.30	0.11
Northwestern	100	8720.16	30644.67	3.51	0.14
North Central	103	7158.50	16048.99	2.24	0.08
Northeastern	111	12794.71	33847.41	2.65	0.30
Southeastern	235	23094.01	40039.23	1.73	0.27
South Central	139	12789.58	25833.51	2.02	0.29
Southwestern	162	16930.12	36111.47	2.13	0.22
Philadelphia	176	11208.51	29160.37	2.60	0.32
Pittsburgh	80	2156.07	6045.42	2.80	0.23

Table 3. Decayed and Filled Primary and Decayed, Missing and Filled Permanent Teeth by Health District and by Grade.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
DMFDFT (all grades)					
Total	6039	464340.56	910514.11	1.96	0.07
Northwestern	490	41116.18	113925.33	2.77	0.17
North Central	383	28998.30	64444.65	2.22	0.22
Northeastern	611	61364.03	134612.02	2.19	0.28
Southeastern	1428	113096.24	179230.31	1.58	0.14
South Central	945	67561.70	121896.28	1.80	0.12
Southwestern	841	76928.21	138937.02	1.81	0.19
Philadelphia	880	63193.60	133263.85	2.11	0.19
Pittsburgh	461	12082.30	24204.64	2.00	0.10
DMFDFT (for grade 1)					
Total	1808	125865.47	233284.15	1.85	0.10
Northwestern	133	11690.34	32742.27	2.80	0.26
North Central	88	6747.50	19508.56	2.89	0.35
Northeastern	198	16017.43	33881.24	2.12	0.46
Southeastern	431	29912.52	42709.57	1.43	0.15
South Central	315	19819.19	33259.13	1.68	0.20
Southwestern	250	19750.88	29602.60	1.50	0.25
Philadelphia	247	18436.07	36348.41	1.97	0.30
Pittsburgh	146	3491.55	5232.37	1.50	0.14
DMFDFT (for grade 3)					
Total	1767	128970.12	255285.36	1.98	0.09
Northwestern	133	11332.11	30493.39	2.69	0.17
North Central	89	7752.77	17103.45	2.21	0.34
Northeastern	186	18392.25	41077.51	2.23	0.32
Southeastern	432	31002.72	54546.51	1.76	0.15
South Central	308	21336.77	39962.78	1.87	0.20
Southwestern	258	19899.76	33866.14	1.70	0.23
Philadelphia	243	15980.46	31404.60	1.97	0.29
Pittsburgh	118	3273.29	6830.98	2.09	0.31
DMFDFT (for grade 9)					
Total	1350	114653.31	202084.50	1.76	0.11
Northwestern	116	9373.58	19918.35	2.12	0.42
North Central	103	7339.53	11491.89	1.57	0.38
Northeastern	116	14159.64	25005.86	1.82	0.42
Southeastern	330	29086.99	41863.81	1.44	0.20
South Central	183	13616.16	22785.44	1.67	0.29
Southwestern	171	20347.46	38671.73	1.90	0.32
Philadelphia	214	17568.56	35467.78	2.02	0.19
Pittsburgh	117	3161.39	6079.64	1.92	0.23
DMFDFT (for grade 11)					
Total	1114	94851.65	219860.10	2.32	0.11
Northwestern	108	8720.16	30771.31	3.53	0.12
North Central	103	7158.50	16340.76	2.28	0.08
Northeastern	111	12794.71	33847.41	2.65	0.30
Southeastern	235	23094.01	40110.43	1.74	0.28
South Central	139	12789.58	25888.94	2.02	0.30
Southwestern	162	16930.12	36796.55	2.17	0.22
Philadelphia	176	11208.51	30043.05	2.68	0.36
Pittsburgh	80	2156.07	6061.66	2.81	0.23

Table 4. Decayed and Filled Primary and Decayed, Missing and Filled Permanent Teeth by Health District and by Grade Including Incipient (possibly reversible) Lesions.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
<b>DMFDFINT (all grades)</b>					
Total	5221	387631.01	994014.12	2.56	0.10
Northwestern	390	33828.68	121364.09	3.59	0.22
North Central	383	28998.30	83594.76	2.88	0.39
Northeastern	611	61364.03	161087.95	2.63	0.26
Southeastern	1148	87028.79	181281.93	2.88	0.20
South Central	779	51060.83	109452.43	2.14	0.22
Southwestern	569	50074.49	132440.03	2.64	0.38
Philadelphia	880	63193.60	166173.47	2.63	0.28
Pittsburgh	461	12082.30	38619.46	3.20	0.09
<b>DMFDFINT (for grade 1)</b>					
Total	1577	103700.51	215789.96	2.08	0.12
Northwestern	108	9952.38	29074.78	2.92	0.28
North Central	88	6747.50	20741.08	3.07	0.39
Northeastern	198	16017.43	36309.03	2.27	0.42
Southeastern	362	23177.01	39128.46	1.69	0.16
South Central	253	13783.45	24264.08	1.76	0.20
Southwestern	175	12095.11	20062.65	1.66	0.34
Philadelphia	247	18436.07	39411.79	2.14	0.33
Pittsburgh	146	3491.55	6798.09	1.95	0.18
<b>DMFDFINT (for grade 3)</b>					
Total	1501	104940.77	253691.14	2.42	0.12
Northwestern	108	9543.04	32136.73	3.37	0.30
North Central	89	7752.77	20241.13	2.61	0.46
Northeastern	186	18392.25	49053.40	2.67	0.34
Southeastern	337	23026.13	50511.76	2.19	0.25
South Central	243	14658.19	29089.91	1.98	0.21
Southwestern	177	12314.64	25651.40	2.08	0.39
Philadelphia	243	15980.46	36277.88	2.27	0.39
Pittsburgh	118	3273.29	10728.91	3.28	0.15
<b>DMFDFINT (for grade 9)</b>					
Total	1187	99359.88	262190.77	2.64	0.18
Northwestern	91	7660.69	27682.90	3.61	0.54
North Central	103	7339.53	17096.91	2.33	0.54
Northeastern	116	14159.64	34994.44	2.47	0.39
Southeastern	276	23190.03	48567.09	2.09	0.28
South Central	162	11585.69	23526.29	2.03	0.37
Southwestern	108	14694.34	47172.99	3.21	0.86
Philadelphia	214	17568.56	51749.23	2.95	0.30
Pittsburgh	117	3161.39	11400.91	3.61	0.38
<b>DMFDFINT (for grade 11)</b>					
Total	956	79629.86	262342.25	3.29	0.18
Northwestern	83	6672.57	32469.68	4.87	0.25
North Central	103	7158.50	25515.64	3.56	0.54
Northeastern	111	12794.71	40731.08	3.18	0.30
Southeastern	173	17635.61	43074.62	2.44	0.37
South Central	121	11033.51	32572.15	2.95	0.46
Southwestern	189	10970.39	39552.98	3.61	0.51
Philadelphia	176	11208.51	38734.56	3.46	0.59
Pittsburgh	80	2156.07	9691.54	4.50	0.37

Healthy People 2000 objective 13.1 addresses reducing the proportion of children age 6-8 and age 15 with signs of present or past dental decay experience. The corresponding results from the Pennsylvania Oral Health Needs Assessment survey are presented in Table 5.

*Healthy People 2000 Objective 13.1: Reduce dental caries (cavities) so that the proportion of children with one or more caries (in permanent or primary teeth) is no more than 35 percent among children aged 6 through 8 and no more than 60 percent among adolescents aged 15. (Baseline: 53 percent of children aged 6 through 8 in 1986-87; 78 percent of the adolescents aged 15 in 1986-87)*

Table 5. Percentage of Children with Caries Experience (DMFTdft > 0) for Healthy People 2000 Objective Age groups.

HP 2000 Age Groups Health Districts	Sample Size	Weighted Size	Total	Percent	SE Percent
<b>age 6-8</b>					
Total	624	1 86277.70	88921.68	47.74	1.77
Northwestern	191	16463.95	18781.86	65.00	4.62
North Central	131	10612.57	6169.94	58.14	3.72
Northeastern	307	26802.70	13641.01	50.89	6.70
Southeastern	640	45574.35	18612.54	40.84	3.16
South Central	478	29928.51	14300.26	47.78	5.24
Southwestern	348	27795.16	12116.83	43.59	4.23
Philadelphia	333	24215.20	11077.61	45.75	3.68
Pittsburgh	196	4885.27	2301.63	47.11	5.55
<b>age 15</b>					
Total	661	56654.77	28032.49	49.48	2.89
Northwestern	66	5311.59	3165.80	59.60	12.77
North Central	54	4869.66	1926.61	39.56	9.49
Northeastern	44	5735.54	2690.88	46.92	9.41
Southeastern	177	14967.89	5791.89	38.70	3.59
South Central	95	6885.53	3311.73	48.10	9.96
Southwestern	83	11085.71	6425.52	57.96	7.59
Philadelphia	82	6191.55	3581.84	57.85	4.87
Pittsburgh	60	1607.29	1138.22	70.82	5.73

Table 6. Untreated Decayed Permanent Teeth by Health District and by Grade.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
-----					
DECAYED PERMANENT (all grades)					
Total	6040	464379.57	93695.59	0.20	0.02
Northwestern	490	41116.18	11845.40	0.29	0.05
North Central	383	28998.30	5734.85	0.20	0.36
Northeastern	611	61364.03	11325.21	0.18	0.34
Southeastern	1428	113096.24	17864.20	0.15	0.03
South Central	945	67561.70	7582.27	0.11	0.02
Southwestern	841	76928.21	12469.42	0.16	0.06
Philadelphia	881	63232.61	23598.97	0.37	0.08
Pittsburgh	461	12082.30	3355.27	0.28	0.07
DECAYED PERMANENT (for grade 1)					
Total	1808	125865.47	9281.98	0.07	0.01
Northwestern	133	11690.34	1580.42	0.14	0.03
North Central	88	6747.50	1046.14	0.16	0.07
Northeastern	198	16017.43	1523.03	0.10	0.03
Southeastern	431	29912.52	1846.57	0.06	0.03
South Central	315	19819.19	1113.60	0.06	0.02
Southwestern	250	19750.88	717.61	0.04	0.01
Philadelphia	247	18436.07	1454.61	0.08	0.05
Pittsburgh	146	3491.55	0.90	0.00	0.00
DECAYED PERMANENT (for grade 3)					
Total	1768	129009.13	15440.91	0.12	0.02
Northwestern	133	11332.11	2021.05	0.18	0.06
North Central	89	7752.77	274.89	0.04	0.03
Northeastern	186	18392.25	3304.32	0.18	0.08
Southeastern	432	31002.72	3252.68	0.10	0.03
South Central	308	21336.77	1170.61	0.05	0.02
Southwestern	258	19899.76	1807.78	0.09	0.02
Philadelphia	244	16019.47	3344.50	0.21	0.10
Pittsburgh	118	3273.29	265.09	0.08	0.02
DECAYED PERMANENT (for grade 9)					
Total	1350	114653.31	35734.57	0.31	0.04
Northwestern	116	9373.58	2274.05	0.24	0.07
North Central	103	7339.53	1639.23	0.22	0.09
Northeastern	116	14159.64	4881.93	0.34	0.10
Southeastern	330	29086.99	5801.37	0.20	0.04
South Central	183	13616.16	2740.90	0.20	0.08
Southwestern	171	20347.46	6244.35	0.31	0.15
Philadelphia	214	17568.56	10309.34	0.59	0.11
Pittsburgh	117	3161.39	1843.39	0.58	0.25
DECAYED PERMANENT (for grade 11)					
Total	1114	94851.65	33238.12	0.35	0.05
Northwestern	108	8720.16	5969.89	0.68	0.19
North Central	103	7158.50	2774.60	0.39	0.15
Northeastern	111	12794.71	1615.92	0.13	0.04
Southeastern	235	23094.01	6963.57	0.30	0.11
South Central	139	12789.58	2477.15	0.19	0.08
Southwestern	162	16930.12	3699.69	0.22	0.12
Philadelphia	176	11208.51	8490.52	0.76	0.22
Pittsburgh	80	2156.07	1246.79	0.58	0.16

Table 7. Untreated Decayed Primary Teeth by Health District and by Grade.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
-----					
DECAYED PRIMARY (all grades)					
Total	6040	464379.57	180274.31	0.39	0.03
Northwestern	490	41116.18	30163.48	0.73	0.24
North Central	383	28998.30	15919.75	0.55	0.11
Northeastern	611	61364.03	25545.76	0.42	0.07
Southeastern	1428	113096.24	33887.06	0.30	0.04
South Central	945	67561.70	19500.60	0.29	0.04
Southwestern	841	76928.21	19315.71	0.25	0.05
Philadelphia	881	63232.61	32040.13	0.51	0.12
Pittsburgh	461	12082.30	3901.82	0.32	0.06
DECAYED PRIMARY (for grade 1)					
Total	1808	125865.47	99783.38	0.79	0.07
Northwestern	133	11690.34	18594.84	1.59	0.23
North Central	88	6747.50	8589.87	1.27	0.36
Northeastern	198	16017.43	13918.05	0.87	0.23
Southeastern	431	29912.52	16599.33	0.55	0.08
South Central	315	19819.19	11075.16	0.56	0.08
Southwestern	250	19750.88	9207.53	0.47	0.12
Philadelphia	247	18436.07	19623.24	1.06	0.24
Pittsburgh	146	3491.55	2175.36	0.62	0.13
DECAYED PRIMARY (for grade 3)					
Total	1768	129009.13	78314.65	0.61	0.05
Northwestern	133	11332.11	11505.31	1.02	0.14
North Central	89	7752.77	7003.36	0.90	0.26
Northeastern	186	18392.25	11627.71	0.63	0.15
Southeastern	432	31002.72	16990.12	0.55	0.08
South Central	308	21336.77	8141.44	0.38	0.06
Southwestern	258	19899.76	9480.23	0.48	0.07
Philadelphia	244	16019.47	11840.02	0.74	0.20
Pittsburgh	118	3273.29	1726.46	0.53	0.16
DECAYED PRIMARY (for grade 9)					
Total	1350	114653.31	1193.68	0.01	0.00
Northwestern	116	9373.58	0.00	0.00	0.00
North Central	103	7339.53	154.12	0.02	0.02
Northeastern	116	14159.64	0.00	0.00	0.00
Southeastern	330	29086.99	226.41	0.01	0.01
South Central	183	13616.16	284.00	0.02	0.02
Southwestern	171	20347.46	529.14	0.03	0.02
Philadelphia	214	17568.56	0.00	0.00	0.00
Pittsburgh	117	3161.39	0.00	0.00	0.00
DECAYED PRIMARY (for grade 11)					
Total	1114	94851.65	982.60	0.01	0.01
Northwestern	108	8720.16	63.32	0.01	0.01
North Central	103	7158.50	172.40	0.02	0.02
Northeastern	111	12794.71	0.00	0.00	0.00
Southeastern	235	23094.01	71.20	0.00	0.00
South Central	139	12789.58	0.00	0.00	0.00
Southwestern	162	16930.12	98.81	0.01	0.01
Philadelphia	176	11208.51	576.87	0.05	0.05
Pittsburgh	80	2156.07	0.00	0.00	0.00

Table 8. Untreated Decayed Primary and Permanent Teeth by Health District and by Grade

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
DECTOT (all grades)					
Total	6040	464379.57	273969.30	0.59	0.04
Northwestern	490	41116.18	42008.88	1.02	0.15
North Central	383	28998.30	21654.50	0.75	0.16
Northeastern	611	61364.03	36870.97	0.60	0.09
Southeastern	1428	113096.24	51751.25	0.46	0.06
South Central	945	67561.70	27002.27	0.40	0.05
Southwestern	841	76928.21	31785.13	0.41	0.10
Philadelphia	881	63232.61	55639.11	0.88	0.18
Pittsburgh	461	12082.30	7257.39	0.60	0.07
DECTOT (for grade 1)					
Total	1808	125865.47	109065.36	0.87	0.07
Northwestern	133	11690.34	20175.26	1.73	0.25
North Central	88	6747.50	9636.91	1.43	0.39
Northeastern	198	16017.43	15441.08	0.96	0.26
Southeastern	431	29912.52	18445.90	0.62	0.10
South Central	315	19819.19	12188.76	0.61	0.07
Southwestern	250	19750.88	9925.14	0.50	0.12
Philadelphia	247	18436.07	21077.85	1.14	0.29
Pittsburgh	146	3491.55	2175.36	0.62	0.13
DECTOT (for grade 3)					
Total	1768	129009.13	93755.57	0.73	0.06
Northwestern	133	11332.11	13526.36	1.19	0.17
North Central	89	7752.77	7278.25	0.94	0.27
Northeastern	186	18392.25	14932.03	0.81	0.18
Southeastern	432	31002.72	20242.81	0.65	0.09
South Central	308	21336.77	9312.06	0.44	0.08
Southwestern	258	19899.76	11288.01	0.57	0.08
Philadelphia	244	16019.47	15184.52	0.95	0.30
Pittsburgh	118	3273.29	1991.55	0.61	0.17
DECTOT (for grade 9)					
Total	1350	114653.31	36928.24	0.32	0.04
Northwestern	116	9373.58	2274.05	0.24	0.07
North Central	103	7339.53	1793.35	0.24	0.10
Northeastern	116	14159.64	4881.93	0.34	0.10
Southeastern	330	29086.99	6027.78	0.21	0.04
South Central	183	13616.16	3024.90	0.22	0.09
Southwestern	171	20347.46	6773.49	0.33	0.14
Philadelphia	214	17560.56	10309.34	0.59	0.11
Pittsburgh	117	3161.39	1843.39	0.58	0.25
DECTOT (for grade 11)					
Total	1114	94851.65	34220.73	0.36	0.05
Northwestern	100	8720.16	6033.21	0.69	0.19
North Central	103	7150.50	2947.00	0.41	0.15
Northeastern	111	12794.71	1615.92	0.13	0.04
Southeastern	235	23094.01	7034.77	0.30	0.11
South Central	139	12789.58	2477.15	0.19	0.08
Southwestern	162	16930.12	3798.50	0.22	0.12
Philadelphia	176	11208.51	9067.39	0.81	0.25
Pittsburgh	80	2156.07	1246.79	0.58	0.16



Table 9. Mean Number of Untreated Decayed Primary and Permanent Teeth by Health District and by Grade, Including Incipient (possibly reversible) Lesions.

Variable Health District	Sample Size	Weighted Size	Total	Mean	SE Mean
-----					
DECINTOT (all grades)					
Total	5221	387631.01	465846.52	1.20	0.08
Northwestern	399	33828.68	66166.19	1.96	0.13
North Central	383	28998.30	40804.71	1.41	0.51
Northeastern	611	61364.83	63346.90	1.03	0.11
Southeastern	1148	87028.79	76665.27	0.88	0.22
South Central	779	51060.83	42026.36	0.82	0.11
Southwestern	569	50074.49	66616.45	1.33	0.26
Philadelphia	800	63193.60	88548.73	1.40	0.30
Pittsburgh	461	12082.30	21671.90	1.79	0.10
DECINTOT (for grade 1)					
Total	1577	103700.51	115687.09	1.12	0.09
Northwestern	108	9952.38	19844.65	1.99	0.27
North Central	88	6747.50	10868.53	1.61	0.41
Northeastern	198	16017.43	17868.87	1.12	0.22
Southeastern	362	23177.01	18436.87	0.80	0.13
South Central	253	13783.45	11777.25	0.35	0.13
Southwestern	175	12095.11	9008.61	0.74	0.20
Philadelphia	247	18436.07	24141.22	1.51	0.33
Pittsburgh	146	3491.55	3741.08	1.07	0.20
DECINTOT (for grade 3)					
Total	1501	104940.77	123584.64	1.18	0.10
Northwestern	108	9543.04	18533.15	1.54	0.30
North Central	89	7752.77	10415.93	1.34	0.39
Northeastern	186	18392.25	22907.92	1.25	0.24
Southeastern	337	23026.13	23526.92	1.02	0.19
South Central	243	14658.19	10431.08	0.71	0.11
Southwestern	177	12314.64	11022.35	0.96	0.19
Philadelphia	243	15980.46	20057.00	1.26	0.42
Pittsburgh	118	3273.29	5889.48	1.00	0.20
DECINTOT (for grade 9)					
Total	1187	99359.88	122199.97	1.23	0.14
Northwestern	91	7660.69	13258.82	1.73	0.13
North Central	103	7339.53	7398.37	1.01	0.22
Northeastern	116	14159.64	14070.52	0.99	0.19
Southeastern	276	23190.03	17976.74	0.78	0.13
South Central	162	11585.69	7633.31	0.66	0.17
Southwestern	100	14694.34	28106.76	1.91	0.72
Philadelphia	214	17568.56	26590.79	1.51	0.36
Pittsburgh	117	3161.39	7164.66	2.27	0.40
DECINTOT (for grade 11)					
Total	956	79629.86	104374.81	1.31	0.13
Northwestern	83	6672.57	14529.57	2.18	0.39
North Central	103	7158.50	12121.88	1.69	0.61
Northeastern	111	12794.71	8499.59	0.66	0.10
Southeastern	173	17635.61	16724.75	0.95	0.21
South Central	121	11033.51	12184.72	1.10	0.31
Southwestern	109	10970.39	17678.72	1.61	0.37
Philadelphia	176	11208.51	17758.91	1.58	0.48
Pittsburgh	80	2156.07	4876.67	2.26	0.43

Healthy People 2000 objective 13.2 addresses reducing the proportion of children with untreated dental caries in their primary and permanent teeth. The corresponding Oral Health Needs Assessment results are presented in table 10.

*Healthy People 2000 Objective 13.2: Reduce untreated dental caries so that the proportion of children with untreated caries (in permanent or primary teeth) is no more than 20 percent among children aged 6 through 8 and no more than 15 percent among adolescents aged 15. (Baseline: 27 percent of children aged 6 through 8 in 1986-87; 23 percent of the adolescents aged 15 in 1986-87)*

Table 10.  
Percent of Children with Untreated Caries: Healthy People 2000 Objective Agegroups

HP 2000 Age Groups Health Districts	Sample Size	Weighted Size	Total	Percent	SE Percent
<b>age 6-8</b>					
Total	2624	186277.70	8595.47	27.16	1.59
Northwestern	191	16463.95	7556.66	45.90	5.05
North Central	131	10612.57	3768.04	35.51	4.86
Northeastern	307	26802.70	7304.94	27.25	6.32
Southeastern	640	45574.35	11227.82	24.64	3.12
South Central	478	29928.51	6934.50	23.17	3.20
Southwestern	348	27795.16	5916.56	21.29	3.81
Philadelphia	333	24215.20	6582.37	27.18	3.24
Pittsburgh	196	4885.27	1304.58	26.70	2.86
<b>age 15</b>					
Total	661	56654.77	8135.44	14.36	2.21
Northwestern	66	5311.59	752.50	14.17	3.75
North Central	54	4869.66	323.81	6.65	3.71
Northeastern	44	5735.54	506.71	8.83	3.75
Southeastern	177	14967.89	1417.13	9.47	2.08
South Central	95	6885.53	748.57	10.87	3.72
Southwestern	83	11085.71	2531.78	22.84	9.01
Philadelphia	82	6191.55	1395.70	22.54	7.26
Pittsburgh	60	1607.29	459.24	28.57	8.72

### 5.1.2 Treatment Urgencies and Anterior Tooth Trauma Experience

After assessing all of the aspects of oral health included in the OHNA screening, a final judgement was made as to whether children required dental treatment and whether treatment was required immediately (e.g. conditions involving caries into the pulp, acute infection, significant pain, and potential neoplasm). Table 11 displays the percentages of children determined to require immediate treatment. Because acute severe dental conditions can usually be prevented through routine preventive dental care, they should be minimized to the greatest extent possible. Parents were asked in the OHNA phone interview about such dental occurrences with their child. From the results it is estimated that about 14% of Pennsylvania schoolchildren in the survey grades had complained of dental pain or problems in the past, ranging from 9% (Southeastern district) to 22% (Philadelphia) across the health districts. About 2% had missed school because of dental problems or pain in the past, but estimates ranged up to 7.5% for the North Central district.

Table 11: Percentage of Children Needing Immediate Dental Care.

GRADESUD Health District	Sample Size	Weighted Size	Total	Percent	SE Percent
Total					
Total	6039	464340.56	21634.64	4.66	0.49
Northwestern	490	41116.18	3072.08	7.47	1.46
North Central	383	28998.30	1377.23	4.75	1.11
Northeastern	611	61364.03	3164.91	5.16	1.98
Southeastern	1428	113096.24	3503.67	3.10	1.13
South Central	945	67561.70	1931.29	2.86	0.47
Southwestern	841	76928.21	1947.74	2.53	0.87
Philadelphia	880	63193.60	6144.66	9.72	1.39
Pittsburgh	461	12082.30	493.06	4.08	2.13
grade 1					
Total	1808	125865.47	7784.31	6.18	0.74
Northwestern	133	11690.34	1620.79	13.86	1.85
North Central	88	6747.50	585.18	8.67	3.87
Northeastern	198	16017.43	1061.57	6.63	2.97
Southeastern	431	29912.52	910.38	3.04	1.02
South Central	315	19819.19	716.63	3.62	0.92
Southwestern	250	19750.88	910.47	4.61	2.16
Philadelphia	247	18436.07	1788.31	9.70	2.24
Pittsburgh	146	3491.55	190.99	5.47	4.43
grade 3					
Total	1767	128970.12	6660.27	5.16	0.74
Northwestern	133	11332.11	987.25	8.71	2.64
North Central	89	7752.77	225.32	2.91	1.25
Northeastern	186	18392.25	1439.93	7.83	3.19
Southeastern	432	31002.72	708.87	2.29	0.85
South Central	308	21336.77	956.13	4.48	1.04
Southwestern	258	19899.76	803.06	4.04	1.16
Philadelphia	243	15980.46	1428.13	8.94	3.16
Pittsburgh	118	3273.29	111.58	3.41	2.76
grade 9					
Total	1350	114653.31	3294.10	2.87	0.49
Northwestern	116	9373.58	73.49	0.78	0.77
North Central	103	7339.53	154.12	2.10	2.10
Northeastern	116	14159.64	344.80	2.44	1.26
Southeastern	330	29086.99	686.46	2.36	1.29
South Central	183	13616.16	80.71	0.59	0.44
Southwestern	171	20347.46	153.88	0.76	0.50
Philadelphia	214	17568.56	1699.61	9.67	1.57
Pittsburgh	117	3161.39	101.04	3.20	3.02
grade 11					
Total	1114	94851.65	3895.96	4.11	0.95
Northwestern	108	8720.16	390.56	4.48	2.80
North Central	103	7150.50	412.61	5.76	2.32
Northeastern	111	12794.71	318.62	2.49	1.75
Southeastern	235	23094.01	1197.97	5.19	3.17
South Central	139	12789.58	177.81	1.39	1.13
Southwestern	162	16930.12	80.32	0.47	0.46
Philadelphia	176	11208.51	1228.61	10.96	2.63
Pittsburgh	80	2156.07	89.46	4.15	1.64

Anterior tooth trauma can potentially be prevented through preventive programs, particularly promotion of mouthguard use. Table 12 shows rates of anterior tooth trauma.

Table 12: Percentage of Children with Evidence of Anterior Tooth Trauma

GRADESUD Health District	Sample Size	Weighted Size	Total	Percent	SE Percent
<b>Total</b>					
Total	6040	464379.57	21396.85	4.61	0.39
Northwestern	490	41116.18	2219.50	5.40	1.67
North Central	383	28998.30	1451.13	5.00	1.77
Northeastern	611	61364.03	2438.03	3.97	0.35
Southeastern	1428	113096.24	3109.96	2.75	0.49
South Central	945	67561.70	2630.33	3.89	1.12
Southwestern	841	76928.21	4267.35	5.55	1.24
Philadelphia	881	63232.61	4547.46	7.19	1.12
Pittsburgh	461	12082.30	733.99	6.07	1.06
<b>grade 1</b>					
Total	1808	125865.47	2036.18	1.62	0.37
Northwestern	133	11690.34	167.37	1.43	0.99
North Central	88	6747.50	89.53	1.33	1.26
Northeastern	198	16017.43	205.67	1.28	0.64
Southeastern	431	29912.52	553.95	1.85	0.87
South Central	315	19819.19	283.42	1.43	0.87
Southwestern	250	19750.88	453.09	2.29	1.37
Philadelphia	247	18436.07	283.15	1.54	0.74
Pittsburgh	146	3491.55	0.00	0.00	0.00
<b>grade 3</b>					
Total	1768	129009.13	3996.06	3.10	0.42
Northwestern	133	11332.11	215.16	1.90	1.33
North Central	89	7752.77	359.02	4.63	2.18
Northeastern	186	18392.25	337.73	1.84	0.95
Southeastern	432	31002.72	756.26	2.44	0.89
South Central	308	21336.77	484.63	2.27	0.88
Southwestern	258	19899.76	734.61	3.69	1.35
Philadelphia	244	16019.47	972.77	6.07	1.11
Pittsburgh	118	3273.29	135.89	4.15	1.91
<b>grade 9</b>					
Total	1350	114653.31	7980.62	6.96	1.02
Northwestern	116	9373.58	1016.00	10.84	4.84
North Central	103	7339.53	394.02	5.37	3.82
Northeastern	116	14159.64	1147.61	8.10	4.78
Southeastern	330	29086.99	513.30	1.76	0.65
South Central	183	13616.16	1230.72	9.04	3.55
Southwestern	171	20347.46	1217.53	5.98	1.82
Philadelphia	214	17568.56	2092.74	11.91	2.06
Pittsburgh	117	3161.39	368.70	11.66	2.99
<b>grade 11</b>					
Total	1114	94851.65	7383.98	7.78	1.27
Northwestern	108	8720.16	820.96	9.41	2.29
North Central	103	7158.50	608.57	8.50	6.72
Northeastern	111	12794.71	747.02	5.84	2.68
Southeastern	235	23094.01	1285.56	5.57	1.63
South Central	139	12789.58	631.56	4.94	2.29
Southwestern	162	16930.12	1862.12	11.00	4.90
Philadelphia	176	11208.51	1198.81	10.70	3.03
Pittsburgh	80	2156.07	229.39	10.64	3.35

While evidence of anterior tooth trauma rises to substantial levels especially by grade 11. Table 13 indicates that a very small proportion result from organized sports participation.

Table 13: Percentage of Children with Organized Sports Related Anterior Tooth Trauma.

GRADESUD Health District	Sample Size	Weighted Size	Total	Percent	SE Percent
Total					
Total	6040	464379.57	1608.80	0.35	0.08
Northwestern	490	41116.18	0.00	0.00	0.00
North Central	383	28998.30	124.79	0.43	0.44
Northeastern	611	61364.03	140.73	9.23	0.15
Southeastern	1428	113096.24	257.02	0.23	0.16
South Central	945	67561.70	280.87	0.42	0.10
Southwestern	841	76928.21	167.71	0.22	0.15
Philadelphia	881	63232.61	485.36	0.77	0.30
Pittsburgh	461	12082.30	152.33	1.26	0.54
grade 1					
Total	1808	125865.47	163.56	0.13	0.09
Northwestern	133	11690.34	0.00	0.00	0.00
North Central	88	6747.50	0.00	0.00	0.00
Northeastern	198	16017.43	67.07	0.42	0.42
Southeastern	431	29912.52	0.00	0.00	0.00
South Central	315	19819.19	0.00	0.00	0.00
Southwestern	250	19750.88	0.00	0.00	0.00
Philadelphia	247	18436.07	96.49	0.52	0.52
Pittsburgh	146	3491.55	0.00	0.00	0.00
grade 3					
Total	1768	129009.13	196.89	0.15	0.09
Northwestern	133	11332.11	0.00	0.00	0.00
North Central	89	7752.77	91.63	1.18	1.14
Northeastern	186	10392.25	0.00	0.00	0.00
Southeastern	432	31002.72	0.00	0.00	0.00
South Central	308	21336.77	0.00	0.00	0.00
Southwestern	258	19899.76	0.00	0.00	0.00
Philadelphia	244	16019.47	45.06	0.28	0.29
Pittsburgh	118	3273.29	60.20	1.84	1.86
grade 9					
Total	1350	114653.31	470.60	0.41	0.15
Northwestern	116	9373.58	0.00	0.00	0.00
North Central	103	7339.53	0.00	0.00	0.00
Northeastern	116	14159.64	73.66	0.52	0.51
Southeastern	330	29086.99	0.00	0.00	0.00
South Central	183	13616.16	181.52	1.33	0.82
Southwestern	171	20347.46	68.90	0.34	0.34
Philadelphia	214	17568.56	54.40	0.31	0.32
Pittsburgh	117	3161.39	92.13	2.91	1.91
grade 11					
Total	1114	94851.65	777.75	0.82	0.29
Northwestern	108	8720.16	0.00	0.00	0.00
North Central	103	7158.50	33.16	0.46	0.49
Northeastern	111	12794.71	0.00	0.00	0.00
Southeastern	235	23094.01	257.02	1.11	0.80
South Central	139	12789.58	99.35	0.78	0.77
Southwestern	162	16930.12	98.81	0.58	0.56
Philadelphia	176	11208.51	289.41	2.58	1.17
Pittsburgh	80	2156.07	0.00	0.00	0.00

### 5.1.3 Fluorosis

- *What is the extent and severity to which Commonwealth children experience dental fluorosis?*

Fluorosis can range from very mild to severe. Very mild and mild fluorosis are not an esthetic or health concern. No cases of fluorosis were found that were other than very mild or mild. The percentages listed in the table indicate those children with any evidence of fluorosis and all cases were limited to very mild or mild fluorosis.

Table 14: Percentage of Children with any Fluorosis.

GRADESUD Health District	Sample Size	Weighted Size	Total	Percent	SE Percent
<b>Total</b>					
Total	6000	460064.51	68455.05	14.88	1.03
Northwestern	490	41116.18	4584.13	11.15	3.13
North Central	383	28998.30	3262.65	11.25	2.79
Northeastern	611	61364.03	4159.97	6.78	1.33
Southeastern	1388	108781.18	10803.92	9.93	1.31
South Central	945	67561.70	8800.02	13.03	2.39
Southwestern	841	76928.21	17814.15	23.16	2.74
Philadelphia	881	63232.61	16173.56	25.58	5.08
Pittsburgh	461	12082.30	2856.65	23.64	1.53
<b>grade 1</b>					
Total	1789	123423.44	11396.13	9.23	1.30
Northwestern	133	11690.34	811.46	6.94	2.32
North Central	88	6747.50	453.50	6.72	4.13
Northeastern	198	16017.43	426.32	2.66	1.47
Southeastern	412	27470.48	824.72	3.00	0.98
South Central	315	19819.19	1251.47	6.31	3.69
Southwestern	250	19750.88	3367.82	17.05	3.92
Philadelphia	247	18436.07	3839.85	20.83	5.94
Pittsburgh	146	3491.55	420.98	12.06	4.62
<b>grade 3</b>					
Total	1747	127136.11	22960.86	18.06	1.70
Northwestern	133	11332.11	1293.49	11.41	3.88
North Central	89	7752.77	937.43	12.09	6.83
Northeastern	186	18392.25	1610.32	8.76	1.34
Southeastern	411	29129.70	2968.85	10.19	1.73
South Central	308	21336.77	3317.34	15.55	3.10
Southwestern	258	19899.76	6269.18	31.50	5.86
Philadelphia	244	16019.47	5443.50	33.98	8.31
Pittsburgh	118	3273.29	1120.74	34.24	2.89
<b>grade 9</b>					
Total	1350	114653.31	19869.78	17.33	1.62
Northwestern	116	9373.58	1395.59	14.89	4.85
North Central	103	7339.53	988.93	13.47	4.03
Northeastern	116	14159.64	1369.69	9.67	3.49
Southeastern	330	29086.99	3811.54	13.10	3.42
South Central	183	13616.16	2528.63	18.57	3.41
Southwestern	171	20347.46	4691.84	23.06	5.12
Philadelphia	214	17568.56	4266.09	24.28	4.66
Pittsburgh	117	3161.39	817.47	25.86	5.75
<b>grade 11</b>					
Total	1114	94851.65	14228.28	15.00	1.72
Northwestern	108	8720.16	1083.59	12.43	4.08
North Central	103	7158.50	882.80	12.33	5.27
Northeastern	111	12794.71	753.64	5.89	2.38
Southeastern	235	23094.01	3198.81	13.85	4.28
South Central	139	12789.58	1702.58	13.31	4.89
Southwestern	162	16930.12	3485.30	20.59	4.82
Philadelphia	176	11208.51	2624.12	23.41	4.34
Pittsburgh	80	2156.07	497.45	23.07	5.20

#### 5.1.4 Access to Fluoridated Water

♦ *To what extent do Commonwealth Children lack access to fluoridated water?*

Fluoridation is probably the single most effective measure to reduce the dental disease burden in populations. Moreover, when water systems are fluoridated, the anti-caries protective effect is realized by all members of a community.

Parent questionnaire results indicate that 16% of Pennsylvania families with children in the survey grade levels use bottled water for their drinking water, 61% use public/community water for drinking, and 21% use well water for drinking. Of those not drinking bottled water, 41% reported that their water was fluoridated, 40% said their water was not fluoridated, and 20% didn't know or were unsure. Table 15 displays the number of fluoridated and non-fluoridated Pennsylvania public water systems. Of the total 2,259 systems, 2,070 (91.6%) are not fluoridated. While many of these are smaller systems, there is a great potential to increase the proportion of the population of Pennsylvania with access to this effective disease prevention measure. Table 16 provides 1997 population estimates by county and percentages of county populations served by public water supplies that are served by fluoridated systems.

Table 15: Number of Fluoridated, Non-fluoridated and Total Pennsylvania Public Water Systems by County.

County	NUMBER OF WATER SYSTEMS			County	NUMBER OF WATER SYSTEMS		
	Fluoridated	Not Fluoridated	Total		Fluoridated	Not Fluoridated	Total
Adams	0	35	35	Lackawanna	0	42	42
Allegheny	31	11	42	Lancaster	6	106	112
Armstrong	4	23	27	Lawrence	3	29	32
Beaver	4	37	41	Lebanon	4	31	35
Bedford	2	25	27	Lehigh	2	46	48
Berks	11	64	75	Luzerne	1	100	101
Blair	1	30	31	Lycoming	1	38	39
Bradford	1	23	24	McKean	2	16	18
Bucks	4	82	86	Mercer	3	31	34
Butler	1	55	56	Mifflin	1	13	14
Cambria	4	43	47	Monroe	1	90	91
Cameron	0	2	2	Montgomery	1	46	47
Carbon	1	26	27	Montour	0	7	7
Centre	3	46	49	Montour	7	48	55
Chester	7	96	103	Northampton	1	12	13
Clarion	3	18	21	Northumberland	1	26	26
Clearfield	3	23	26	Perry	0	0	1
Clinton	3	15	18	Philadelphia	1	59	59
Columbia	0	20	20	Pike	0	9	9
Crawford	1	34	35	Potter	0	42	43
Cumberland	8	28	36	Schuylkill	3	19	22
Dauphin	5	27	32	Snyder	2	42	44
Delaware	4	6	10	Somerset	0	5	5
Elk	3	8	11	Sullivan	2	23	25
Erie	3	44	47	Susquehanna	1	25	26
Fayette	8	17	25	Tioga	0	5	5
Forest	0	3	3	Union	2	20	22
Franklin	4	27	31	Venango	0	16	16
Fulton	0	3	3	Warren	3	18	21
Greene	2	5	7	Washington	0	37	37
Huntingdon	1	20	21	Wayne	1	25	26
Indiana	5	30	35	Westmoreland	0	26	26
Jefferson	7	6	13	Wyoming	6	73	79
Juniata	0	13	13	York			
				<b>Pennsylvania</b>			
				<b>Totals</b>	<b>189</b>	<b>2070</b>	<b>2259</b>
				<b>(percent)</b>	<b>(8.37%)</b>	<b>(91.63%)</b>	



Table 16: 1997 county population estimates and percent of county populations served by public water supplies that are served by fluoridated systems.

County	Estimated 1997 population	Percent with Fluoridation in Public System Pop.	County	Estimated 1997 population	Percent with Fluoridation in Public System Pop.
Adams	85,754	0.00%	Lackawanna	210,464	0.00%
Allegheny	1,280,624	93.96%	Lancaster	454,063	52.58%
Armstrong	73,572	28.92%	Lawrence	95,442	67.04%
Beaver	185,682	27.75%	Lebanon	117,216	83.96%
Bedford	49,253	36.35%	Lehigh	297,703	4.42%
Berks	354,057	56.43%	Luzerne	317,560	13.00%
Blair	130,923	6.28%	Lycoming	118,405	66.72%
Bradford	62,292	51.30%	McKean	46,806	27.25%
Bucks	582,633	33.99%	Mercer	122,045	72.32%
Butler	169,197	1.73%	Mifflin	47,176	92.27%
Cambria	157,419	48.22%	Monroe	122,531	5.87%
Cameron	5,719	0.00%	Montgomery	712,466	3.07%
Carbon	58,844	2.44%	Montour	17,971	0.00%
Centre	132,993	51.64%	Northampton	257,289	80.37%
Chester	416,541	48.98%	Northumberland	95,100	11.54%
Clarion	41,820	47.96%	Perry	44,164	0.00%
Clearfield	80,656	50.30%	Philadelphia	1,451,372	100.00%
Clinton	36,885	78.41%	Pike	39,108	0.00%
Columbia	64,230	0.00%	Potter	17,160	0.00%
Crawford	89,322	5.13%	Schuylkill	151,256	7.05%
Cumberland	207,852	86.47%	Snyder	38,279	36.69%
Dauphin	245,793	36.35%	Somerset	80,255	17.33%
Delaware	543,010	99.22%	Sullivan	6,103	0.00%
Elk	34,911	79.23%	Susquehanna	42,085	27.97%
Erie	279,401	6.03%	Tioga	41,613	23.55%
Fayette	145,036	31.59%	Union	41,774	0.00%
Forest	4,910	0.00%	Venango	58,067	32.40%
Franklin	127,373	56.72%	Warren	44,228	0.00%
Fulton	14,457	0.00%	Washington	205,807	21.34%
Greene	42,210	82.25%	Wayne	45,387	0.00%
Huntingdon	45,172	43.42%	Westmoreland	374,673	19.83%
Indiana	89,182	60.44%	Wyoming	29,387	0.00%
Jefferson	46,567	52.61%	York	370,518	24.30%
Juniata	21,898	0.00%			
			Pennsylvania Totals	12,019,661	52.41%

Population on Public Water Supply = 10,557,610

Population on Fluoridated Public Water Supply = 5,533,320

The OHNA survey results provide further evidence of the benefits of fluoridation. Children of parents reporting that their drinking water is fluoridated were more likely not to have decay experience or untreated decay and had a 22% lower rate of decay experience and a 28% lower rate of untreated decay than children of parents reporting that their drinking water is not fluoridated.

### 5.1.5 Sealants

Dental sealants are plastic coatings painted on the pits and fissures of chewing surfaces of the teeth to prevent dental caries. Sealants are an effective caries preventive measure complimenting the protection provided by fluoridated water. One of the Healthy People 2000 objectives promotes the assessment of the level to which children have access and are obtaining this effective preventive service. Table 17 displays the corresponding findings for Pennsylvania from the OHNA survey.

*Healthy People 2000 Objective 13.8: Increase to at least 50 percent the proportion of children who have received protective sealants on the occlusal (chewing) surfaces of permanent molar teeth. (Baseline: 11 percent of children aged 8 and 8 percent of adolescents aged 14 in 1986-87)*

Table 17: Percentage of children age 8 and 14 with at least one dental sealant.

Healthy People Age Groups HEALTH_Districts	Sample Size	Weighted Size	Total	Percent	SE Percent	
<b>age 8</b>						
Total	861	63001.73	15885.82	25.21		1.59
Northwestern	64	5377.35	1128.32	20.98	3.92	
North Central	47	4170.87	607.25	14.56	1.13	
Northeastern	110	10787.25	3390.93	31.43	3.54	
Southeastern	221	16398.29	4865.57	29.67	2.01	
South Central	165	10099.04	2644.39	26.18	6.72	
Southwestern	101	8326.56	2273.35	27.30	3.94	
Philadelphia	93	6250.34	511.24	8.18	5.28	
Pittsburgh	60	1592.03	464.77	29.19	4.96	
<b>age 14</b>						
Total	606	51538.07	12651.85	24.55		2.27
Northwestern	44	3561.11	223.21	6.27	1.85	
North Central	45	2328.34	321.10	13.79	5.09	
Northeastern	71	8301.08	1768.45	21.30	4.79	
Southeastern	136	12609.71	3761.36	29.83	5.94	
South Central	78	6001.31	1777.48	29.62	5.81	
Southwestern	88	9294.42	3306.70	35.58	5.31	
Philadelphia	91	8012.72	984.55	12.29	3.57	
Pittsburgh	53	1429.38	509.00	35.61	7.72	

Table 17 shows large variation among the dental health districts in the proportion of children having dental sealants, ranging from 8 to 31 percent for children aged 8 and from 6 to 36 percent for children aged 14. Certain health districts, counties, or school districts can be targeted for programs providing free or low cost sealants and for educational initiatives to encourage dentists to provide more sealants for their young patients.

### 5.1.5 Dental Care Access

♦ *To what extent do Commonwealth children have access to necessary dental care?*

The first fundamental assessment of dental care access is the number of dentist serving the population at the county level. Table 18 provides these numbers for Pennsylvania counties.

Table 18: 1997 Population Estimates, Number of Dentists, and Population to Dentist Ratio by County.

County	Estimated 1997 population	Total Dentists	Population to Dentist ratio	County	Estimated 1997 population	Total Dentists	Population to Dentist ratio
Adams	85,754	29	2,957	Lackawanna	210,464	160	1,315
Allegheny	1,280,624	1,255	1,020	Lancaster	454,063	252	1,802
Armstrong	73,572	29	2,537	Lawrence	95,442	64	1,491
Beaver	185,682	102	1,820	Lebanon	117,216	52	2,254
Bedford	49,253	20	2,463	Lehigh	297,703	223	1,335
Berks	354,057	182	1,945	Luzerne	317,560	218	1,457
Blair	130,923	74	1,769	Lycoming	118,405	61	1,941
Bradford	62,292	23	2,708	McKean	46,806	16	2,925
Bucks	582,633	485	1,201	Mercer	122,045	71	1,719
Butler	169,197	103	1,643	Mifflin	47,176	17	2,775
Cambria	157,419	94	1,675	Monroe	122,531	49	2,501
Cameron	5,719	1	5,719	Montgomery	712,466	900	792
Carbon	58,844	35	1,681	Montour	17,971	11	1,634
Centre	132,993	72	1,847	Northampton	257,289	190	1,354
Chester	416,541	299	1,393	Northumberland	95,100	38	2,503
Clarion	41,820	14	2,987	Perry	44,164	12	3,680
Clearfield	80,656	37	2,180	Philadelphia	1,451,372	944	1,537
Clinton	36,885	22	1,677	Pike	39,108	20	1,955
Columbia	64,230	31	2,072	Potter	17,160	7	2,451
Crawford	89,322	41	2,179	Schuylkill	151,256	71	2,130
Cumberland	207,852	155	1,341	Snyder	38,279	21	1,823
Dauphin	245,793	179	1,373	Somerset	80,255	36	2,229
Delaware	543,010	451	1,204	Sullivan	6,103	2	3,052
Elk	34,911	11	3,174	Susquehanna	42,085	10	4,209
Erie	279,401	185	1,510	Tioga	41,613	19	2,190
Fayette	145,036	73	1,987	Union	41,774	20	2,089
Forest	4,910	2	2,455	Venango	58,067	25	2,323
Franklin	127,373	57	2,235	Warren	44,228	20	2,211
Fulton	14,457	4	3,614	Washington	205,807	126	1,633
Greene	42,210	12	3,518	Wayne	45,387	24	1,891
Huntingdon	45,172	19	2,377	Westmoreland	374,673	237	1,581
Indiana	89,182	37	2,410	Wyoming	29,387	15	1,959
Jefferson	46,567	28	1,663	York	370,518	206	1,799
Juniata	21,898	6	3,650				
				<b>Pennsylvania Totals</b>	<b>12,019,661</b>	<b>8,304</b>	<b>1,447</b>

There are fairly large differences in population to dentist ratios across counties ranging from one dentist for every 792 people in Montgomery County to one dentist for every 5,719

people in Cameron County. Where insufficient numbers of dentists serve a population area many people may have a difficult time obtaining prompt and thorough dental care. Different program options can improve access to dental care including programs to encourage dentists to set up practices in underserved areas and to set up dental clinics operated by local or state health departments.

Another indicator of dental access was investigated in the phone survey of parents of a subset of the students screened in the oral health assessment. Parents were asked when their child last saw the dentist. Table 19 shows the percentage saying that their child saw a dentist within the past year and the percentage saying that it had been more than a year since their child saw a dentist. At least annual visits are necessary to maintain good oral health and to prevent major dental problems from developing.

Table 19: Percent of Children Seeing the Dentist in the Previous Year for Pennsylvania and for the eight health districts.

DENTIST VISIT IN LAST YEAR				
HEALTH DISTRICT	Sample Size	Weighted Size	Percent	SE Percent
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within last year				
Total	1095	392183.67	87.17	1.34
Northwestern	78	32794.51	87.26	4.95
North Central	90	24830.28	85.63	3.59
Northeastern	135	54340.81	88.83	3.52
Southeastern	249	94612.77	90.53	2.84
South Central	185	61978.23	91.74	2.89
Southwestern	161	66587.73	88.46	3.06
Philadelphia	122	48180.80	76.20	4.90
Pittsburgh	75	8858.54	76.68	2.34
more than 1 year since last visit				
Total	173	57698.54	12.83	1.34
Northwestern	13	4786.06	12.74	4.95
North Central	17	4168.02	14.37	3.59
Northeastern	18	6836.23	11.17	3.52
Southeastern	33	9891.49	9.47	2.84
South Central	21	5583.46	8.26	2.89
Southwestern	18	8687.10	11.54	3.06
Philadelphia	36	15051.81	23.80	4.90
Pittsburgh	17	2694.37	23.32	2.34
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These results would indicate that a large proportion (87.2%) of Pennsylvania schoolchildren in the survey index grades have seen a dentist in the past year. A fairly large disparity is seen, however, between the two major cities and the other health districts. While estimates range from 8% to 14% for the other health districts, more than 23% of children in the survey index grades in Pittsburgh and Philadelphia have not seen a dentist in the previous year. The weighted sizes show that in real numbers about 2,700 Pittsburgh children and 15,000 Philadelphia children in grades 1, 3, 9, and 11 have not seen a dentist in the previous year. Increasing access to dental care for the children in the two cities would be desirable, as these results would be related to the other survey findings indicating that children in Pittsburgh and Philadelphia have more dental treatment needs. Furthermore, this access issue is important for the entire state, as 39% of children not seeing a dentist in the previous year had untreated caries compared to 18% of those who had seen a dentist in the previous year. Caries left untreated can eventually require complex costly dental treatment, not to mention the potential of pain and infection for the child.

Further issues related to dental care access were investigated in the parent phone survey. Slightly under 10% of parents reported having had trouble at some point in getting dental care for their child, ranging from 7% to 11% across the health districts. Of Pennsylvania families with children among the survey grades, 92% get care at private offices, 4% get care at public dental clinics, 2% get care at hospitals, and 2% get care at dental schools.

Also related to these issues of dental care access is income. The parent phone interview included a question on family income. Income is often a primary predictor of oral health status and treatment needs. Mean numbers of teeth with caries experience and untreated decay related to family income are shown in table 20. Percentages with any decay experience or untreated caries by income level are shown in table 21. Both tables show a substantial gradient in caries experience and untreated caries across the income levels. Children from families with low family income have much higher rates and probability of dental caries experience and untreated decay. Policy should be developed to promote programs that can address issues related to this disparity in the oral health of children across incomes levels.

Table 20: Levels of Decay Experience and Untreated Decay by Income Category.

Variable INCOME	Sample Size	Weighted Size	Total	Mean	SE Mean
<b>DMF-DFT</b>					
Total	1140	403570.37	740581.83	1.84	0.09
less than \$20,000	176	55388.84	151697.13	2.74	0.31
\$20,000 to \$50,000	553	192547.80	403637.56	2.10	0.14
\$50,001 to \$100,000	326	127357.85	165147.87	1.30	0.11
more than \$100,000	85	28275.87	20099.27	0.71	0.17
<b>DECAY TOTAL</b>					
Total	1140	403570.37	223400.00	0.55	0.05
less than \$20,000	176	55388.84	62194.38	1.12	0.22
\$20,000 to \$50,000	553	192547.80	120457.49	0.63	0.08
\$50,001 to \$100,000	326	127357.85	36037.77	0.28	0.04
more than \$100,000	85	28275.87	4710.36	0.17	0.05

Table 21: Percent with Decay Experience and Untreated Decay by Income Category.

Variable INCOME	Sample Size	Weighted Size	Total	Percent	SE Percent
<b>Untreated Caries</b>					
Total	1140	403570.37	80051.84	21.82	1.54
less than \$20,000	176	55388.84	18153.34	32.77	4.17
\$20,000 to \$50,000	553	192547.80	48574.01	25.23	2.62
\$50,001 to \$100,000	326	127357.85	18454.16	14.49	2.00
more than \$100,000	85	28275.87	2870.33	10.15	2.64
<b>Any Caries Experience</b>					
Total	1140	403570.37	205363.35	50.89	1.68
less than \$20,000	176	55388.84	32068.00	57.90	3.69
\$20,000 to \$50,000	553	192547.80	107838.37	56.01	2.54
\$50,001 to \$100,000	326	127357.85	57939.34	45.49	2.47
more than \$100,000	85	28275.87	7517.64	26.59	5.24

### 5.1.6 Orthodontic Treatment Needs

The OHNA oral screening included a brief orthodontic assessment. Although not thorough by orthodontic standards, the assessment provides a reliable assessment of the proportion of Pennsylvania schoolchildren that could benefit from orthodontic treatment. Based on findings in

the orthodontic assessment, a five category code was assigned to the children: no obvious need for orthodontic care; mild occlusal condition where orthodontic treatment possibly could be of benefit; definite orthodontic treatment need; presently in orthodontic care; orthodontic treatment already completed. The definite orthodontic treatment code was assigned for severe occlusal conditions such as major overjet greater than 6 mm, major posterior crossbite, complete overbite, major overbite with palatal trauma, missing permanent tooth, tooth blocked out from occlusion (out of the arch), and open bite. Table 22 shows the distributions across the five categories for schoolchildren in Pennsylvania and the six Health Districts.

Across all of the districts, approximately ten percent of children in grades 1, 3, 9, and 11 have a definite need for orthodontic treatment due to one or more major occlusal problems. These problems can affect function and because of esthetic effects can have an impact on self esteem and quality of life. Children particularly in the Northwest region, Pittsburgh, and Philadelphia appear to have less access to orthodontic care based on the figures for children in or having completed orthodontic treatment. Programs to improve access to orthodontic care may benefit these children, especially those with serious occlusal problems.

Table 22: Percentages of children in the orthodontic assessment categories for Pennsylvania and for the eight health districts.

ORTHODONTIC CATEGORY HEALTH DISTRICT	Sample Size	Weighted Size	Percent	SE Percent
no orthodontic tx need				
Total	3565	268434.57	57.81	1.54
Northwestern	311	26455.15	64.34	4.38
North Central	224	17465.78	60.23	4.19
Northeastern	370	35729.64	50.23	2.63
Southeastern	883	65232.13	57.68	3.27
South Central	547	37186.23	55.04	2.45
Southwestern	461	44282.35	57.56	5.83
Philadelphia	489	34777.38	55.03	4.14
Pittsburgh	280	7305.91	60.47	4.57
treatment possible				
Total	1208	92626.86	19.95	0.94
Northwestern	103	8363.56	20.34	1.62
North Central	61	4636.06	15.99	1.93
Northeastern	96	10169.31	16.57	1.90
Southeastern	243	21949.29	19.41	2.41
South Central	200	14178.44	20.99	2.27
Southwestern	158	13020.70	16.93	1.69
Philadelphia	235	17353.76	27.46	3.64
Pittsburgh	112	2955.75	24.46	3.98
need orthodontic tx				
Total	643	50530.69	10.88	0.89
Northwestern	47	3793.90	9.23	1.59
North Central	39	3012.24	10.39	2.67
Northeastern	55	5963.74	9.72	2.44
Southeastern	119	10641.88	9.41	1.92
South Central	100	7329.07	10.85	3.34
Southwestern	125	10367.06	13.48	1.52
Philadelphia	119	8425.03	13.33	2.57
Pittsburgh	39	997.77	8.26	1.77
now in ortho tx				
Total	265	21057.47	4.53	0.49
Northwestern	11	952.85	2.32	0.77
North Central	27	2022.55	6.97	2.08
Northeastern	38	4005.27	6.53	1.29
Southeastern	64	4721.31	4.17	1.08
South Central	40	3485.25	5.16	1.18
Southwestern	39	3265.59	4.24	1.69
Philadelphia	30	2145.45	3.40	0.70
Pittsburgh	16	459.20	3.80	0.45
completed ortho tx				
Total	358	31690.96	6.82	0.91
Northwestern	18	1550.72	3.77	1.51
North Central	32	1861.66	6.42	1.24
Northeastern	52	5496.06	8.96	2.37
Southeastern	119	10551.62	9.33	2.26
South Central	58	5382.71	7.97	2.63
Southwestern	58	5992.51	7.79	3.00
Philadelphia	7	491.99	0.78	0.40
Pittsburgh	14	363.69	3.01	1.27

# THE PENNSYLVANIA ORAL HEALTH NEEDS ASSESSMENT

## ANCILLARY STUDIES

### A. 1 STUDY 1: Study of Emergency Dental Visits to School Nurses' Offices

#### A.1.1 Background

Acute dental conditions such as toothache and traumatic injury to the teeth are reported to be a significant cause for lost school time among children. Furthermore chronic dental pain has been reported to result in significant impairment in school performance among afflicted children. However, the extent of this problem has never been quantified. Traumatic injury to the teeth has been reported to be the major cause of preventable tooth loss among adolescents. Furthermore, most organized "contact sports" in Pennsylvania do not mandate mouthguard use. However, little data exist to support this contention in Pennsylvania

To address this issue, a study of school nurses was conducted via a mailed survey to a representative sample of the 501 public school districts in Pennsylvania. The purpose of this study was to determine the frequency (prevalence) and nature of emergency visits for dental problems to school nurses during a designated month. School nurses were asked to keep a log of emergency visits by type (dental vs. non-dental) and to record the nature of the dental problem, when appropriate (e.g., toothache, trauma, and abscess). Additionally, these nurses responded to questions about mouthguard use during school-sponsored contact sports programs.

#### A.1.2 Survey Procedures

Sample selection: All schools that participated in the OHNA project were selected to be part of this ancillary study. Each of the 153 school buildings which participated in the OHNA dental screenings received questionnaires. The school nurses served as contact and informant for completion of these questionnaires.

Survey instrument: A one-page *Dental Emergency Tracking Form* was distributed to each school nurse. For each school, all dental emergencies that were encountered during the month of April, 2000 were recorded on this sheet by the school nurse.

#### A.1.3 Results

Survey forms were returned from 121 schools, wherein a total of 1406 dental emergencies were recorded. Nurses reported on average a total of 12 dental emergencies per month. The number of emergencies reported ranged from 0 to 58 emergencies per month. Among all emergencies reported, the most common were, toothache (23%), gum pain (18%), orthodontic appliance problems (11%), and cavities (10%).

Data were aggregated to the district level and the rate of dental emergencies was estimated. This rate was calculated by dividing the total number of dental emergency visits to school nurses in a month by the total of all emergencies to the school nurse for the month. The rate is provided in Table x. There were significant disparities among schools, as indicated by the range of reported emergencies. Although aggregating to the district level minimizes those differences,



there was still a 2.5 fold difference in rates of dental emergencies between the Northwest and Southeast Health Districts.

Mouthguards were reported as "required" for school sports at 53% of schools.

Table x

DISTRICT	RATE OF DENTAL EMERGENCIES OUT OF ALL EMERGENCY VISITS TO SCHOOL NURSE.
Northwest	4.8%
Northcentral	3.6%
Northeast	2.3%
Southeast	1.9%
Southcentral	2.2%
Southwest	2.6%

## A.2 STUDY 2: Study of dental sealants among Pennsylvania dentists.

### A.2.1 Background

Dental sealants are one of the most effective caries preventive mechanisms known. Furthermore, they directly address the most common form a dental decay – lesions on the occlusal surfaces of molars – where typically over 80% of new caries occur. Historically, however, private practicing dentists have been slow to adopt sealant use. As a result, many children continue to experience high levels of preventable dental disease.

This study assessed the extent of sealant use among private practicing dentists in Pennsylvania via a mailed questionnaire. Additionally, reasons for underutilization of sealants was explored.

### A.2.1 Survey Procedure

Sample selection: A list of dentists from the American Dental Association was used to create a sample of all dentists in the counties surveyed for the Oral Health Needs Assessment. Dentists who were listed as either general practitioners or pediatric dentists were selected for participation. All "specialist" dentists were excluded.

Survey instrument: A one page questionnaire addressing issues of sealant use and attitudes toward sealant effectiveness was mailed to all dentists. These were returned via mail to the Principal Investigator.

### A.2.3 Results

A total of 82% of Pennsylvania dentists reported using sealants. Most dentists (90%) applied the sealants themselves. However 50% of respondents indicated that hygienists also applied sealants in their offices. Most dentist felt sealants were cost-effective and were appropriate for most children.