



Oral Health Status of School Children in the Commonwealth of the Bahamas

Results of a National Survey

1999-2000

The Ministry of Health of the Commonwealth of the Bahamas

and

The Pan American Health Organization

Pan American Sanitary Bureau

Nassau, Bahamas



Division of Health Systems and Services Development

Regional Program on Oral Health

2001

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ACKNOWLEDGEMENT

A generous grant from PAHO/WHO provided the necessary funds for the training of examiners and recorders, the data collection throughout New Providence and the Family Islands and the portable examination dental chairs and lights. We wish to express our sincere thanks to Dr. Saskia Estupinan-Day, Regional Advisor for Oral Health, Pan American Health Organization, Dr. Richard Van West-Charles, the Bahamas Representative PAHO/WHO and the Pan American Health Organization for the technical and financial assistance provided for this project.

The Department of Oral Health acknowledge, with thanks, contributions of all those persons and agencies in the development and implementation of this Survey.

Special mention must be made of meaningful contribution of the following members of the National Oral Health Interim Committees who shared the vision of a National Survey and gave many hours in the initial planning of this national survey:

Dr. Numir Rashad, Consultant Head, Department of Oral Health

Dr. Kimberley Richardson, Pediatric Dentist, formerly of the Ministry

Dr. Joyous Pickstock, Senior Dental Officer, Department of Oral Health

Dr. Ricardo Crawford, President, Bahamas Dental Association

Dr. Sidney Sweeting, Representative, Bahamas Dental Council

Also, of the following members of the subcommittee who met regularly with the NOHIC members during the planning stages and continued to lend their support throughout the conduct of the Survey.

Mr. Terrance Fountain Epidemiologist, Ministry of Health

Ms. Dixie Jones, Administrative Officer, Ministry of Health

Ms. Monique Jones, Health Education Officer, Ministry of Health

Mrs. Jan Thompson, Administrative Officer, Ministry of Health

Special recognition and gratitude must be given to Dr. Eugenio D. Beltran who acted as consultant for all aspects of the survey. We thank him for providing the training and calibration of the examiners and recorders. We appreciated his design of the protocol and methodology for the Survey and his supervision of the cleaning of data and data transfer to the EPI program. His assistance in the preparation of the final report and continuous provision of direction and support throughout the conduct of this project proved invaluable. The Department of Oral Health and, indeed, the Ministry of Health extend our appreciation to the Oral Division of the Centers of Disease Control and Prevention for allowing Dr. Beltran to spend so many hours away from his post to assist us.

Special gratitude is extended to the most important participants in this national assessment, the clinical examiners and recorders. Drs. Catherine Adderley, Dante Bazard, Vincent McWeeney, William Lee, Dr. Hiram Lockhart and Dental Nurse LaGloria Ferguson did an exceptional in conducting the clinical examinations during the survey. These highly motivated examiners and recorders must be lauded for the diligent and meticulous care given to the collection of data. The quality of information generated serves as a testament to their thoroughness. The recorders: Ms. Susan Carey, Ms. Ebian Smith, Ms. Glendina Rahming and Ms. Faye Lewis are applauded for the initiative taken to gather and assemble the required numbers of students despite the many barriers encountered at various sample sites.

Sincere appreciation goes to Ms. Alicia Sands for her assistance in gathering the necessary demographic statistics from the schools, calculating the kappa value of the examiners and especially, her untiring efforts in entering the collected data from all the sample sites into the EPI info program. Thanks to Terrance Fountain for his guidance in the statistical and epidemiological input during the planning and development of the project.

The support received from the Ministry of Education and its staff and the Independent Schools throughout the Bahamas during the preparations and execution of the Survey is greatly appreciated.

Mr. Chris Symonnette from the Bahamas Information Bureaux has been most helpful in the public releases announcing the commencement and progress of the National Oral Health Survey. The participation of his office sensitized the general public to our objectives and contributed greatly to their acceptance and support.

Thompson Trading Company, local distributors for Colgate-Palmolive Company, supplied Oral Hygiene kits for the thousands of participants in the survey. Each child used the contents of these kits (toothbrushes and toothpaste) to prepare for the clinical examination. We are sincerely grateful for these donations, without which we could not have successfully conducted this survey.

The Honourable Minister Senator Dr. Ronald Knowles and his executive staff, and the Chief Medical Officer, Dr. Dahl Regis must be commended for their foresight in making Oral Health a priority concern of the Ministry and for their continued support of this project.

Our gratitude is extended to all those students who served as sample representatives of the population and to the school teachers and officials who assisted in the collection of data during this exercise. Without their cooperation this study would not have been possible.

Dr. C.O. Vanderpool

Survey Coordinator and Chief Facilitator

21 March 2001

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INTRODUCTION

In 1997, the Minister of Health appointed a group of government and non-government professionals to study the Oral Health situation in the Bahamas, and to make recommendation to the Government for the improvement of its oral health services.

Early in its deliberations the National Oral Health Interim Committee (NOHIC), as this partnership was called realized that there was a lack of scientific data available to assess the status of oral health of the residents of the Bahamas. Therefore, immediately, plans were initiated to conduct a National Oral Health Survey.

With the support of the Pan American Health Organization (PAHO)/World Health Organization (WHO), Dr. Eugenio D. Beltran an epidemiologist from the Centers for Disease Control and Prevention, was engaged to establish the methodology and criteria for a nation-wide study of existing oral condition of the Bahamian people.

The purpose of the survey was to assess the oral health status and treatment needs of the schoolchildren in the Bahamas.

The Survey was initially designed to include samples of the adult population – ages 24- to 35 years and, 65 years and older. During the collection of data from several sample sites for this segment of the population, examiners encountered many difficulties in gathering sufficient persons in the adult age groups recommended. In order not to delay the completion of the Survey, a decision was made to eliminate these groups from the samples and concentrate on the school population only.

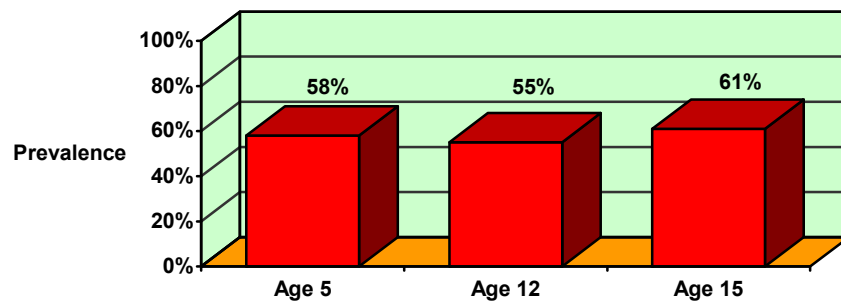
In conjunction with the clinical collection of data regarding oral diseases, questionnaires were designed to assess the knowledge, attitude and practices of the population in regard to oral health. These questionnaires were given to the students to be filled out and returned with parental consent for participation in the Survey. This request was found to delay responses from participants thus was discontinued. Those questionnaires already completed were collated with the clinical data and placed on file for future evaluation.

The results of this national survey of schoolchildren identify many aspects of the oral health status of the population, the prevalence and severity of dental caries and dental fluorosis, the pattern of disease and the degree of treatment needs. This information will assist the Department of Oral Health and the Ministry of Health in formulating plans and programmes to reduce these common diseases. Also, it will assist with the estimation of costs to implement programmes aimed at the prevention of such oral disorders.

I. Executive Summary and Recommendations

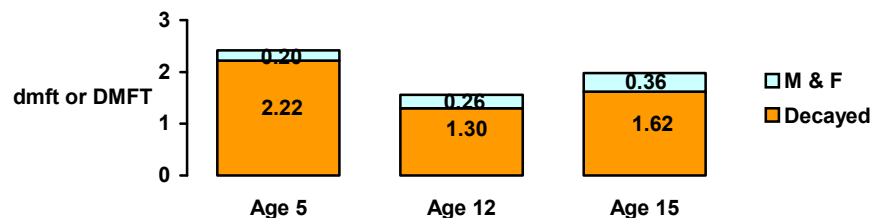
A representative sample of 5-, 12-, and 15-year-old school children from eleven islands of The Commonwealth of the Bahamas were examined for dental caries, enamel fluorosis, and treatment needs by six standardized examiners using a visual-tactile approach. A total of 2,684 children, representing approximately 15,000 children were examined between September 1999 and March 2000, using explorers, dental mirrors, and portable dental lights. Aggregated estimates of prevalence and severity of both dental caries and enamel fluorosis were constructed using island and sex-specific data (weighted data). Appendices A to D provides additional information on sampling, diagnostic criteria, examination protocol, examiner reliability and, data management.

Among the 1,060 five-year-old school children, the prevalence of dental caries in their



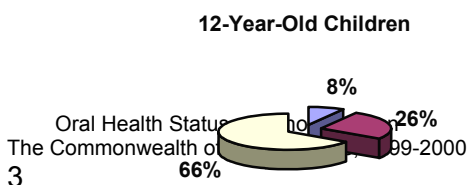
primary dentition was 58%. The prevalence of dental caries in the permanent dentition of 12- and 15-year-old school children was 55% and 61%, respectively. Five-year-old children had, on average, 2.42 decayed, missing, and filled teeth (dmft) and 4.43 decayed, missing, and filled surfaces (dmfs). The mean DMFT and DMFS scores for 12-year-olds were 1.56 and 2.30, respectively. The mean DMFT and DMFS scores for 15-year-olds were 1.98 and 2.96, respectively.

Untreated decayed teeth were the main component of overall caries experience in the three age groups, accounting for 94% of the caries experience in the primary dentition of 5-



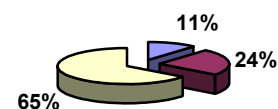
year-old school children and about 80% in the permanent dentition of both 12- and 15-year-old groups.

Similarly, among 12- and 15-year-old children who had experienced dental caries in their permanent dentition, approximately 90% of the mean value was localized in the occlusal,



■ Mesio-Distal ■ Buccal-lingual ■ Occlusal

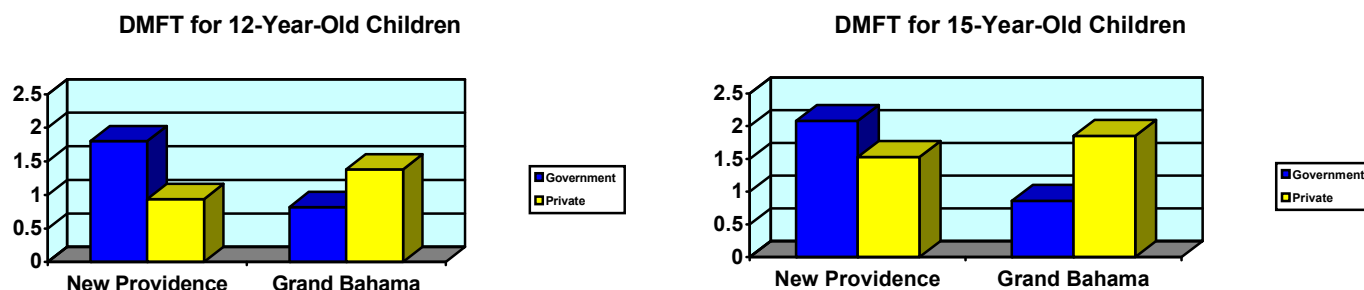
15-Year-Old Children



■ Mesio-Distal ■ Buccal-lingual ■ Occlusal

buccal, and lingual surfaces, and probably originated in pit and fissures of these surfaces.

Two sample units, representing children attending government and private schools, were selected in the islands of New Providence and Grand Bahama. Among 12- and 15-year-old children in New Providence, those attending private schools had less caries prevalence and severity than those attending government schools did. In Grand Bahama, children attending government schools had less caries prevalence and severity. One possible

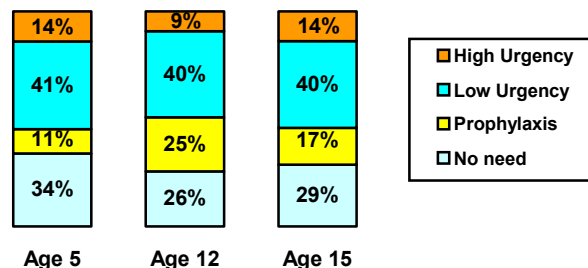


explanation for this pattern is the preventive benefit received from a series of interventions delivered only to children attending government schools in Grand Bahama. From 1990 to 1992, a daily fluoride mouthrinse program was in effect targeting children from first to sixth grades. Between 1994 and 1996, children in elementary schools received 0.5 mg F daily as a dietary supplement. In addition, between 1993 and 1995 there was a strong health education program tied with screening and early detection. Based on these interventions, the 15-year-old cohort benefited from the fluoride rinse program when they were 6- to 8-years-old and from dietary fluoride supplements between 10- and 12-years-old. The 12-year-old cohort benefited from fluoride supplements between the ages of 7 and 9 years but did not benefited from rinses because they were too young when the program was in effect. This may explain why the 15-year-old cohort in government schools had less disease prevalence and severity than had the 12-year-old cohort.

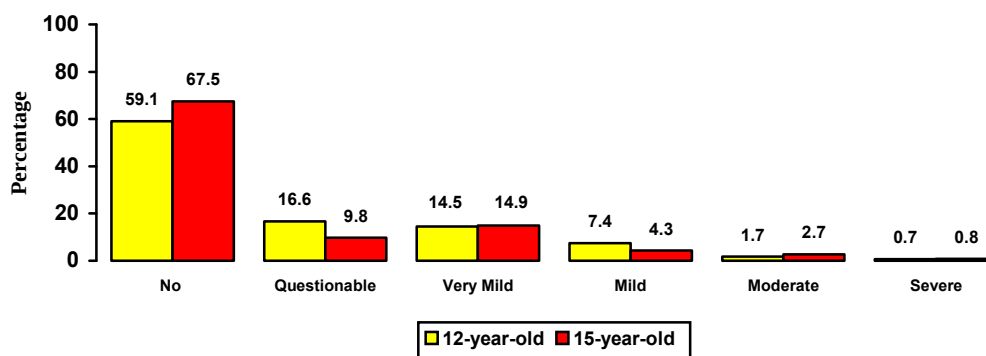
Another possible explanation is inter-examiner discrepancies. In Grand Bahama, both, 12- and 15-year-old cohorts enrolled in government schools were examined by one examiner; the 5-year-olds and the entire sample enrolled in private schools by another. However, these two examiners showed a high level of inter-examiner reliability against the standard during training and, it is improbable that a differential in diagnosis could explain the large differences observed. In addition, we have additional examination data from children in New Providence, where all examiners examined 25 children in one of the schools selected for the study. According to these data, both examiners were in close agreement with each other.

There were important inter-island differences in dental caries prevalence and severity. Overall estimates were higher for Andros, Abaco and Long Island among all age groups, 5-year-olds in Cat Island and 15-year-olds in Bimini.

Between 55% and 65% of the sample required dental treatment at examination time. In 9% to 14% of the sample this treatment was classified as urgent due to history of pain or infection.



Among 5-year-old children, 2.3 teeth required restorative treatment, including fillings, crowns, pulpal treatment, and extractions. The numbers of teeth requiring restorative treatment among 12- and 15-year-old children were 1.09 and 1.52 teeth per child, respectively.



The prevalence of enamel fluorosis (very mild to severe), measured as the worst score among the upper anterior teeth—cuspid to cuspid—fell between 23% and 24%.

These values appear higher than expected for a population with limited exposure to systemic fluorides - the three most common sources of fluoride being fluoride in the drinking water, ingested fluoride toothpaste by younger children, and dietary fluoride supplements.

Regarding natural fluoride in the drinking/cooking water, there is reliable information indicating that some water sources in the Bahamas have concentrations between 0.8 to 2.0 mg/l F and that boiling water is a common practice; however, most water sources remain unknown in their fluoride concentration.

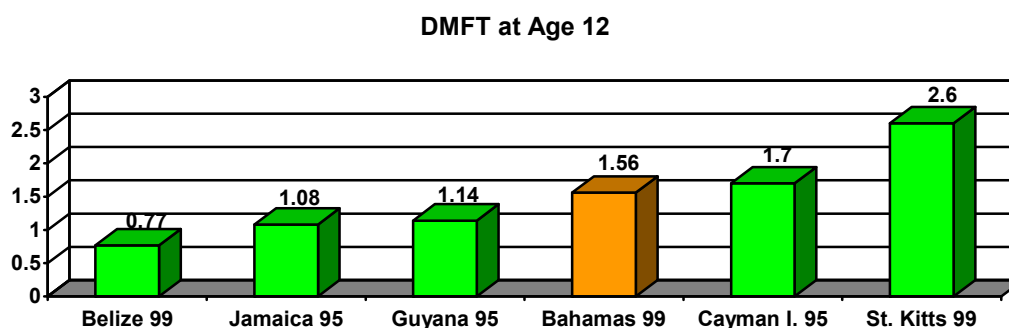
In addition, according to market share data, fluoride toothpaste distribution in the Bahamas was homogeneous during the time the 12- and 15-year-old cohorts were at risk of enamel fluorosis for the upper anterior teeth, i.e., 1984-1993.

Finally, the fluoride supplement program was available only for children attending government primary schools in Grand Bahama.

None of these potential sources of overexposure to fluoride could explain the higher than expected prevalence of enamel fluorosis in the cohorts studied, or the differential distribution of enamel fluorosis prevalence between the sampling units. At the same time, it is impossible to rule out some level of diagnostic error, taking into account that reliability for enamel fluorosis was not as good as for dental caries. Although only three examiners obtained

good kappa estimates during training, the other three examiners were retrained; and none of these retrained examiners was solely involved in the examination of the sampling units with high prevalence. Consequently, the severity and distribution of enamel fluorosis in the Bahamas will require further epidemiological investigation.

The mean DMFT at age 12 in the Bahamas compares favorably with other countries in the English-speaking Caribbean Region (Figure 24). Due to the large number of children with untreated needs, the implementation of appropriate preventive and restorative initiatives in the country will, undoubtedly, lead to additional improvement in the overall oral health status and further decline in indicators of dental caries prevalence and severity.



Recommendations

1. Increase the number of restorative services provided to the population to reduce the number of untreated decayed teeth observed. A strong emphasis should be provided to the primary dentition of young children who displayed the highest level of untreated needs. The increase in restorative services will require an increase in the current number of dental providers.
2. Because of the high level of dental caries observed in the occlusal, buccal, and lingual surfaces, the use of dental sealants should be introduced nationwide using an appropriate protocol to identify those children who will benefit the most.
3. The levels of fluoride in all drinking water should be reassessed following international standard guidelines, to determine if children are receiving higher than optimal or suboptimal levels of fluoride.
4. The use of fluoride toothpaste among young children should be investigated to avoid possible overexposure to systemic fluorides if such toothpaste is swallowed by children under 6.
5. An overall national program for dental caries prevention should be implemented. Special attention should be given to the islands with the most unmet needs, e.g., Abaco, Long Island, and Andros.
6. All preventive programs should include appropriate program evaluation measurements.
7. Parental and children health education should stress the importance of prevention for dental caries, routine visit to the dental office, and the prompt restoration of decayed teeth.

II. Main Findings

A. Dental caries in the primary dentition of 5-year-old schoolchildren

1. The prevalence of dental caries in the primary dentition of 5-year-old schoolchildren was 58.1% (i.e., 58.1% of all children had a dmft>0). The prevalence of untreated decayed teeth (dt>0) was 57.6%, half percent point lower than the overall 58.1% prevalence [Table B-1].
2. There were no differences by sex in the prevalence of dental caries in the primary dentition (dmft>0) and untreated decayed teeth (dt>0) [Tables B-2 & B-3].
3. The prevalence of dental caries and untreated decayed teeth in the primary dentition of 5-year-old children enrolled in government schools of New Providence was higher than in children enrolled in private schools (62% vs. 34% for dmft>0 and 62% vs. 32% for dt>0) [Tables B-4 & B-5].
4. In the island of Grand Bahama, the difference in prevalence of dental caries and untreated decayed teeth, between government and private schools is less marked than in New Providence [Tables B-6 & B-7].
5. There were important differences in the prevalence of dental caries in the primary dentition among sampling units. Cat Island, Abaco, Andros and Long Island showed the highest prevalence figures (greater than 65%). All other sampling units fell in the 50% to 62% range, except private schools of New Providence which showed the lowest prevalence (34%) [Figure 1].
6. The pattern in the prevalence of untreated decayed teeth (dt>0) among sampling units [Figure 2] was similar to the pattern of caries prevalence [Figure 1]. The proximity between the values of these two indicators in each sample unit implies that most caries experience in these subpopulation groups, and by extension to the entire population, were untreated decayed teeth.
7. On average, 5 year-old children had 2.42 decayed, missing and filled teeth (dmft) [Table C-1, Figure 13] and 4.43 decayed, missing and filled surfaces (dmfs) [Table C-19, Figure 14]. About 42% were caries-free (dmft=0) and an additional 30% had between 1 and 3 decayed missing and filled teeth. About 11% had more than seven teeth affected by dental caries (dmft ≥ 7) [Table C-7, Figure 15]. The mean dmft and dmfs values were slightly higher, but not significant, in males than in females [Tables C-1 & C-19].
8. Untreated decay was the largest component in the dmft and dmfs indices: 2.22 decayed teeth compared with 0.13 missing, and 0.07 filled teeth [Table C-1, Figure 13]; 4.12 decayed surfaces compared with 0.17 missing , and 0.14 filled surfaces.[Table C-19, Figure 14].
9. Among those who had experienced caries in the primary dentition (dmft>0) the highest component of the dmft—at the overall level and in each sampling unit—was decayed teeth (dt) [Tables C-13 & C-14]. The overall mean contribution of decayed teeth was 94% [Table C-13 & Figure 16] and ranged from as low as 84% in the private schools of New Providence to close to 99% in Inagua-San Salvador [Table C-14].

10. There were important differences in the mean dmft and dmfs values among sampling units [Figures 3 & 4]. The highest mean dmft and dmfs values were observed in Abaco, Andros and government schools in Grand Bahama. Mean dmft and dmfs scores by sampling unit matched closely with the prevalence figures.

B. Dental caries in the permanent dentition of 12-year-old schoolchildren

1. The prevalence of dental caries in the permanent dentition of 12-year-old schoolchildren was **54.5%** (i.e., 54.5% of all children had DMFT>0). The prevalence of untreated decayed teeth (DT>0) in these children was **50%** [Table B-1].
2. Males had slightly higher prevalence of dental caries (DMFT>0) and untreated decayed teeth (DT>0) than females, but this difference was below the five percentage points [Tables B-2 & B-3].
3. The prevalence of dental caries and untreated decayed teeth in the permanent dentition of 12-year-old children enrolled in government schools of New Providence was higher than in children enrolled in private schools (57% versus 44% for DMFT>0 and 53% vs. 37% for DT>0) [Tables B-4 & B-5].
4. On the other hand, in the island of Grand Bahama, children in private schools had higher prevalence of dental caries (DMFT>0) and untreated decayed teeth (DT>0) than children in government schools [Tables B-6 & B-7].
5. There were important differences in the prevalence of dental caries in the permanent dentition among sampling units [Figure 5]. Again, Abaco, Long Island, and Andros showed the highest prevalence figures (greater than 65%). In addition, Eleuthera, Cat Island, Inagua-San Salvador and the private schools from Grand Bahama Island showed prevalences higher than 60%. The lowest prevalence was observed in private schools of New Providence and in government schools in Grand Bahama (44% and 45%, respectively). The value reported for Exuma, i.e., 33% is unreliable, because it is based on nine children only [See Table A-2]. Based on this small sample size, all estimates for Exuma for 12-year-old children will be excluded.
6. The pattern in the prevalence of untreated decayed teeth (DT>0) among sampling units [Figure 6] was similar to the pattern of caries prevalence [Figure 5].
7. On average, 12 year-old children had **1.56** decayed, missing and filled teeth (DMFT) [Table C-3, Figure 13] and **2.30** decayed, missing and filled surfaces (DMFS) [Table C-21, Figure 14]. About **46%** were caries-free (DMFT=0) and an additional 40% had between 1 and 3 decayed missing and filled teeth. About 4% had more than seven teeth affected by dental caries (DMFT ≥ 7) [Table C-9, Figure 15]. There were no differences by sex in the mean DMFT and DMFS values [Tables C-3 & C-21].
8. Untreated decay was the largest component in the DMFT and DMFS indices: 1.30 decayed teeth, compared with 0.05 missing, and 0.21 filled teeth [Table C-3, Figure 13]; 1.78 decayed surfaces, compared with 0.15 missing surfaces, and 0.37 filled surfaces [Table C-21, Figure 14].
9. Among those who had experienced caries in the permanent dentition (DMFT>0) the highest component of the DMFT—at the overall level and in each sampling unit—was

decayed teeth (DT) [Tables C-15 & C-16]. The overall mean contribution of decayed teeth was 81% [Table C-15, Figure 16] and ranged from as low as 75% in the government schools of Grand Bahama to 96% in Andros [Table C-16]. Almost two-thirds (65.5%) of all caries experience was localized in the occlusal surfaces, and an additional 26% in the buccal-lingual surfaces [Table C-25, Figure 17]. This indicates that more than 90% of all caries experience originated in pit and fissures. This pattern varied across sampling units but most units had at least 80% or more of the caries experience originated in pit and fissures.

10. As in the case of prevalence, there were important differences in the mean DMFT and DMFS values among sampling units [Figures 7 & 8]. The highest mean DMFT and DMFS values were observed in Abaco, Long Island, Andros and Cat Island. Mean DMFT and DMFS values by sampling unit matches closely to the prevalence figures.

C. Dental caries in the permanent dentition of 15-year-old schoolchildren

1. The prevalence of dental caries in the permanent dentition of 15-year-old schoolchildren was 61% (i.e., 61% of all children had DMFT>0). The prevalence of untreated decayed teeth (DT>0) in these children was 55% [Table B-1].
2. No difference between males and females was observed in the prevalence of both dental caries (DMFT>0) and untreated decayed teeth (DT>0) [Tables B-2 & B-3].
3. The prevalence of dental caries and untreated decayed teeth in the permanent dentition of 15-year-old children enrolled in government schools of New Providence was higher than in children enrolled in private schools (64% versus 52% for DMFT>0 and 62% vs. 32% for DT>0) [Tables B-4 & B-5].
4. On the other hand, in the island of Grand Bahama, children in private schools had higher prevalence of dental caries (DMFT>0) and untreated decayed teeth (DT>0) than children in government schools [Tables B-6 & B-7].
5. There were important differences in the prevalence of dental caries in the permanent dentition among sampling units [Figure 9]. Only private schools in New Providence, government schools in Grand Bahama and Inagua-San Salvador showed prevalence lower than 60%.
6. The pattern in the prevalence of untreated decayed teeth (DT>0) among sampling units [Figure 10] was similar to the pattern of caries prevalence [Figure 9].
7. On average, 15 year-old children had 1.98 decayed, missing and filled teeth (DMFT) [Table C-5, Figure 13] and 2.96 decayed, missing and filled surfaces (DMFS) [Table C-23, Figure 14]. About 39% were caries-free (DMFT=0) and an additional 39% had between 1 and 3 decayed missing and filled teeth. About 6% had more than seven teeth affected by dental caries (DMFT ≥ 7) [Table C-11, Figure 15]. There were no differences by sex in the mean DMFT values [Tables C-5]. Females had slightly higher mean value of filled surfaces (0.41 versus 0.31 among males, but this difference did not reached statistical significance [Table C-23].
8. Untreated decay was the largest component in the DMFT and DMFS indices: 1.62 decayed teeth, compared with 0.11 missing, and 0.24 filled teeth [Table C-5, Figure

13]; 2.26 decayed surfaces, compared with 0.33 missing, and 0.37 filled surfaces [Table C-23, Figure 14]. Fifteen-year-old children had a larger proportion of their mean DMFT and DMFS composed by missing and filled teeth than 12-year-old children (Figures 7 and 8 versus Figures 11 and 12).

9. Among those who had experienced caries in the permanent dentition (DMFT>0) the highest component of the DMFT—at the overall level and in each sampling unit—was decayed teeth (DT) [Tables C-17 & C-18]. The overall mean contribution of decayed teeth was 80% [Table C-17, Figure 16] and ranged from as low as 47% in the private schools of New Providence to 93% in the government schools of the same island [Table C-18]. The low value for children in private schools in New Providence suggests a cohort effect that acted for a restricted period of time: it disappears in the 12-year-old cohort (decayed teeth contribution in government schools = 80%). Almost two-thirds (65%) of all caries experience was localized in the occlusal surfaces, and an addition 24% in the buccal-lingual surfaces [Table C-27, Figure 17]. This indicates that almost 90% of all caries experience originated in pit and fissures. This pattern varied across sampling units but most units had 80% or more of the caries experience originated in pit and fissures. Two exceptions are noteworthy. Cat Island had almost 95% of their caries lesions localized in pit and fissures and Exuma had a large proportion of lesions (24%) localized in the mesio and distal surfaces.
10. As in the case of prevalence, there were important differences in the mean DMFT and DMFS values among sampling units [Figures 11 & 12]. The highest mean DMFT and DMFS values were observed in Abaco, Bimini, Long Island, and Andros. Mean DMFT and DMFS values by sampling unit matches closely to the prevalence figures.

D. Tooth-Specific Treatment Needs

1. On average, every 5-year-old child required restorative treatment (fillings, crowns and pulp treatment) in almost two teeth. Twelve-year-old children required restorative treatment in 1.04 teeth and 15-year-old children required such treatment in 1.45 teeth [Table D-2, Figure 24].
2. Sealants were reported as required in 0.61 teeth of every 5-year-old, 1.43 teeth of every 12-year-old, and in 1.77 teeth of every 15-year-old child [Table D-1, Figure 24].
3. Extractions were required in 0.33 teeth of every 5-year-old, 0.05 teeth of every 12-year-old, and in 0.07 teeth of every 15-year-old child [Table D-2, Figure 24].
4. Restorative treatment* was required in 2,089 teeth among 5-year-olds, 1,228 teeth among 12-year-olds, and 1,152 teeth among 15-year-old children. Sealants were required in 545 among those at age 5, 1,020 among those at age 12, and 1,155 among those at age 15. Two hundred and forty-four teeth required extraction at age 5. The numbers were smaller at age 12 (50) and at age 15 (57) [Tables D-3 to D-8, Figure 24].

* These total numbers are applicable **only** to the sample. To extrapolate to the entire population, the mean value for each age group needs to be multiplied by the total number of children in that age group.

5. Matching closely the prevalence and severity indicators, children in Andros, Eleuthera, Abaco, and Cat Islands showed the largest mean number of teeth requiring restorative treatment and extractions [Tables D-4, D-6, and D-8].

E. Treatment Urgency

1. Fifty-five per cent of 5-year-old children required some level of dental treatment [Figure 18]. In 14% of children, the treatment needed was classified as urgent due to pain or infection [Table E-1, Figure 18]. There were wide differences among sampling units [Table E-4, Figure 19]. The largest treatment needs were observed in Cat Island, Abaco, and government schools in New Providence and Eleuthera. The largest urgent treatment needs (35%) were observed in Abaco.
2. Sixty-five per cent of 12-year-old children required some level of dental treatment [Figure 18]. In 9% of children, the treatment needed was classified as urgent due to pain or infection [Table E-2, Figure 18]. Again, there were wide differences among sampling units [Table E-4, Figure 20]. The largest treatment needs were observed in Abaco, Long Island, Inagua-San Salvador, and Andros. The largest urgent treatment needs (20.5%) was observed in Cat Island and Long Island.
3. Fifty-seven per cent of 15-year-old children required some level of dental treatment [Figure 18]. In 14% of children, the treatment needed was classified as urgent due to pain or infection [Table E-3, Figure 18]. Again, there were wide differences among sampling units [Table E-4, Figure 21]. The largest treatment needs were observed in Long Island, Abaco, and Bimini. The largest urgent treatment needs (45%) was observed in Long Island.

F. Enamel Fluorosis

1. The overall prevalence of enamel fluorosis—measured from Dean’s index criteria: very mild to severe—was 24.3% among 12-year-old children and 22.7% among 15-year-old children [Tables F-1, F-3, Figure 22].
2. There were important differences in enamel fluorosis between sampling units [Tables F-2 and F-4, Figure 23]. Children attending schools in Long Island, Abaco, Exuma, Eleuthera and New Providence (government and private) showed the highest prevalence figures (greater than 20%).

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A. Demographics

Table A-1. Population Distribution and Relative Weights by Age and by Type of School

Sampling Unit	Population Size by Age Group G=Government Schools P= Private Schools				Relative Weights (Percentages) by Age Group			
	5	12	15	Total	5	12	15	Total
New Providence	G = 2,665 P = 598	G = 2,472 P = 1,043	G=2,319 P = 878	G = 7,456 P = 2,428	51.73% 11.61%	48.60% 20.50%	49.90% 16.94%	50.09% 16.31%
Grand Bahama	G = 675 P = 302	G = 528 P = 291	G = 657 P = 270	G = 1,860 P = 863	13.10% 5.86%	10.38% 5.72%	14.14% 5.81%	12.49% 5.80%
Andros	219	191	124	534	4.25%	3.75%	2.67%	3.59%
Eleuthera	222	168	161	551	4.31%	3.30%	3.47%	3.70%
Abaco	249	199	157	605	4.83%	3.91%	3.38%	4.06%
Cat Island	36	20	37	93	0.70%	0.39%	0.80%	0.62%
Exuma	90	55	49	194	1.75%	1.08%	1.05%	1.30%
Long Island	47	62	49	158	0.91%	1.22%	1.05%	1.06%
Inagua-San Salvador	38	28	29	95	0.74%	0.55%	0.62%	0.64%
Bimini	11	30	8	49	0.21%	0.59%	0.17%	0.33%
Total	5,152	5,087	4,647	14,886	100.00%	100.00%	100.00%	100.00%

Table A-2. Sample Distribution and Relative Weights by Age and by Type of School ¹

Sampling Unit	Sample Size by Age Group G=Government Schools P= Private Schools				Sample Size Relative Weights (Percentages) by Age Group			
	5	12	15	Total	5	12	15	Total
New Providence ²	G = 250 P = 124	G = 150 P = 123	G = 125 P = 124	G = 525 P = 371	23.58% 11.70%	17.34% 14.22%	16.47% 16.34%	19.56% 13.82%
Grand Bahama ²	1G = 96 P = 75	G = 101 P = 69	G = 91 P = 65	G = 288 P = 209	9.06% 7.08%	11.68% 7.98%	11.99% 8.56%	10.73% 7.79%
Andros ³	104	94	83	281	9.81%	10.87%	10.94%	10.47%
Eleuthera ³	129	91	108	328	12.17%	10.52%	14.23%	12.22%
Abaco ³	107	94	58	259	10.09%	10.87%	7.64%	9.65%
Cat Island ⁴	29	39	20	88	2.74%	4.51%	2.64%	3.28%
Exuma ⁴	49	9 ⁵	25	83	4.62%	1.04%	3.29%	3.09%
Long Island ⁴	39	44	40	123	3.68%	5.09%	5.27%	4.58%
Inagua-San Salvador ⁴	32	36	7	75	3.02%	4.16%	0.92%	2.79%
Bimini ⁴	26	15	13	54 ⁶	2.45%	1.73%	1.71%	2.01%
Total	1,060	865	759	2,684				

¹ For New Providence and Grand Bahama only.

² Designed as a probability sample.

³ Designed as a sample of half of the population.

⁴ Designed as a census.

⁵ Six 13-year-old children were examined but not included in the analysis.

⁶ The only island where the sample size (n=54) exceeded the number provided for sampling (n=23). The latter value was used in the estimation of weights.

Table A-3. Sample Distribution by Age and Sex

Sampling Unit	Age 5			Age 12			Age 15			Overall		
	Male	Female	%♀	Male	Female	%♀	Male	Female	%♀	Male	Female	%♀
New Providence Government Private	112 63	138 61	55% 49%	54 51	96 72	64% 59%	50 45	75 79	60% 64%	216 159	309 212	59% 57%
Grand Bahama Government Private	47 30	49 45	51% 60%	52 23	49 46	49% 67%	41 26	50 39	55% 60%	140 79	148 130	51% 62%
Andros	50	54	52%	51	43	46%	43	40	48%	144	137	49%
Eleuthera	64	65	50%	52	39	43%	51	57	53%	167	161	49%
Abaco	56	51	48%	40	54	57%	19	39	67%	115	144	56%
Cat Island	17	12	41%	18	21	54%	11	9	45%	46	42	48%
Exuma	22	27	55%	1	8	89%	14	11	44%	37	46	55%
Long Island	18	21	54%	28	16	36%	23	17	43%	69	54	44%
Inagua-San Salvador	18	14	44%	16	20	56%	3	4	57%	37	38	51%
Bimini	15	11	42%	6	9	60%	4	9	69%	25	29	54%
Total	512	548	52%	392	473	55%	330	429	57%	1234	1450	54%

B. Prevalence of Dental Caries

Table B-1. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15 *

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	621	58.11%	613	57.59%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	503	54.50%	458	48.97%
15	n.a.	----	n.a.	----	501	61.21%	444	54.61%

Table B-2. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Males *

Age	Prevalence of Dental Caries in Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	286	57.55%	285	57.38%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	237	55.59%	223	51.97%
15	n.a.	----	n.a.	----	213	61.15%	191	53.63%

* Aggregate statistics were obtained applying age- and sex-specific weights.

Table B-3. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Females *

Age	Prevalence of Dental Caries in Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	335	58.83 %	328	57.97%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	266	53.34%	235	46.59%
15	n.a.	----	n.a.	----	288	61.16%	253	55.10%

Table B-4. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. New Providence, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	154	61.6%	154	61.6%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	86	57.3%	79	52.7%
15	n.a.	----	n.a.	----	80	64.0%	78	62.4%

* Aggregate statistics were obtained applying age- and sex-specific weights.

Table B-5. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. New Providence, Private Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	42	33.9%	39	31.5%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	54	44.0%	46	37.4%
15	n.a.	----	n.a.	----	65	52.4%	40	32.3%

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Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	57	59.4%	57	59.4%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	45	44.6%	35	34.6%
15	n.a.	----	n.a.	----	43	47.3%	34	37.4%

Table B-7. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Grand Bahama, Private Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	39	52.0%	38	50.7%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	42	60.9%	39	56.5%
15	n.a.	----	n.a.	----	41	63.1%	36	55.4%

Table B-8. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Andros, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	72	69.2%	71	68.3%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	63	67.0%	63	67.0%
15	n.a.	----	n.a.	----	69	83.1%	67	80.7%

Table B-9. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Eleuthera, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	80	62.0%	80	62.0%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	58	63.7%	49	53.9%
15	n.a.	----	n.a.	----	75	69.4%	68	63.0%

Table B-10. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Abaco, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	74	69.2%	72	67.3%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	67	71.3%	63	67.0%
15	n.a.	----	n.a.	----	46	79.3%	44	75.9%

Table B-11. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Cat Island, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	21	72.4%	21	72.4%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	24	61.5%	22	56.4%
15	n.a.	----	n.a.	----	15	75.0%	13	65.0%

Table B-12. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Exuma, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	25	51.0%	25	51.0%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	3	33.3%	0	0.0%
15	n.a.	----	n.a.	----	17	68.0%	17	68.0%

Table B-13. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Long Island, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	26	66.7%	25	64.1%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	31	70.5%	31	70.5%
15	n.a.	----	n.a.	----	35	87.5%	33	82.5%

Table B-14. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Inagua-San Salvador, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	17	53.1%	17	53.1%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	22	61.1%	21	58.3%
15	n.a.	----	n.a.	----	4	57.1%	4	57.1%

Table B-15. Prevalence of Dental Caries (dmft>0) and Untreated Decayed Teeth (dt>0) in the Primary Dentition at Age 5. Prevalence of Dental Caries (DMFT>0) and Untreated Decayed Teeth (DT>0) in the Permanent Dentition at Age 12 and at Age 15. Bimini, Government Schools

Age	Prevalence of Dental Caries in the Primary Dentition (dmft>0)		Prevalence of Untreated Decayed Teeth in the Primary Dentition (dt>0)		Prevalence of Dental Caries in the Permanent Dentition (DMFT >0)		Prevalence of Untreated Decayed Teeth in the Permanent Dentition (DT>0)	
	N	%	N	%	N	%	N	%
5	14	53.9%	14	53.9%	n.a.	----	n.a.	----
12	n.a.	----	n.a.	----	8	53.3%	8	53.3%
15	n.a.	----	n.a.	----	11	84.6%	10	76.9%

C. Severity of Dental Caries

Tooth-Based Analysis

Primary Dentition

Table C-1. Mean Number of Decayed, Missing, and Filled Teeth (dmft) by Component Elements in the Primary Dentition of 5-Year-Old Children. By Sex

Sex	N	Decayed Teeth	Missing Teeth	Filled Teeth	dmf Teeth
		μ	μ	μ	μ
Males*	512	2.31	0.13	0.06	2.50
Females*	548	2.14	0.13	0.08	2.35
All*	1,060	2.22	0.13	0.07	2.42

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Table C-2. Mean Number of Decayed, Missing, and Filled Teeth (dmft) by Component Elements in the Primary Dentition of 5-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Teeth		Missing Teeth		Filled Teeth		dmf Teeth	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	374	1.79	2.44	0.11	0.62	0.09	0.52	1.99	2.70
Government Schools	250	2.25	2.61	0.12	0.69	0.06	0.39	2.43	2.88
Private Schools	124	0.88	1.71	0.10	0.45	0.14	0.73	1.11	2.03
Grand Bahama	171	2.37	3.11	0.09	0.50	0.04	0.27	2.51	3.28
Government Schools	96	2.73	3.48	0.10	0.61	0.06	0.35	2.90	3.69
Private Schools	75	1.92	2.50	0.08	0.32	0.01	0.12	2.01	2.59
Andros	104	3.25	3.31	0.14	0.74	0.07	0.35	3.46	3.63
Eleuthera	129	2.12	2.60	0.07	0.36	0.02	0.20	2.21	2.75
Abaco	107	3.41	3.85	0.57	1.58	0.09	0.42	4.07	4.52
Cat Island	29	2.62	2.60	0.00	0.00	0.03	0.19	2.66	2.66
Exuma	49	2.20	2.90	0.12	0.60	0.02	0.14	2.35	3.22
Long Island	39	2.03	2.25	0.03	0.16	0.03	0.16	2.08	2.29
Inagua-San Salvador	32	1.59	2.41	0.00	0.00	0.03	0.18	1.63	2.43
Bimini	26	2.08	2.38	0.00	0.00	0.08	0.39	2.15	2.38
All *	1,060	2.22		0.13		0.07		2.42	

Permanent Dentition

Table C-3. Mean Number of Decayed, Missing, and Filled Teeth (DMFT) by Component Elements in the Permanent Dentition of 12-Year-Old Children. By Sex

Sex	N	Decayed Teeth	Missing Teeth	Filled Teeth	dmf Teeth
		μ	μ	μ	μ
Males*	392	1.36	0.06	0.15	1.57
Females*	473	1.25	0.05	0.26	1.55
All*	865	1.30	0.05	0.21	1.56

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Table C-4. Mean Number of Decayed, Missing, and Filled Teeth (DMFT) by Component Elements in the Permanent Dentition of 12-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Teeth		Missing Teeth		Filled Teeth		DMF Teeth	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	273	1.16	1.91	0.04	0.19	0.21	0.61	1.41	2.09
Government Schools	150	1.51	2.12	0.06	0.24	0.23	0.61	1.80	2.26
Private Schools	123	0.75	1.52	0.01	0.09	0.19	0.61	0.94	1.75
Grand Bahama	170	0.79	1.08	0.04	0.23	0.22	0.77	1.05	1.35
Government Schools	101	0.59	0.98	0.07	0.29	0.16	0.72	0.82	1.18
Private Schools	69	1.07	1.17	0.00	0.00	0.30	0.85	1.38	1.53
Andros	94	2.31	2.84	0.07	0.34	0.04	0.20	2.43	2.89
Eleuthera	91	1.29	1.90	0.15	0.51	0.13	0.40	1.57	2.05
Abaco	94	2.63	3.18	0.05	0.31	0.47	1.03	3.15	3.59
Cat Island	39	1.77	1.99	0.08	0.35	0.08	0.35	1.92	1.95
Exuma	9	0.44	0.88	0.00	0.00	0.11	0.33	0.56	0.88
Long Island	44	2.32	2.80	0.16	0.57	0.16	0.48	2.64	3.32
Inagua-San Salvador	36	1.19	1.58	0.00	0.00	0.33	0.76	1.53	1.81
Bimini	15	1.20	1.47	0.13	0.35	0.13	0.35	1.47	1.68
All*	865	1.30		0.05		0.21		1.56	

Table C-5. Mean Number of Decayed, Missing, and Filled Teeth (DMFT) by Component Elements in the Permanent Dentition of 15-Year-Old Children. By Sex

Sex	N	Decayed Teeth	Missing Teeth	Filled Teeth	dmf Teeth
		μ	μ	μ	μ
Males*	330	1.70	0.11	0.21	2.02
Females*	429	1.57	0.12	0.27	1.96
All*	759	1.62	0.11	0.24	1.98

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Table C-6. Mean Number of Decayed, Missing, and Filled Teeth (DMFT) by Component Elements in the Permanent Dentition of 15-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Teeth		Missing Teeth		Filled Teeth		DMF Teeth	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	249	1.33	2.10	0.12	0.46	0.36	0.99	1.81	2.37
Government Schools	125	1.94	2.40	0.06	0.28	0.07	0.42	2.08	2.50
Private Schools	124	0.71	1.52	0.18	0.59	0.65	1.28	1.53	2.21
Grand Bahama	156	0.94	1.41	0.08	0.31	0.25	0.70	1.27	1.66
Government Schools	91	0.57	0.88	0.11	0.35	0.18	0.59	0.86	1.10
Private Schools	65	1.46	1.79	0.03	0.25	0.35	0.82	1.85	2.10
Andros	83	3.08	2.94	0.29	0.60	0.05	0.27	3.42	3.12
Eleuthera	108	1.91	2.44	0.16	0.41	0.35	1.15	2.42	2.69
Abaco	58	3.47	3.92	0.40	0.86	0.90	2.06	4.76	4.85
Cat Island	20	2.25	2.29	0.10	0.31	0.10	0.31	2.45	2.37
Exuma	25	2.00	2.25	0.32	0.63	0.16	0.37	2.48	2.54
Long Island	40	3.48	2.86	0.28	0.55	0.15	0.48	3.90	3.02
Inagua-San Salvador	7	2.43	2.30	0.29	0.49	0.43	1.13	3.14	3.08
Bimini	13	4.15	5.26	0.38	0.51	0.54	1.66	5.08	5.56
All *	759	1.62		0.11		0.24		1.98	

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Caries Severity Categorized According to the World Health Organization Criteria

Primary Dentition

Table C-7. Percentage of the Population within Four Levels of Caries Severity in the Primary Dentition of 5-Year-Old Children. By Sex*

Sex	N	Dental Caries Severity in the Primary Dentition							
		dmft = 0		1 ≤ dmft ≤ 3		4 ≤ dmft ≤ 6		dmft ≥ 7	
		N	%	N	%	N	%	N	%
Males*	512	226	42.45%	145	28.18%	83	17.51%	59	11.86%
Females*	548	213	41.17%	167	30.78%	104	18.77%	64	9.28%
All *	1060	439	41.90%	312	29.48%	187	18.14%	123	10.45%

Table C-8. Percentage of the Population within Four Levels of Caries Severity in the Primary Dentition of 5-Year-Old Children. By Sampling Unit

Sampling Unit	N	Dental Caries Severity in the Primary Dentition							
		dmft = 0		1 ≤ dmft ≤ 3		4 ≤ dmft ≤ 6		dmft ≥ 7	
		N	%	N	%	N	%	N	%
New Providence	273	178	47.6%	105	28.1%	63	16.8%	28	7.5%
Government Schools	250	96	38.4%	80	32.0%	51	20.4%	23	9.2%
Private Schools	124	82	66.1%	25	20.2%	12	9.7%	5	4.0%
Grand Bahama	171	75	43.9%	47	27.5%	30	17.5%	19	11.1%
Government Schools	96	39	40.6%	27	28.1%	16	16.7%	14	14.6%
Private Schools	75	36	48.0%	20	26.7%	14	18.7%	5	6.7%
Andros	104	32	30.8%	28	26.9%	24	23.1%	20	19.2%
Eleuthera	129	49	38.0%	44	34.1%	25	19.4%	11	8.5%
Abaco	107	33	30.8%	29	27.1%	15	14.0%	30	28.0%
Cat Island	29	8	27.6%	14	48.3%	3	10.3%	4	13.8%
Exuma	49	24	49.0%	11	22.5%	8	16.3%	6	12.2%
Long Island	39	13	33.3%	16	41.0%	8	20.9%	2	5.1%
Inagua-San Salvador	32	15	46.9%	11	34.4%	4	12.5%	2	6.3%
Bimini	26	12	46.2%	7	26.9%	6	23.1%	1	3.9%
All *	1060	464	41.9%	308	29.5%	187	18.1%	101	10.5%

Permanent Dentition

* Aggregate statistics were obtained applying age- and sex-specific weights. Percentages are weighted estimates and sometimes do not match the sample size ratios.

Table C-9. Percentage of the Population within Four Levels of Caries Severity (WHO Criteria) in the Permanent Dentition of 12-Year-Old Children. By Sex

Sex	N	Dental Caries Severity in the Permanent Dentition							
		DMF-T = 0		1 ≤ DMF-T ≤ 3		4 ≤ DMF-T ≤ 6		DMF-T ≥ 7	
		N	%	N	%	N	%	N	%
Male*	392	155	44.41%	173	42.47%	45	8.83%	19	4.28%
Female*	473	207	46.66%	187	37.51%	58	12.35%	21	3.48%
All *	865	362	45.53%	360	39.62%	103	11.14%	40	3.76%

Table C-10. Percentage of the Population within Four Levels of Caries Severity (WHO Criteria) in the Permanent Dentition of 12 -Year-Old Children. By Sampling Unit

Sampling Unit	N	Dental Caries Severity in the Permanent Dentition							
		DMF-T = 0		1 ≤ DMF-T ≤ 3		4 ≤ DMF-T ≤ 6		DMF-T ≥ 7	
		N	%	N	%	N	%	N	%
New Providence	273	133	48.7%	103	37.7%	28	10.3%	9	3.3%
Government Schools	150	64	42.7%	58	38.7%	21	14.0%	7	4.7%
Private Schools	123	69	56.1%	45	36.6%	7	5.7%	2	1.6%
Grand Bahama	170	83	48.8%	74	43.5%	13	7.7%	0	0
Government Schools	101	56	55.5%	42	41.6%	3	3.0%	0	0
Private Schools	69	27	39.1%	32	46.4%	10	14.5%	0	0
Andros	94	31	33.0%	39	41.5%	14	14.9%	10	10.6%
Eleuthera	91	33	36.3%	49	53.9%	6	6.6%	3	3.3%
Abaco	94	27	28.7%	35	37.2%	20	21.3%	12	12.8%
Cat Island	39	15	38.5%	14	35.9%	9	23.1%	1	2.6%
Exuma	9	6	66.7%	3	33.3%	0	0%	0	0%
Long Island	44	13	29.6%	20	45.5%	7	15.9%	4	9.1%
Inagua-San Salvador	36	14	38.9%	17	47.2%	4	11.1%	1	2.8%
Bimini	15	7	46.7%	6	40.0%	2	13.3%	0	0%
All *	865	362	45.5%	360	39.6%	103	11.1%	40	3.8%

Table C-11. Percentage of the Population within Four Levels of Caries Severity (WHO Criteria) in the Permanent Dentition of 15-Year-Old Children. By Sex

* Aggregate statistics were obtained applying age- and sex-specific weights. Percentages are weighted estimates and sometimes do not match the sample size ratios.

Sex	N	Dental Caries Severity in the Permanent Dentition							
		DMF-T = 0		1 ≤ DMF-T ≤ 3		4 ≤ DMF-T ≤ 6		DMF-T ≥ 7	
		N	%	N	%	N	%	N	%
Male*	330	117	38.85%	121	35.77%	59	18.67%	33	6.28%
Female*	429	141	38.65%	179	40.97%	69	14.35%	40	6.03%
All *	759	258	38.80%	300	38.89%	128	16.14%	73	6.18%

Table C-12. Percentage of the Population within Four Levels of Caries Severity (WHO Criteria) in the Permanent Dentition of 15 -Year-Old Children. By Sampling Unit

Sampling Unit	N	Dental Caries Severity in the Permanent Dentition							
		DMF-T = 0		1 ≤ DMF-T ≤ 3		4 ≤ DMF-T ≤ 6		DMF-T ≥ 7	
		N	%	N	%	N	%	N	%
New Providence	249	104	41.8%	91	36.6%	43	17.3%	11	4.4%
Government Schools	125	45	36.0%	48	38.4%	24	19.2%	8	6.4%
Private Schools	124	59	47.6%	43	34.7%	19	15.3%	2	2.4%
Grand Bahama	156	72	46.2%	69	44.2%	12	7.7%	3	1.9%
Government Schools	91	48	52.8%	41	45.0%	2	2.2%	0	0.0%
Private Schools	65	24	36.9%	28	43.1%	10	15.4%	3	4.6%
Andros	83	14	16.9%	34	41.0%	22	26.5%	13	15.7%
Eleuthera	108	33	30.6%	48	44.4%	16	14.8%	11	10.2%
Abaco	58	12	20.7%	19	32.8%	9	15.5%	18	31.0%
Cat Island	20	5	25.0%	8	40.0%	6	30.0%	1	5.0%
Exuma	25	8	32.0%	11	44.0%	4	16.0%	2	8.0%
Long Island	40	5	12.5%	14	35.5%	13	32.5%	8	20.0%
Inagua-San Salvador	7	3	42.9%	0	46.0%	3	42.9%	1	38.5%
Bimini	13	2	15.4%	6	46.2%	0	0%	5	38.5%
All *	759	258	38.8%	300	38.9%	128	16.1%	73	6.2%

Contribution of the Components of the dmft and DMFT Index Among Children with Caries Experience

* Aggregate statistics were obtained applying the age- and sex-specific weights. Percentages are weighted estimates and sometimes do not match the sample size ratios.

**Table C-13. Relative Contribution of the Components of the dmft Index (Primary Dentition)
Among 5-Year-Old Children with History of Caries Experience in the Primary Dentition
(dmft>0)***

Sex	N	Decayed	Missing	Filled
		%	%	%
Male*	283	94.62%	3.16%	2.22%
Female*	335	92.88%	3.52%	3.60%
All *	621	93.71%	3.33%	2.96%

**Table C-14. Relative Contribution of the Components of the dmft Index (Primary Dentition)
Among 5-Year-Old Children with History of Caries Experience in the Primary Dentition
(dmft>0). By Sampling Unit**

Sampling Unit	N (dmft >0)	Decayed	Missing	Filled
		%	%	%
New Providence	196	92.7%	3.4%	3.9%
Government	154	95.2%	2.8%	2.0%
Private	42	83.5%	5.8%	10.7%
Grand Bahama	96	95.2%	3.3%	1.5%
Government	57	95.9%	2.1%	2.0%
Private	39	94.2%	4.9%	0.9%
Andros	72	95.1%	1.6%	3.2%
Eleuthera	80	97.6%	1.7%	0.7%
Abaco	74	88.1%	8.7%	3.2%
Cat Island	21	98.4%	0.0%	1.6%
Exuma	25	97.4%	2.2%	0.4%
Long Island	26	95.6%	3.9%	0.5%
Inagua-San Salvador	17	98.5%	0.0%	1.5%
Bimini	14	95.2%	0.0%	4.8%
All *	621	93.7%	3.3%	3.0%

* Aggregate statistics were obtained applying age- and sex-specific weights.

*Table C-15. Relative Contribution of the Components of the DMFT Index (Permanent Dentition) Among 12-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFT>0). By Sex **

Sex	N	Decayed	Missing	Filled
		%	%	%
Male*	237	84.56%	2.52%	11.96%
Female*	266	77.17%	4.21%	18.62%
All *	503	80.94%	3.33%	15.73%

Table C-16. Relative Contribution of the Components of the DMFT Index (Permanent Dentition) Among 12-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFT>0). By Sampling Unit

Sampling Unit	N (DMFT >0)	Decayed	Missing	Filled
		%	%	%
New Providence	140	80.58%	2.39%	17.04%
Government	86	80.74%	3.79%	15.47%
Private	54	80.31%	0.15%	19.54%
Grand Bahama	87	79.83%	4.60%	15.57%
Government	45	75.19%	8.89%	15.93%
Private	42	84.80%	0.00%	15.20%
Andros	63	95.67%	2.55%	1.77%
Eleuthera	58	78.57%	8.79%	12.64%
Abaco	67	83.53%	0.70%	15.76%
Cat Island	24	86.81%	6.94%	6.25%
Exuma	3	66.67%	0.00%	33.30%
Long Island	31	91.99%	3.71%	4.30%
Inagua-San Salvador	22	82.73%	0.00%	17.27%
Bimini	8	82.29%	8.33%	9.38%
All *	503	80.94%	3.33%	15.73%

* Aggregate statistics were obtained applying age- and sex-specific weights.

Table C-17. Relative Contribution of the Components of the DMFT Index (Permanent Dentition) Among 15-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFT>0). By Sex *

Sex	N	Decayed	Missing	Filled
		%	%	%
Male*	213	79.32%	6.37%	14.31%
Female*	288	80.07%	5.94%	13.98%
All *	501	79.99%	6.04%	13.98%

Table C-18. Relative Contribution of the Components of the DMFT Index (Permanent Dentition) Among 15-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFT>0). By Sampling Unit

Sampling Unit	N (DMFT >0)	Decayed	Missing	Filled
		%	%	%
New Providence	145	72.65%	6.17%	21.18%
Government	80	93.20%	3.01%	3.79%
Private	65	47.36%	10.05%	42.59%
Grand Bahama	84	74.48%	6.69%	18.83%
Government	43	70.93%	12.40%	16.67%
Private	41	78.20%	0.70%	21.10%
Andros	69	89.38%	7.54%	3.08%
Eleuthera	75	80.25%	9.18%	10.57%
Abaco	46	79.18%	6.19%	14.63%
Cat island	15	84.50%	2.17%	13.33%
Exuma	17	77.25%	13.33%	9.41%
Long Island	35	85.56%	8.32%	6.12%
Inagua-San Salvador	4	82.12%	9.17%	10.71%
Bimini	11	84.84%	6.54%	8.62%
All *	501	79.99%	6.04%	13.98%

Surface-Based Analysis

* Aggregate statistics were obtained applying age- and sex-specific weights.

Primary Dentition

Table C-19. Mean Number of Decayed, Missing, and Filled Surfaces (dmfs) by Component Elements in the Primary Dentition of 5-Year-Old Children. By Sex

Sex	N	Decayed Surfaces	Missing Surfaces	Filled Surfaces	dmf Surfaces
		μ	μ	μ	μ
Males*	512	4.39	0.18	0.14	4.71
Females*	548	3.87	0.16	0.13	4.16
All*	1,060	4.12	0.17	0.14	4.43

Table C-20. Mean Number of Decayed, Missing, and Filled Surfaces (dmfs) by Component Elements in the Primary Dentition of 5-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Surfaces		Missing Surfaces		Filled Surfaces		dmf Surfaces	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	374	3.21	5.00	0.16	0.94	0.17	1.07	3.54	5.36
Government Schools	250	3.96	5.37	0.18	1.01	0.14	0.88	4.28	5.71
Private Schools	124	1.70	3.74	0.12	0.80	0.23	1.39	2.06	4.22
Grand Bahama	171	4.71	7.84	0.12	0.68	0.07	0.49	4.90	7.93
Government Schools	96	5.79	9.56	0.09	0.52	0.10	0.62	5.99	9.59
Private Schools	75	3.32	4.57	0.16	0.84	0.03	0.23	3.51	4.80
Andros	104	6.51	8.08	0.12	0.71	0.17	0.94	6.80	8.29
Eleuthera	129	4.06	5.73	0.19	1.04	0.03	0.25	4.28	6.05
Abaco	107	6.36	8.87	0.50	1.67	0.21	0.97	7.07	9.44
Cat Island	29	4.97	5.88	0.00	0.00	0.10	0.41	5.07	5.89
Exuma	49	3.53	5.35	0.18	0.73	0.06	0.43	3.78	5.83
Long Island	39	3.67	4.38	0.08	0.48	0.13	0.80	3.87	4.66
Inagua-San Salvador	32	2.91	5.81	0.00	0.00	0.06	0.35	2.97	5.82
Bimini	26	3.73	4.81	0.00	0.00	0.15	0.78	3.88	4.89
All *	1,060	4.12		0.17		0.14		4.43	

Permanent Dentition

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Table C-21. Mean Number of Decayed, Missing, and Filled Surfaces (DMFS) by Component Elements in the Permanent Dentition of 12-Year-Old Children. By Sex

Sex	N	Decayed Surfaces	Missing Surfaces	Filled Surfaces	dmf Surfaces
		μ	μ	μ	μ
Males*	392	1.84	0.18	0.28	2.30
Females*	473	1.72	0.15	0.42	2.29
All*	865	1.78	0.15	0.37	2.30

Table C-22. Mean Number of Decayed, Missing, and Filled Surfaces (DMFS) by Component Elements in the Permanent Dentition of 12-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Surfaces		Missing Surfaces		Filled Surfaces		DMF Surfaces	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	273	1.59	2.63	0.11	0.56	0.36	1.12	2.06	3.05
Government Schools	150	2.05	2.89	0.18	0.71	0.37	0.98	2.60	3.23
Private Schools	123	1.03	2.15	0.02	0.27	0.35	1.27	1.41	2.68
Grand Bahama	170	1.12	2.02	0.12	0.68	0.43	1.46	1.68	2.54
Government Schools	101	0.96	2.01	0.21	0.88	0.27	1.18	1.44	2.36
Private Schools	69	1.36	2.02	0.00	0.00	0.67	1.78	2.03	2.75
Andros	94	3.33	4.54	0.16	0.92	0.06	0.32	3.55	4.68
Eleuthera	91	2.15	4.32	0.46	1.54	0.15	0.45	2.77	4.88
Abaco	94	3.38	4.21	0.16	0.92	0.79	1.82	4.33	5.36
Cat Island	39	3.00	3.63	0.23	1.06	0.10	0.45	3.33	3.62
Exuma	9	0.44	0.88	0.00	0.00	0.22	0.67	0.67	1.00
Long Island	44	2.61	3.16	0.48	1.70	0.20	0.63	3.30	4.28
Inagua-San Salvador	36	1.81	2.44	0.00	0.00	0.42	0.97	2.22	2.85
Bimini	15	1.67	1.99	0.40	1.06	0.27	0.70	2.33	2.82
All *	865	1.78		0.15		0.37		2.30	

Table C-23. Mean Number of Decayed, Missing, and Filled Surfaces (DMFS) by Component Elements in the Permanent Dentition of 15-Year-Old Children. By Sex

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Sex	N	Decayed Surfaces	Missing Surfaces	Filled Surfaces	dmf Surfaces
		μ	μ	μ	μ
Males*	330	2.26	0.31	0.31	2.88
Females*	429	2.26	0.36	0.41	3.03
All*	759	2.26	0.33	0.36	2.96

Table C-24. Mean Number of Decayed, Missing, and Filled Surfaces (DMFS) by Component Elements in the Permanent Dentition of 15-Year-Old Children. By Sampling Unit

Sampling Unit	N	Decayed Surfaces		Missing Surfaces		Filled Surfaces		DMF Surfaces	
		μ	s.d.	μ	s.d.	μ	s.d.	μ	s.d.
New Providence	249	1.88	2.98	0.34	1.33	0.52	1.38	2.73	3.65
Government School	125	2.67	3.31	0.19	0.83	0.11	0.60	2.98	3.61
Private Schools	124	1.08	2.36	0.48	1.68	0.93	1.77	2.49	3.68
Grand Bahama	156	1.29	2.21	0.21	0.91	0.39	1.09	1.89	2.79
Government Schools	91	0.87	1.56	0.30	1.01	0.27	0.98	1.44	2.18
Private Schools	65	1.88	2.80	0.09	0.74	0.55	1.23	2.52	3.39
Andros	83	4.53	4.89	0.80	1.69	0.16	1.11	5.48	5.55
Eleuthera	108	2.68	3.71	0.47	1.24	0.49	1.72	3.64	4.12
Abaco	58	4.81	5.82	1.19	2.57	1.45	3.44	7.45	8.27
Cat Island	20	2.85	3.31	0.30	0.92	0.20	0.62	3.35	3.88
Exuma	25	3.08	3.80	0.96	1.88	0.20	0.50	4.24	4.33
Long Island	40	4.45	3.79	0.83	1.66	0.25	0.81	5.53	4.47
Inagua-San Salvador	7	3.57	3.46	0.86	1.46	0.57	1.51	5.00	4.90
Bimini	13	6.31	9.59	1.15	1.52	0.62	1.71	8.08	10.52
All *	759	2.26		0.33		0.36		2.96	

Contribution of Specific Tooth Surfaces in the DMFS Among Children with Caries Experience

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Table C-25. Relative Contribution of Type of Surface on the DMFS Index (Permanent Dentition) Among 12-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFS>0). By Sex*

Sex	N	Occlusal	Buccal-Lingual	Mesio-Distal
		%	%	%
Males*	237	65.41%	25.59%	8.04%
Females*	266	65.10%	26.31%	8.58%
All*	503	65.45%	26.34%	8.21%

Table C-26. Relative Contribution of the Type of Surface on the DMFS Index (Permanent Dentition) Among 12-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFS >0). By Sampling Unit

Sampling Unit	N (DMFS >0)	Occlusal	Bucco-Lingual	Mesio-Distal
		%	%	%
New Providence	140	66.68%	26.30%	7.02%
Government	86	66.92%	25.18%	7.90%
Private	54	66.29%	28.09%	5.62%
Grand Bahama	87	60.49%	27.83%	11.68%
Government	45	50.51%	32.28%	17.20%
Private	42	71.19%	23.05%	5.76%
Andros	63	70.89%	21.78%	7.33%
Eleuthera	58	60.13%	28.71%	11.16%
Abaco	67	76.77%	17.06%	6.18%
Cat Island	24	61.16%	26.30%	12.55%
Exuma	3	50.00%	50.00%	0.00%
Long Island	31	70.72%	26.34%	2.93%
Inagua-San Salvador	22	68.99%	23.74%	7.27%
Bimini	8	58.26%	25.22%	16.52%
All *	503	65.45%	26.34%	8.21%

Table C-27. Relative Contribution of Type of Surface on the DMFS Index (Permanent Dentition) Among 15-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFS>0). By Sex

* Statistics were obtained applying age-and sex-specific weights.

Sex	N	Occlusal	Buccal-Lingual	Mesio-Distal
		%	%	%
Males*	213	66.50%	23.81%	9.69%
Females*	288	63.18%	24.35%	12.47%
All*	501	64.59%	24.12%	11.28%

Table C-28. Relative Contribution of Type of Surface on the DMFS Index (Permanent Dentition) Among 15-Year-Old Children with History of Caries Experience in the Permanent Dentition (DMFS>0). By Sampling Unit

Sampling Unit	N (DMFS >0)	Occlusal	Bucco-Lingual	Mesio-Distal
		%	%	%
New Providence	145	64.59%	23.22%	12.19%
Government	80	68.28%	23.27%	8.45%
Private	65	59.99%	23.15%	16.85%
Grand Bahama	84	63.30%	25.32%	11.38%
Government	43	59.41%	27.67%	12.91%
Private	41	67.28%	22.91%	9.82%
Andros	69	61.82%	25.91%	12.27%
Eleuthera	75	59.79%	25.42%	14.79%
Abaco	46	62.37%	25.67%	11.96%
Cat Island	15	75.26%	20.34%	4.40%
Exuma	17	49.29%	26.98%	23.73%
Long Island	35	60.14%	26.20%	13.66%
Inagua-San Salvador	4	59.01%	21.80%	19.18%
Bimini	11	57.73%	28.76%	13.50%
All *	501	64.59%	24.12%	11.28%

D. Tooth-Specific Treatment Needs

*Table D-1. Mean Number of Teeth Requiring No Treatment or Preventive Treatment. By Age**

* Statistics were obtained applying age- and sex-specific weights.

* Aggregate statistics were obtained applying age- and sex-specific weights. Because these are weighted summary data, standard deviations were not calculated.

Age	N	No Need for Treatment	Sealants
		μ	μ
5	1060	17.66	0.61
12	865	24.23	1.43
15	759	24.53	1.77

*Table D-2. Mean Number of Teeth Requiring Restorative Treatment or Extraction. By Age**

Age	N	1 Surface Restoration	2+ Surface Restoration	Crown	Veneer	Pulp Tx & Restoration	Extraction
		μ	μ	μ	μ	μ	μ
5	1060	0.91	0.97	0.07	0.02	0.00	0.33
12	865	0.96	0.28	0.00	0.00	0.00	0.05
15	759	1.15	0.29	0.01	0.00	0.00	0.07

Table D-3. Mean Number of Teeth Requiring No Treatment or Preventive Treatment at Age 5. By Region

Sampling Unit	N	No Need for Treatment	Preventive Treatment	Sealants
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		μ	Total I	μ	Total	μ	Total
New Providence	374	17.85	6677	0.00		0.61	230
Government	250	17.27	4318	0.00	0	0.74	186
Private	124	19.02	2359	0.00		0.34	42
Grand Bahama	171	17.66	3020	0.00		0.63	108
Government	96	17.39	1669	0.00	0	0.78	75
Private	75	18.01	1351	0.00		0.44	33
Andros	104	17.66	1837	0.00	0	0.27	28
Eleuthera	129	18.61	2401	0.00	0	0.40	51
Abaco	107	17.16	1836	0.00	0	0.30	32
Cat Island	29	17.28	501	0.00	0	1.14	33
Exuma	49	18.76	919	0.00	0	0.04	2
Long Island	39	20.03	781	0.00	0	0.00	0
Inagua-Salvador	32	18.00	576	0.00	0	0.91	29
Bimini	26	16.65	433	0.00	0	1.23	32
All *	1,060	17.66	18981	0.00	0	0.61	545

Table D-4. Mean Number of Teeth Requiring Restorative Treatment or Extraction at Age 5. By Region

Sampling Unit	N	1 Surface Amalgam		2+ Surface Amalgam		Crown		Veneer		Pulp Treatment & Restoration		Extraction	
		μ	Total I	μ	Total	μ	Total I	μ	Total	μ	Total	μ	Total
New Providence	374	0.79	294	0.78	291	0.06	22	0.00	0	0.00	1	0.30	111
Government	250	1.00	250	0.95	238	0.08	20	0.00	0	0.00	1	0.40	101
Private	124	0.35	44	0.43	43	0.02	2	0.00	0	0.00	0	0.08	10

* Aggregate statistics were obtained applying age- and sex-specific weights.

Grand Bahama	171	0.96	165	1.11	189	0.01	1	0.00	0	0.02	4	0.23	40
Government	96	1.04	100	1.29	124	0.01	1	0.00	0	0.01	3	0.36	35
Private	75	0.87	65	0.87	65	0.00	0	0.00	0	0.04	1	0.07	5
Andros	104	1.13	118	1.33	138	0.14	15	0.05	5	0.01	1	0.25	26
Eleuthera	129	0.55	71	1.10	142	0.00	0	0.28	36	0.00	0	0.02	2
Abaco	107	1.22	131	1.70	182	0.28	30	0.00	0	0.00	0	0.36	38
Cat Island	29	1.00	29	1.21	35	0.00	0	0.00	0	0.00	0	0.31	9
Exuma	49	1.08	53	0.33	16	0.00	0	0.00	0	0.00	0	0.22	11
Long Island	39	0.05	2	0.31	12	0.15	6	0.03	1	0.00	0	0.00	0
Inagua-Salvador	32	1.00	32	0.22	7	0.00	0	0.28	9	0.00	0	0.09	3
Bimini	26	1.04	27	0.81	21	0.00	0	0.12	3	0.00	0	0.15	4
All *	1,060	0.91	922	0.97	1033	0.07	74	0.02	54	0.00	6	0.33	244

Table D-5. Mean Number of Teeth Requiring No Treatment or Preventive Treatment at Age 12. By Region

Sampling Unit	N	No Need for Treatment		Preventive Treatment		Sealants	
		μ	Total	μ	Total	μ	Total
New Providence	273	24.31	6636	0.00	0	1.47	400
Government	150	23.75	3562	0.00	0	1.71	256
Private	123	24.99	3074	0.00	0	1.17	144
Grand Bahama	170	24.71	4200	0.00	0	1.33	226
Government	101	25.29	2554	0.00	0	0.90	91
Private	69	23.86	1646	0.00	0	1.96	135
Andros	94	23.55	2214	0.00	0	1.46	137
Eleuthera	91	24.18	2200	0.00	0	1.10	100
Abaco	94	23.46	2205	0.00	0	0.90	85
Cat Island	39	23.23	906	0.00	0	2.21	86
Exuma	9	25.22	227	0.00	0	0.78	7
Long Island	44	27.05	1190	0.00	0	0.00	0
Inagua-Salvador	36	25.19	907	0.00	0	0.67	24
Bimini	15	23.87	358	0.00	0	1.67	25
All *	865	24.23	21043	0.00	0	1.43	1020

Table D-6. Mean Number of Teeth Requiring Restorative Treatment or Extraction at Age 12. By Region

Sampling Unit	N	1 Surface Amalgam		2+ Surface Amalgam		Crown		Veneer		Pulp Treatment & Restoration		Extraction	
		μ	Total	μ	Total	μ	Total	μ	Total	μ	Total	μ	Total

* Aggregate statistics were obtained applying age- and sex-specific weights.

New Providence	273	0.79	249	0.24	66	0.00	0	0.00	0	0.00	0	0.05	14
Government	150	1.16	174	0.31	46	0.00	0	0.00	0	0.00	0	0.07	10
Private	123	0.61	75	0.16	20	0.00	0	0.00	0	0.00	0	0.03	4
Grand Bahama	170	0.61	104	0.22	37	0.01	1	0.00	0	0.01	1	0.01	2
Government	101	0.45	45	0.21	21	0.00	0	0.00	0	0.00	0	0.02	2
Private	69	0.86	59	0.23	16	0.01	1	0.00	0	0.01	1	0.00	0
Andros	94	1.40	32	0.35	33	0.01	1	0.04	4	0.00	0	0.12	11
Eleuthera	91	0.74	67	0.51	46	0.00	0	0.02	2	0.00	0	0.11	10
Abaco	94	1.88	177	0.76	71	0.01	1	0.00	0	0.00	0	0.05	5
Cat Island	39	1.08	42	0.54	21	0.00	0	0.08	3	0.00	0	0.15	6
Exuma	9	0.44	4	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0
Long Island	44	0.02	1	0.02	1	0.00	0	0.02	1	0.00	0	0.02	1
Inagua-Salvador	36	0.86	31	0.28	10	0.06	2	0.03	1	0.00	0	0.03	1
Bimini	15	1.00	15	0.20	3	0.00	0	0.07	1	0.00	0	0.00	0
All *	865	0.96	722	0.28	288	0.00	5	0.00	12	0.00	1	0.05	50

Table D-7. Mean Number of Teeth Requiring No Treatment or Preventive Treatment at Age 15. By Region

Sampling Unit	N	No Need for Treatment		Preventive Treatment		Sealants	
		μ	Total	μ	Total	μ	Total
New Providence	249	24.63	6132	0.00	0	1.90	473
Government	125	23.77	2971	0.00	0	2.14	267
Private	124	25.49	3161	0.00	0	1.66	206
Grand Bahama	156	25.54	3984	0.00	0	1.37	214
Government	91	26.26	2390	0.00	0	1.04	95
Private	65	24.52	1594	0.00	0	1.83	119
Andros	83	24.05	1996	0.00	0	1.61	134
Eleuthera	108	24.94	2693	0.00	0	1.33	144
Abaco	58	23.53	1365	0.00	0	0.84	49
Cat Island	20	23.45	469	0.00	0	2.45	49
Exuma	25	24.60	615	0.00	0	1.40	35
Long Island	40	27.68	1107	0.00	0	0.00	0
Inagua-Salvador	7	23.14	162	0.00	0	2.29	16
Bimini	13	20.62	268	0.00	0	3.15	41
All *	759	24.53	18791	0.00	0	1.77	1155

Table D-8. Mean Number of Teeth Requiring Restorative Treatment or Extraction at Age 15. By Region

* Aggregate statistics were obtained applying age- and sex-specific weights.

Sampling Unit	N	1 Surface Amalgam		2+ Surface Amalgam		Crown		Veneer		Pulp Treatment & Restoration		Extraction	
		μ	Total	μ	Total	μ	Total	μ	Total	μ	Total	μ	Total
New Providence	249	1.02	255	0.21	53	0.00	1	0.00	0	0.00	0	0.07	18
Government	125	1.54	193	0.27	34	0.01	1	0.00	0	0.00	0	0.10	12
Private	124	0.50	62	0.15	19	0.00	0	0.00	0	0.00	0	0.05	6
Grand Bahama	156	0.70	109	0.22	34	0.01	2	0.00	0	0.02	3	0.03	5
Government	91	0.36	33	0.19	17	0.00	0	0.00	0	0.00	0	0.02	2
Private	65	1.17	76	0.26	17	0.03	2	0.00	0	0.05	3	0.05	3
Andros	83	1.42	118	0.53	44	0.10	8	0.01	1	0.00	0	0.10	8
Eleuthera	108	0.75	81	0.78	84	0.00	0	0.06	6	0.00	0	0.05	5
Abaco	58	2.26	131	1.05	61	0.10	6	0.00	0	0.02	1	0.05	3
Cat Island	20	1.60	32	0.40	8	0.00	0	0.00	0	0.00	0	0.05	1
Exuma	25	1.32	33	0.52	13	0.00	0	0.00	0	0.00	0	0.12	3
Long Island	40	0.05	2	0.00	0	0.00	0	0.03	1	0.00	0	0.20	8
Inagua-Salvador	7	1.43	10	1.00	7	0.00	0	0.00	0	0.00	0	0.00	0
Bimini	13	3.00	39	0.69	9	0.00	0	0.00	0	0.00	0	0.46	6
All *	759	1.15	810	0.29	313	0.01	17	0.00	8	0.00	4	0.07	57

* Aggregate statistics were obtained applying age- and sex-specific weights.

E. Treatment Urgency

Table E-1. Percentage of the 5-Year-Old Population According to their Urgency of Treatment Needs

Sex	N	Urgency of Treatment Needs			
		No Need	Prophylaxis	Low Urgency	High Urgency
Males *	511**	34.02%	10.71%	40.50%	14.76%
Females*	548	33.89%	11.56%	41.17%	13.37%
All *	1,059	34.02%	11.25%	40.74%	14.03%

Table E-2. Percentage of the 12-Year-Old Population According to their Urgency of Treatment Needs

Sex	N	Urgency of Treatment Needs			
		No Need	Prophylaxis	Low Urgency	High Urgency
Males*	392	21.54%	27.22%	41.00%	10.24%
Females*	473	28.60%	24.09%	38.33%	8.76%
All *	865	25.62%	25.16%	39.96%	9.27%

Table E-3. Percentage of the 15-Year-Old Population According to their Urgency of Treatment Needs

Sex	N	Urgency of Treatment Needs			
		No Need	Prophylaxis	Low Urgency	High Urgency
Males*	330	26.54%	19.51%	41.05%	12.90%
Females*	429	30.27%	15.71%	39.40%	14.62%
All *	759	28.70%	17.23%	40.17%	13.91%

* Aggregate statistics were obtained applying age- and sex-specific weights.

** One missing case.

Table E-4. Percent of the Population According to Their Urgency of Treatment Needs. By Sampling Unit and Age

Sampling Unit	Age														
	5 Years					12 Years					15 Years				
	N	No	Prophy	Low Urg	High Urg	N	No	Prophy	Low Urg	High Urg	N	No	Prophy	Low Urg	High Urg
New Providence	373*	39.9%	8.9%	40.1%	11.1%	273	25.6%	28.6%	37.0%	8.8%	249	31.3%	22.5%	33.7%	12.5%
Government	250	31.2%	8.4%	46.0%	13.4%	150	16.7%	30.7%	40.0%	12.7%	125	20.8%	16.0%	44.0%	19.2%
Private	123	59.4%	9.8%	26.8%	4.1%	123	36.6%	26.0%	33.3%	4.1%	124	41.9%	29.0%	23.4%	5.6%
Grand Bahama	171	27.2%	21.3%	38.5%	13.0%	170	38.5%	15.4%	45.0%	1.2%	156	39.1%	14.7%	40.4%	5.8%
Government	96	24.0%	20.8%	44.8%	10.4%	101	58.4%	4.0%	36.6%	1.0%	91	58.2% ¹	4.4%	35.2%	2.2%
Private	75	33.3%	21.3%	29.3%	17.0%	69	10.1%	31.9%	56.5%	1.5%	65	2.3%	29.2%	47.7%	10.8%
Andros	104	37.5%	7.7%	35.6%	19.2%	94	16.0%	23.4%	41.4%	19.2%	83	21.7%	12.1%	51.8%	14.5%
Eleuthera	129	31.8%	10.1%	48.1%	10.1%	93	31.9%	9.9%	50.6%	7.7%	108	25.9%	12.0%	51.9%	10.2%
Abaco	107	29.9%	8.41%	27.1%	34.6%	94	22.3%	8.5%	51.1%	18.1%	58	12.1%	15.5%	43.1%	29.3%
Cat Island	29	13.8%	13.8%	55.2%	17.2%	39	10.3%	35.9%	33.3%	20.5%	20	0.0%	35.0%	50.0%	15.0%
Exuma	49	55.1%	4.1%	18.4%	22.5%	9	66.7%	11.1%	22.2%	0.0%	25	36.0%	0.0%	56.0%	8.0%
Long Island	39	33.3%	12.8%	33.3%	20.5%	44	4.6%	31.8%	43.2%	20.5%	40	0.0%	15.0%	40.0%	45.0%
Inagua-Salvador	32	15.6%	34.4%	34.4%	15.6%	36	5.6%	33.3%	52.8%	8.3%	7	0.0%	42.9%	57.1%	0.0%
Bimini	26	7.7%	38.5%	38.5%	15.4%	15	0.0%	53.3%	40.0%	6.7%	13	0.0%	23.1%	61.5%	15.4%
All **	1059	34.0%	11.3%	40.7%	14.0%	865	25.6%	25.2%	40.0%	9.3%	759	28.7%	17.2%	40.2%	13.9%

* One case with missing data.

**Aggregate statistics were obtained applying age- and sex-specific weights.

F. Dental Fluorosis

Table F-1. Population Distribution for the Maximum Fluorosis Score According to Dean's Index Applied to the Six Upper Anterior Teeth (Cuspid to Cuspid) of 12-Year-Old Children. By Sex

Sex	N	No Fluorosis		Questionable		Very Mild		Mild		Moderate		Severe	
		N	%	N	%	N	%	N	%	N	%	N	%
Males ¹	387	256	60.2%	57	19.7%	41	10.6%	20	7.1%	9	1.5%	4	1.1%
Females ¹	467	278	58.5%	72	14.9%	76	16.8%	29	7.5%	9	1.8%	3	0.5%
All ¹	854	534	59.1%	129	16.6%	117	14.5%	49	7.4%	18	1.7%	7	0.7%

¹Statistics were obtained applying age- and sex-specific weights.

Table F-2. Population Distribution for the Maximum Fluorosis Score According to Dean's Index Applied to the Six Upper Anterior Teeth (Cuspid to Cuspid) of 12-Year-Old Children. By Sampling Unit

Sampling Unit	N	No Fluorosis		Questionable		Very Mild		Mild		Moderate		Severe	
		N	%	N	%	N	%	N	%	N	%	N	%
New Providence Government Private	273	155	55.3%	42	15.8%	47	16.9%	22	9.2%	6	2.2%	1	0.7%
	150	86	57.3%	31	20.7%	20	13.2%	10	6.7%	2	1.3%	0	0.7%
	123	69	52.9%	11	9.8%	27	21.1%	12	12.2%	4	3.3%	1	0.8%
Grand Bahama Government Private	163	117	71.8%	20	12.3%	16	9.8%	10	6.1%	0	0.0%	0	0.0%
	101	83	82.2%	2	2.0%	8	7.9%	8	7.9%	0	0.0%	0	0.0%
	62 ²	34	54.8%	18	29.0%	8	12.9%	2	3.2%	0	0.0%	0	0.0%
Andros	94	50	53.2%	24	25.5%	13	13.8%	3	3.2%	3	3.2%	1	1.1%
Eleuthera	91	69	75.8%	3	3.3%	16	17.6%	1	1.1%	1	1.1%	1	1.1%
Abaco	92 ³	49	53.3%	19	20.7%	14	15.2%	7	7.6%	2	2.2%	1	1.1%
Cat Island	39	33	84.6%	3	7.7%	1	2.6%	0	0.0%	0	0.0%	2	5.1%
Exuma	9	4	44.4%	3	33.3%	2	22.2%	0	0.0%	0	0.0%	0	0.0%
Long Island	43	21	47.8%	8	18.2%	4	11.4%	4	9.1%	5	11.4%	1	2.3%
Inagua-San Salvador	35	26	74.3%	3	8.6%	3	8.6%	2	5.7%	1	2.9%	0	0.0%
Bimini	15	10	66.7%	4	26.7%	1	0.0%	0	6.7%	0	0.0%	0	0.0%
All ¹	854	534	59.1%	129	16.6%	117	14.5%	49	7.4%	18	1.7%	7	0.7%

¹Statistics were obtained applying age- and sex-specific weights.

²Seven cases with missing data.

³Two cases with missing data.

Table F-3. Population Distribution for the Maximum Fluorosis Score According to Dean's Index Applied to the Six Upper Anterior Teeth (Cuspid to Cuspid) of 15-Year-Old Children. By Sex

Sex	N	No Fluorosis		Questionable		Very Mild		Mild		Moderate		Severe	
		N	%	N	%	N	%	N	%	N	%	N	%
Males ¹	328	222	73.4%	49	10.8%	38	12.1%	10	2.4%	7	1.0%	2	0.2%
Females ¹	421	274	64.0%	50	8.9%	57	16.5%	24	5.5%	12	3.8%	4	1.2%
All ¹	749	496	67.5%	99	9.8%	95	14.9%	34	4.3%	19	2.7%	6	0.8%

Table F-4. Population Distribution for the Maximum Fluorosis Score According to Dean's Index Applied to the Six Upper Anterior Teeth (Cuspid to Cuspid) of 15-Year-Old Children. By Sampling Unit

¹ Statistics were obtained applying the age- and sex-specific weights

Sampling Unit	N	No Fluorosis		Questionable		Very Mild		Mild		Moderate		Severe	
		N	%	N	%	N	%	N	%	N	%	N	%
New Providence	249	161	64.7%	21	8.4%	42	16.9%	14	5.6%	8	3.2%	3	1.2%
Government	125	80	64.0%	12	9.6%	22	17.6%	6	4.8%	4	3.2%	1	0.8%
Private	124	81	65.3%	9	7.3%	20	16.1%	8	6.5%	4	3.2%	2	1.6%
Grand Bahama	154	127	82.5%	11	7.1%	14	9.1%	1	0.7%	1	0.7%	0	0.0%
Government	91	80	87.9%	0	0.0%	9	9.9%	1	1.1%	1	1.1%	0	0.0%
Private	63 ²	47	74.6%	11	17.5%	5	7.9%	0	0.0%	0	0.0%	0	0.0%
Andros	75 ³	49	65.3%	16	21.3%	5	6.7%	3	4.0%	0	0.0%	2	2.7%
Eleuthera	108	77	71.3%	10	9.3%	14	13.0%	4	3.7%	3	2.8%	0	0.0%
Abaco	58	26	44.8%	18	31.0%	8	13.8%	2	3.5%	3	5.2%	1	1.7%
Cat Island	20	16	80.0%	2	10.0%	0	0.0%	1	5.0%	1	5.0%	0	0.0%
Exuma	25	13	52.0%	6	24.0%	3	12.0%	1	4.0%	2	8.0%	0	0.0%
Long Island	40	14	35.0%	10	25.0%	7	17.5%	9	22.5%	0	0.0%	0	0.0%
Inagua-San Salvador	7	4	57.1%	2	28.6%	1	14.3%	0	0.0%	0	0.0%	0	0.0%
Bimini	13	9	69.2%	3	23.1%	0	0.0%	0	0.0%	1	7.7%	0	0.0%
All ¹	749	496	67.5%	99	9.8%	94	14.9%	35	4.3%	19	2.7%	6	0.8%

¹ Statistics were obtained applying the age- and sex-specific weights.

² Two cases with missing data.

³ Eight cases with missing data.

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Figure 1
Prevalence of Dental Caries (dmft>0) in the Primary Dentition of 5-year-old Schoolchildren, by Sampling Unit

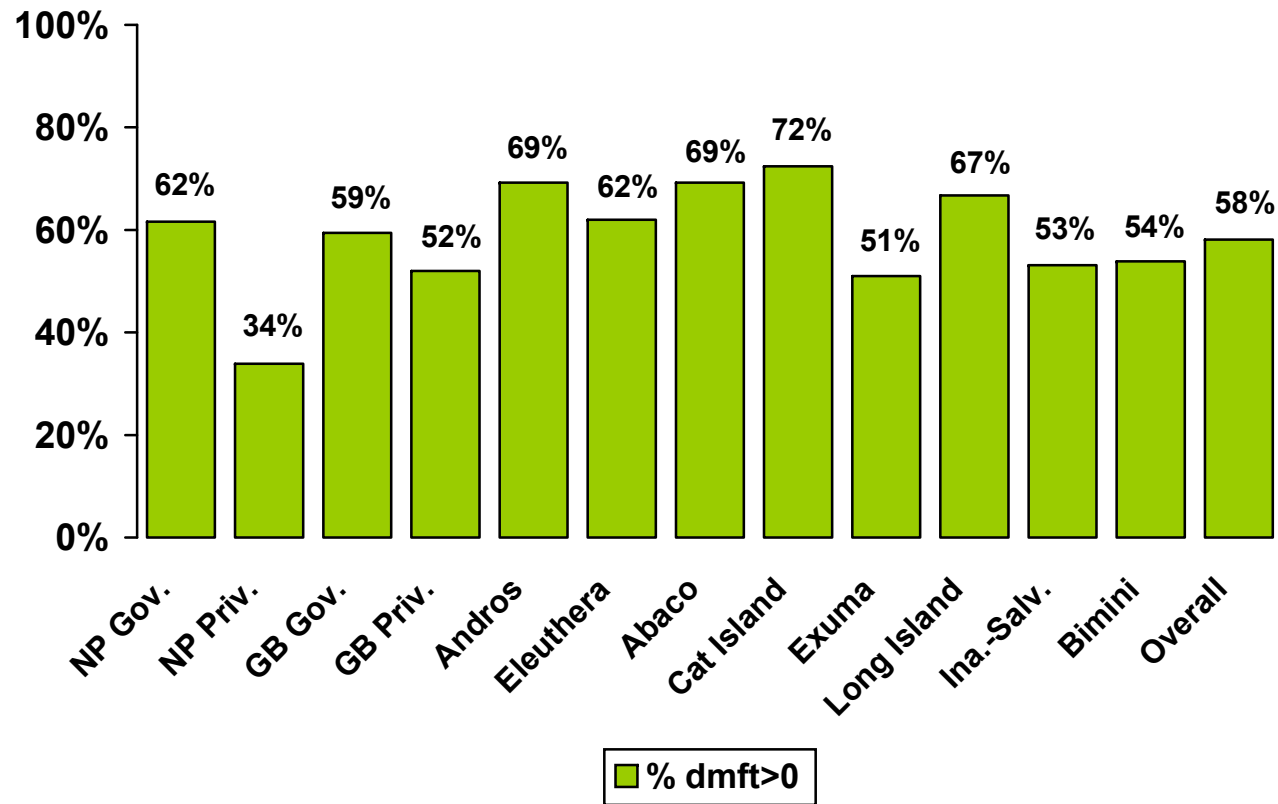


Figure 2
Prevalence of Untreated Decayed Teeth (dt>0) in the Primary Dentition of 5-year-old Schoolchildren, by Sampling Unit

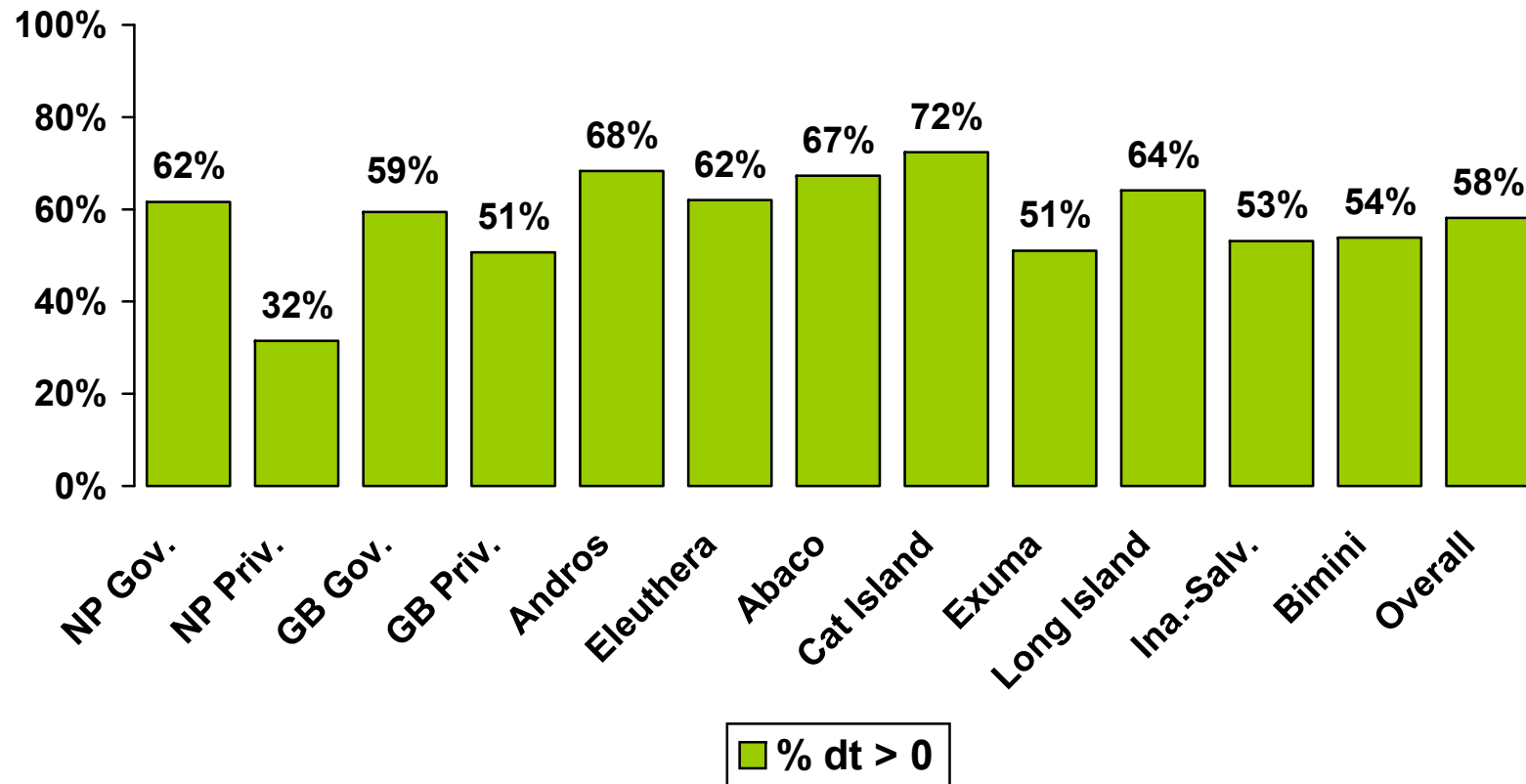


Figure 3
Mean Number of Decayed, Missing and Filled Teeth (dmft) in the Primary Dentition of 5-Year-Old Children, by Sampling Unit

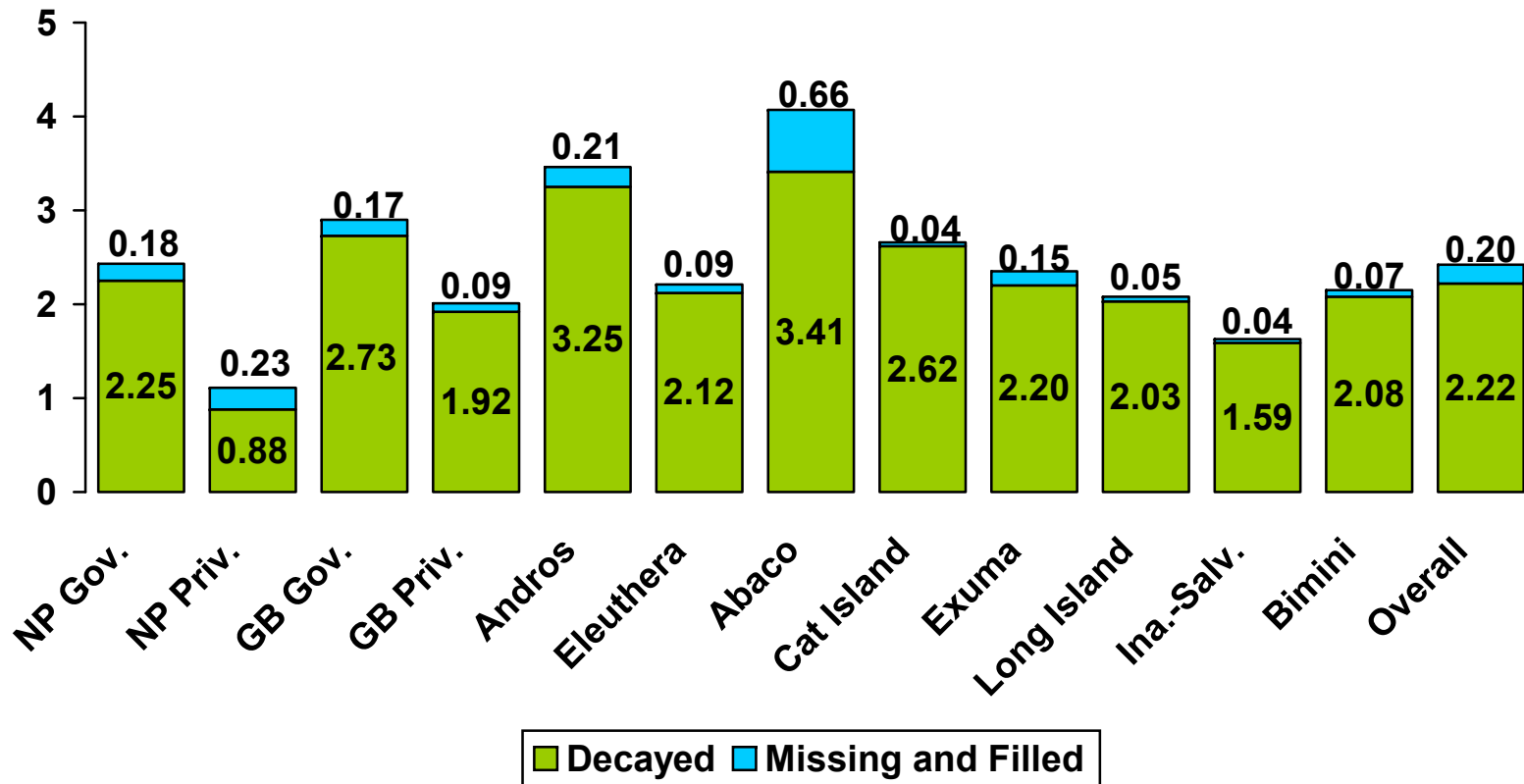


Figure 4
Mean Number of Decayed, Missing, and Filled Surfaces (dmfs) in the Primary Dentition of 5-Year-Old Schoolchildren, by Sampling Unit

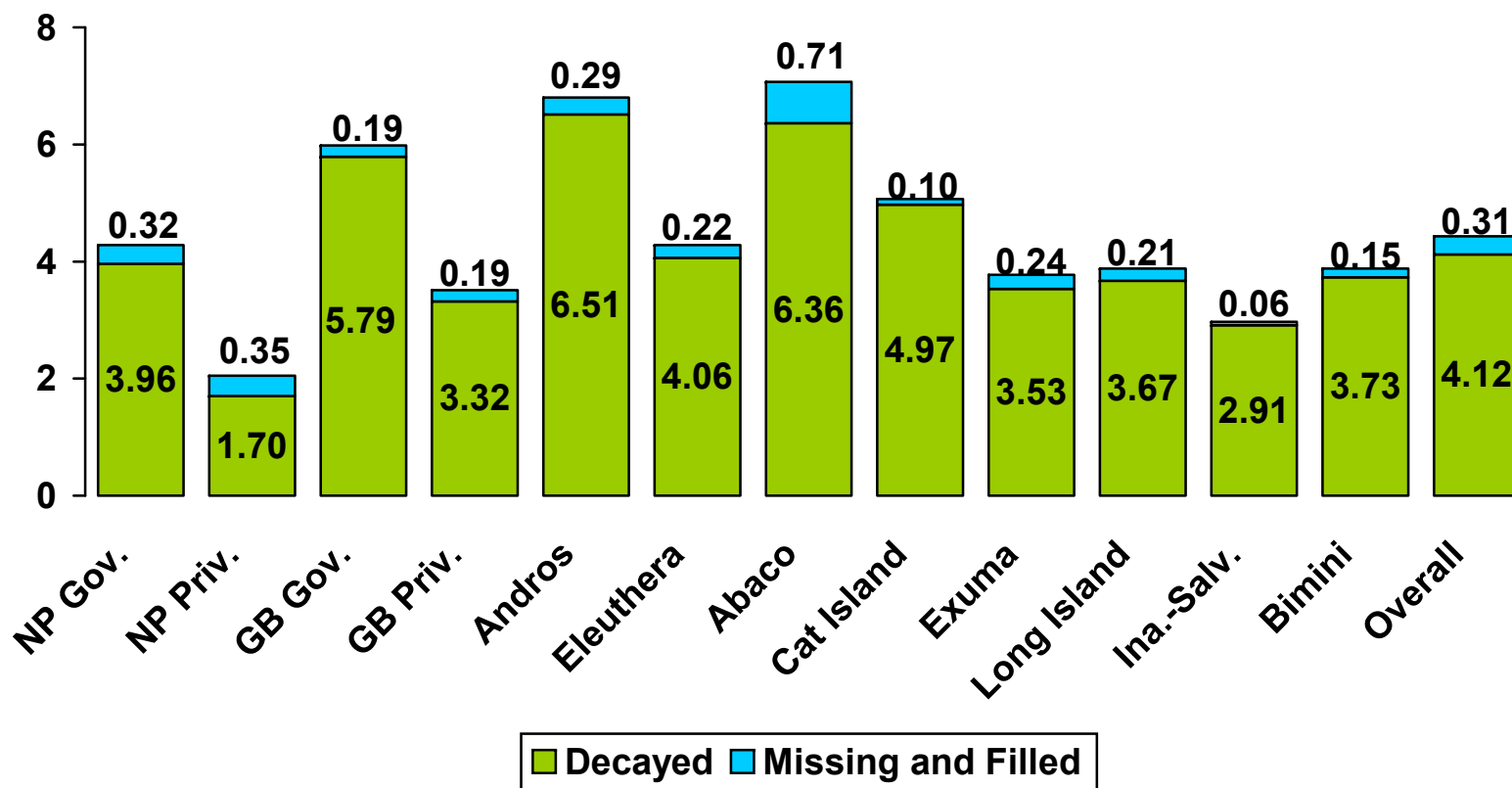


Figure 5
Prevalence of Dental Caries (DMFT>0) in the Permanent Dentition of 12-Year-Old Schoolchildren, by Sampling Unit

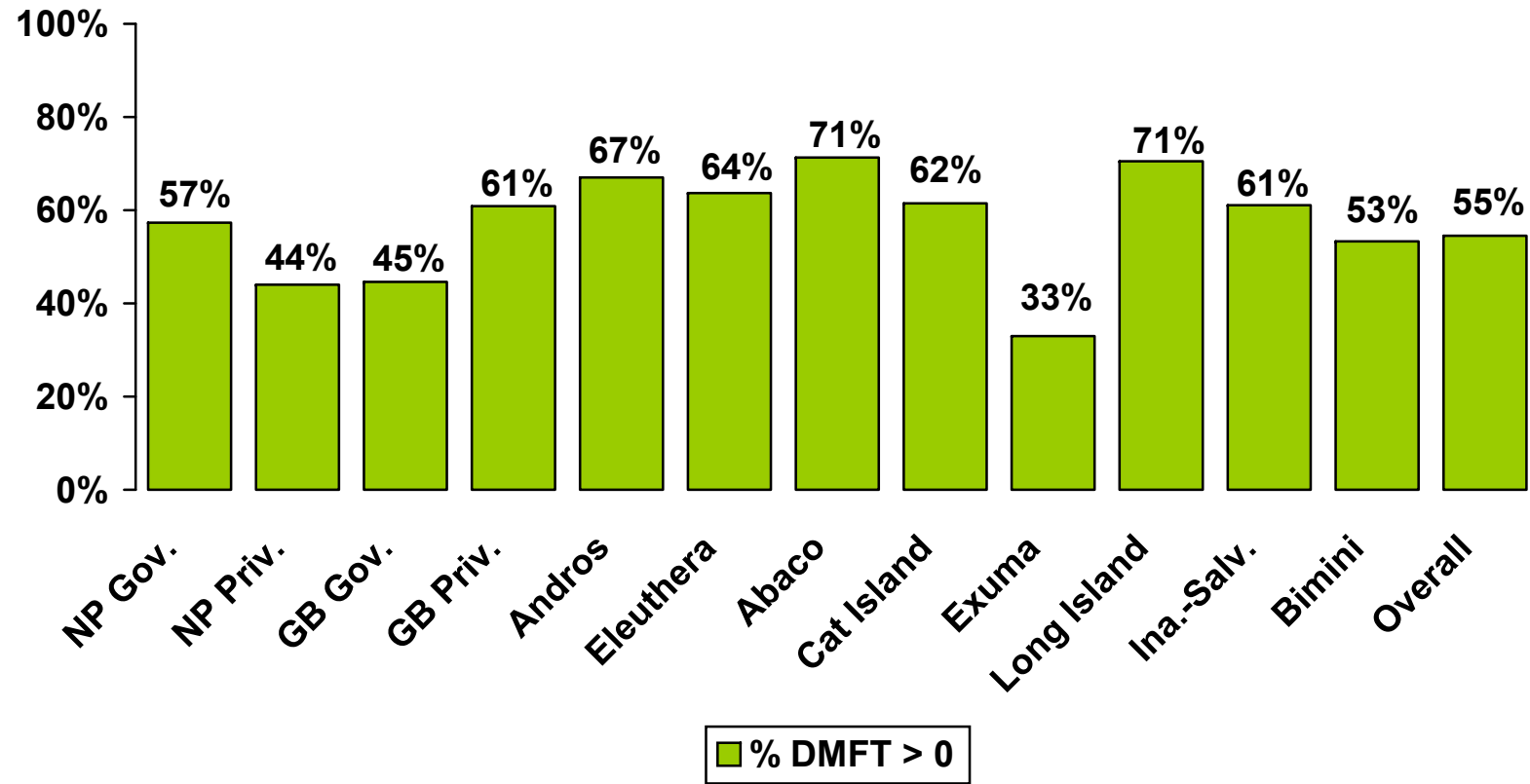


Figure 6
Prevalence of Untreated Decayed Teeth (DT>0) in the Permanent Dentition of 12-Year-Old Schoolchildren, by Sampling Unit

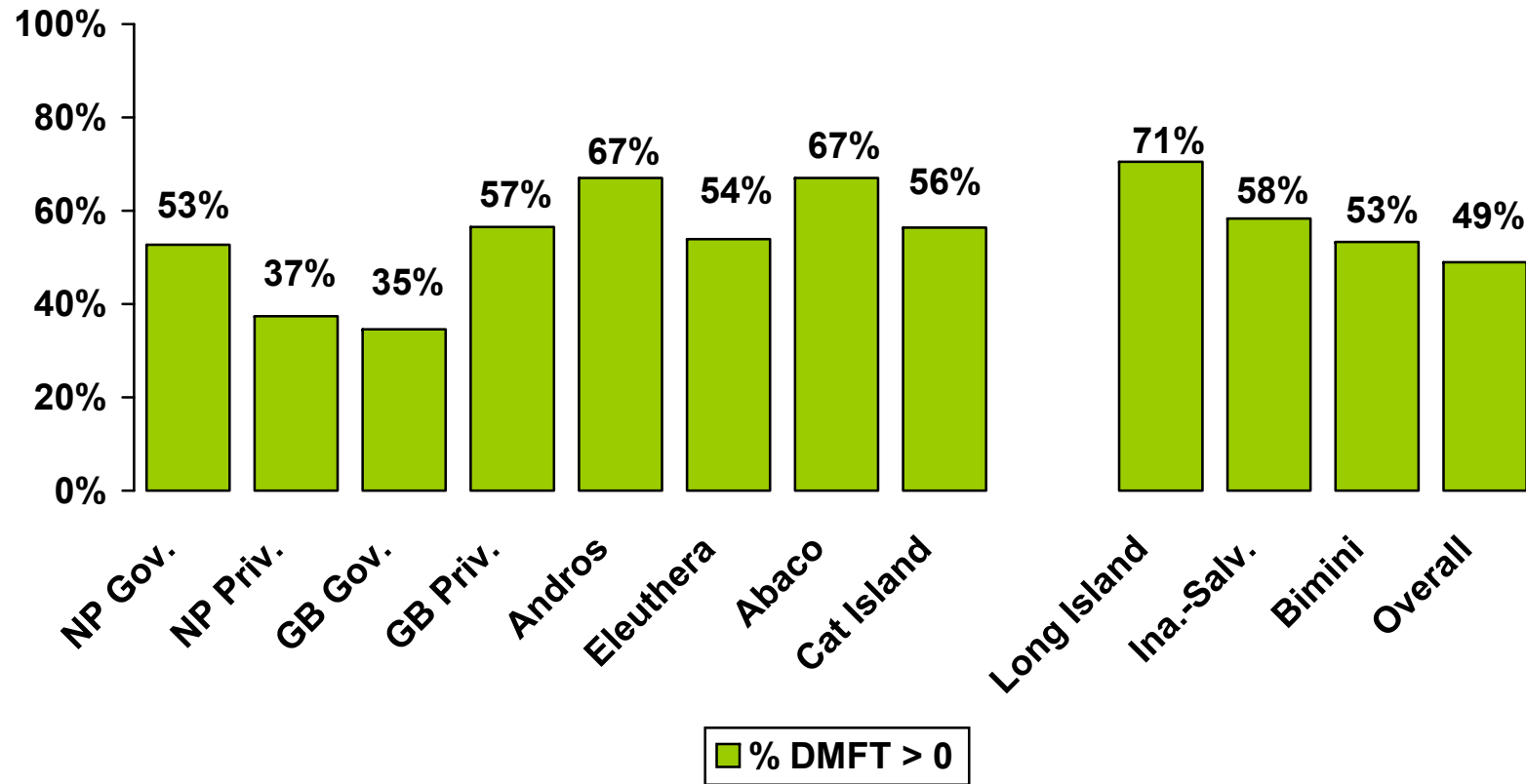


Figure 7
Mean Number of Decayed, Missing, and Filled Teeth (DMFT) in the Permanent Dentition of 12-Year-Old Schoolchildren, by Sampling Unit

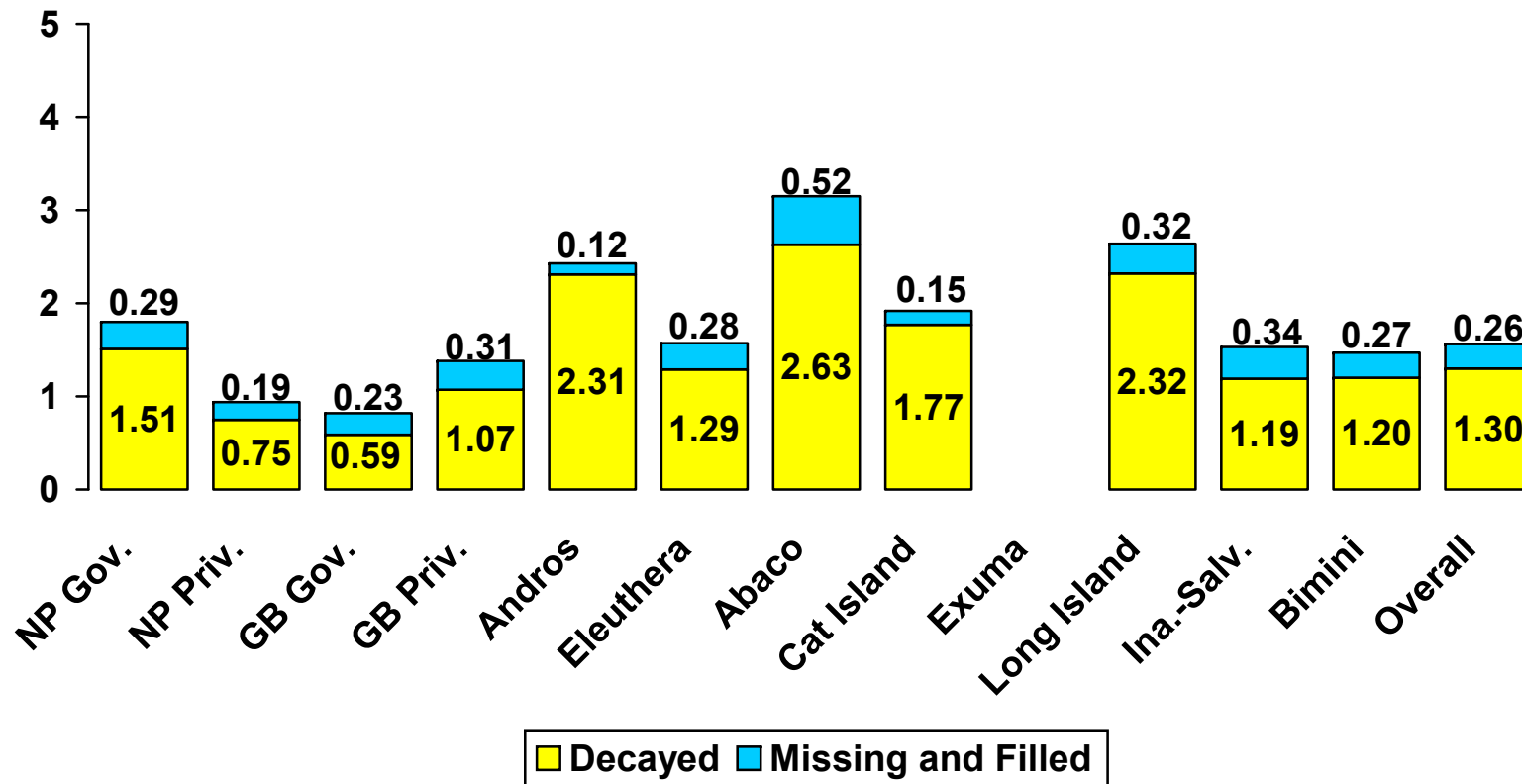


Figure 8
Mean Number of Decayed, Missing, and Filled Teeth (DMFS) in the Permanent Dentition of 12-Year-Old Schoolchildren, by Sampling

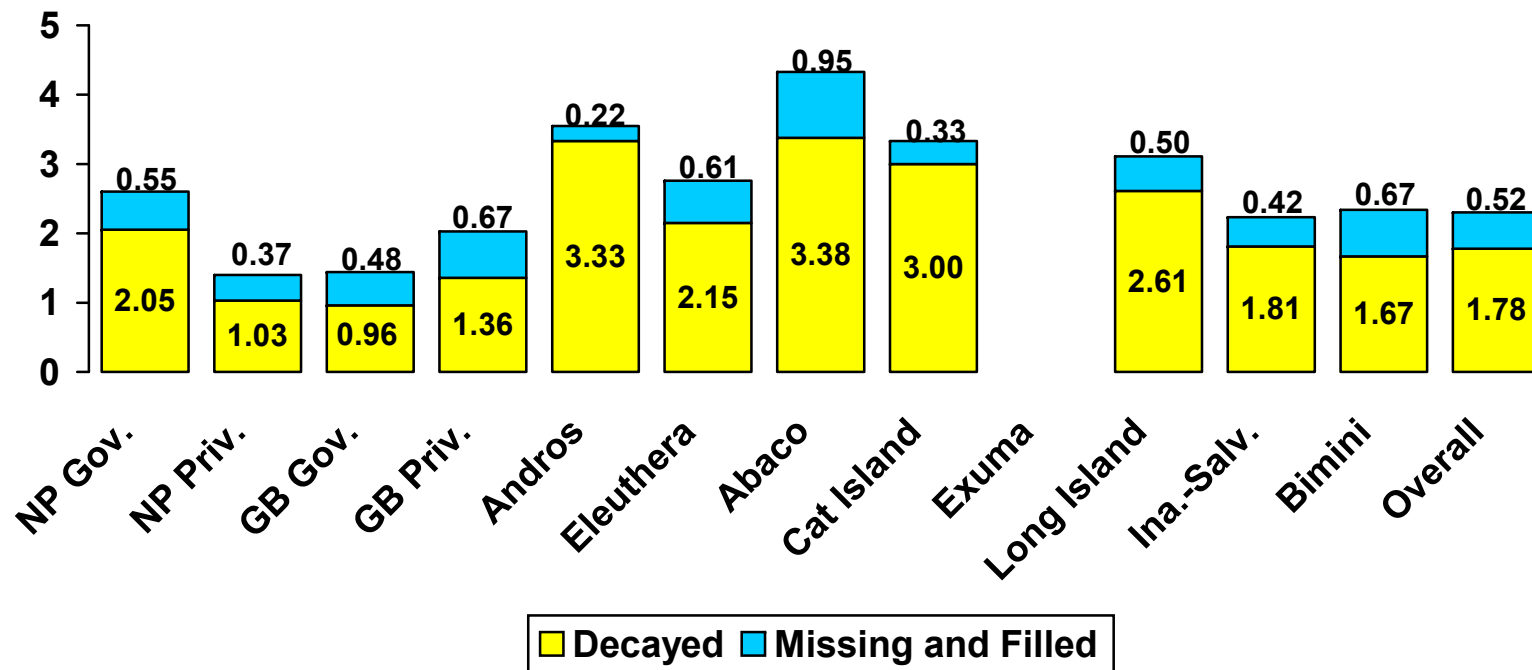


Figure 9
Prevalence of Dental Caries (DMFT>0) in the Permanent Dentition of 15-year-old Schoolchildren, by Sampling Unit

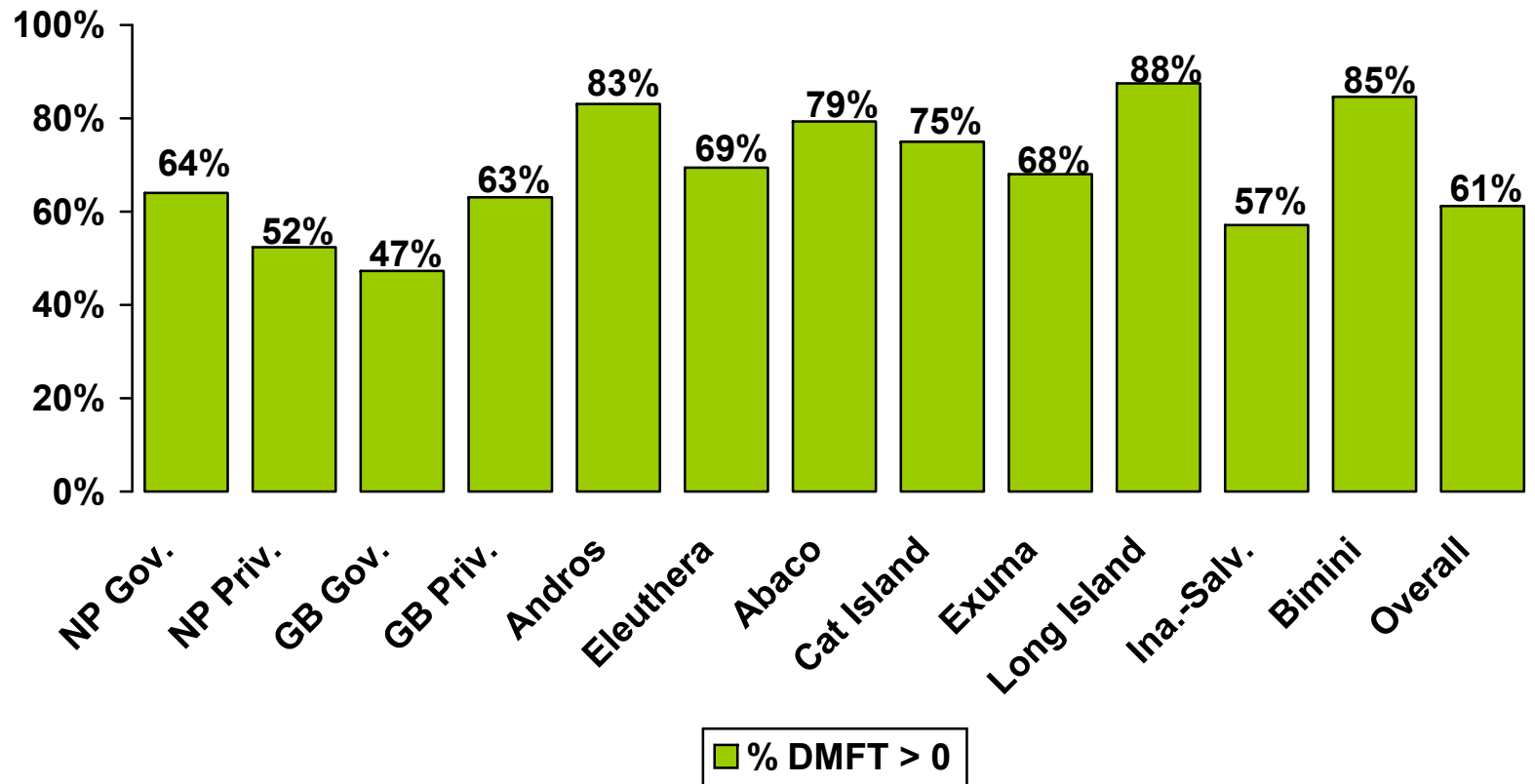


Figure 10
Prevalence of Untreated Decayed Teeth (DT>0) in the Permanent Dentition of 15-year-old Schoolchildren, by Sampling Unit

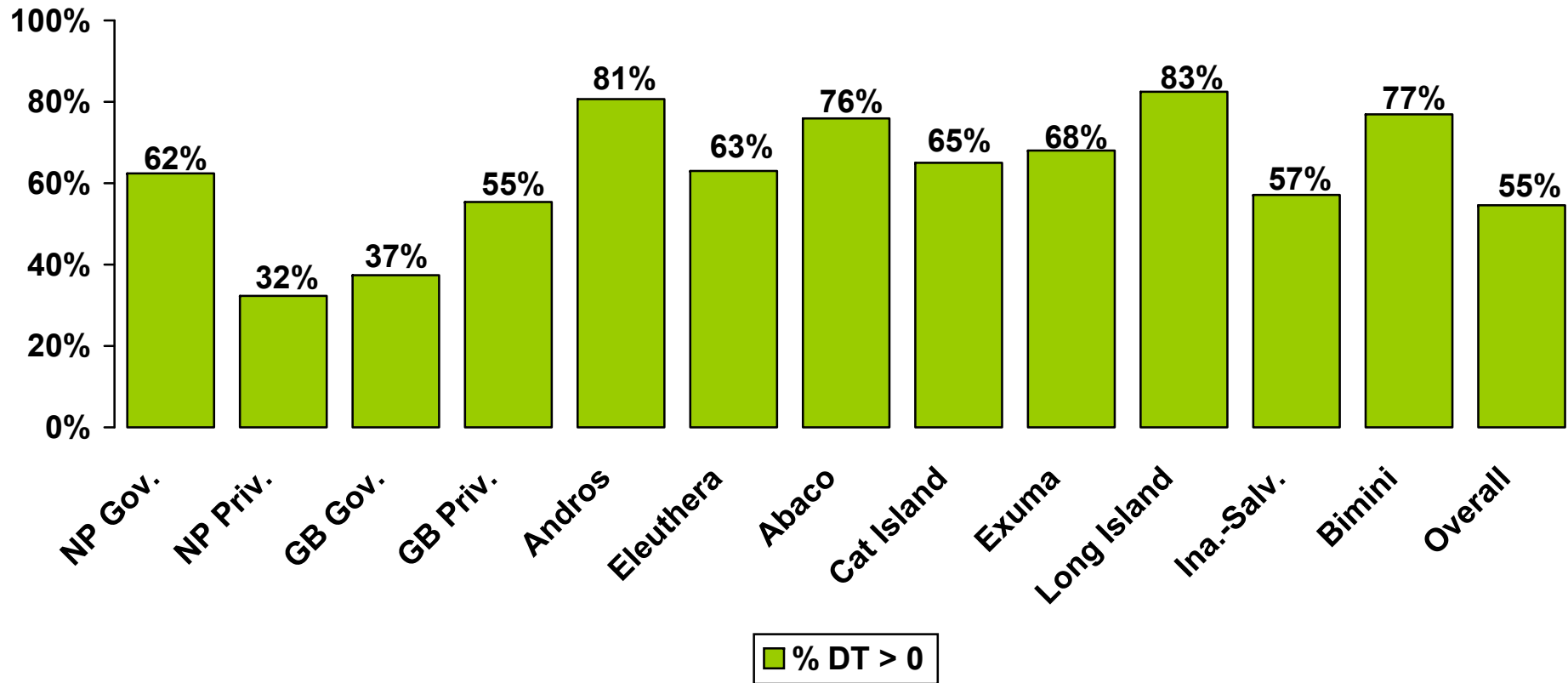


Figure 11
Mean Number of Decayed, Missing, and Filled Teeth (DMFT) in the Permanent Dentition of 15-Year-Old Schoolchildren, by Sampling Unit

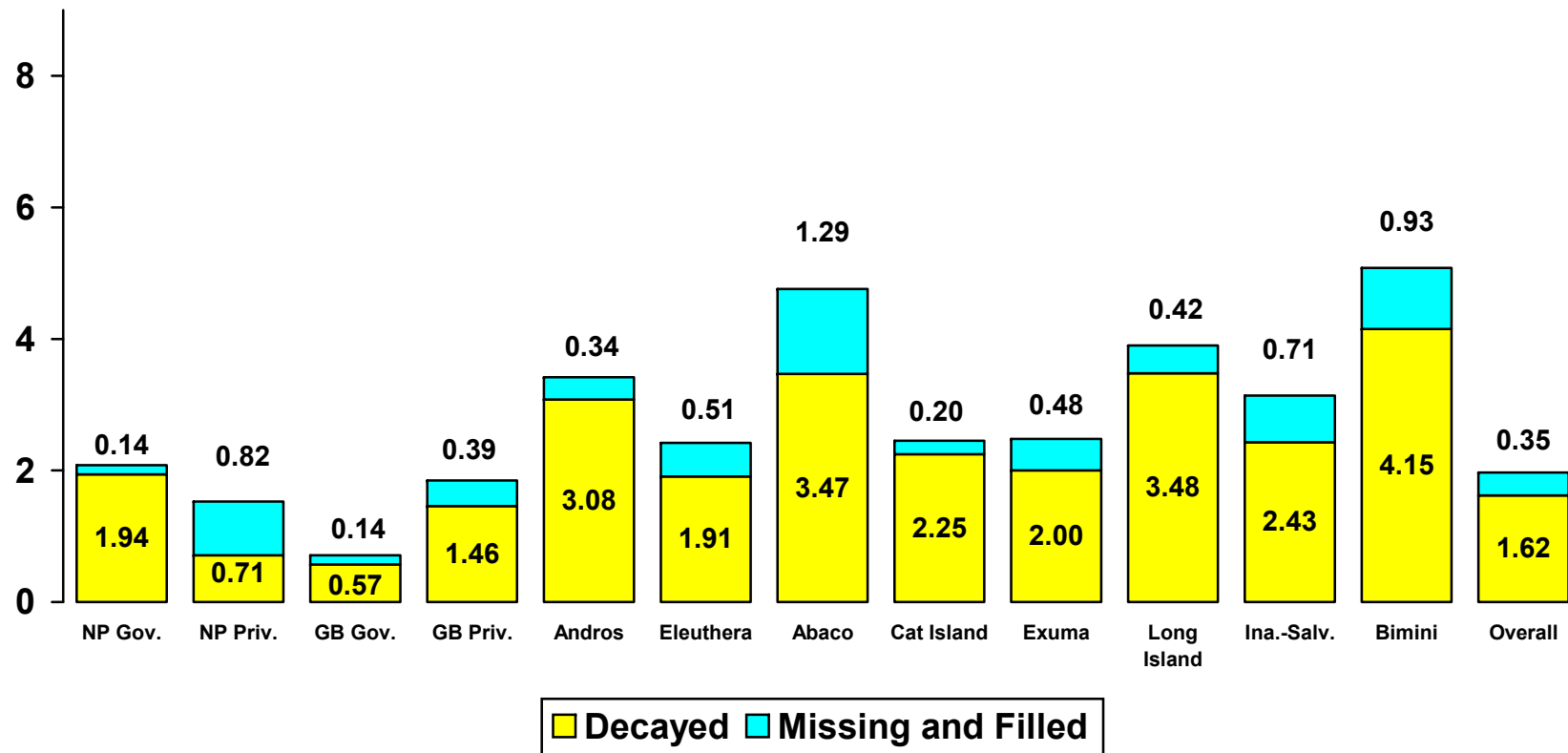


Figure 12
Mean Number of Decayed, Missing, and Filled Surfaces (DMFS) in the Permanent Dentition of 15-Year-Old Schoolchildren, by Sampling Unit

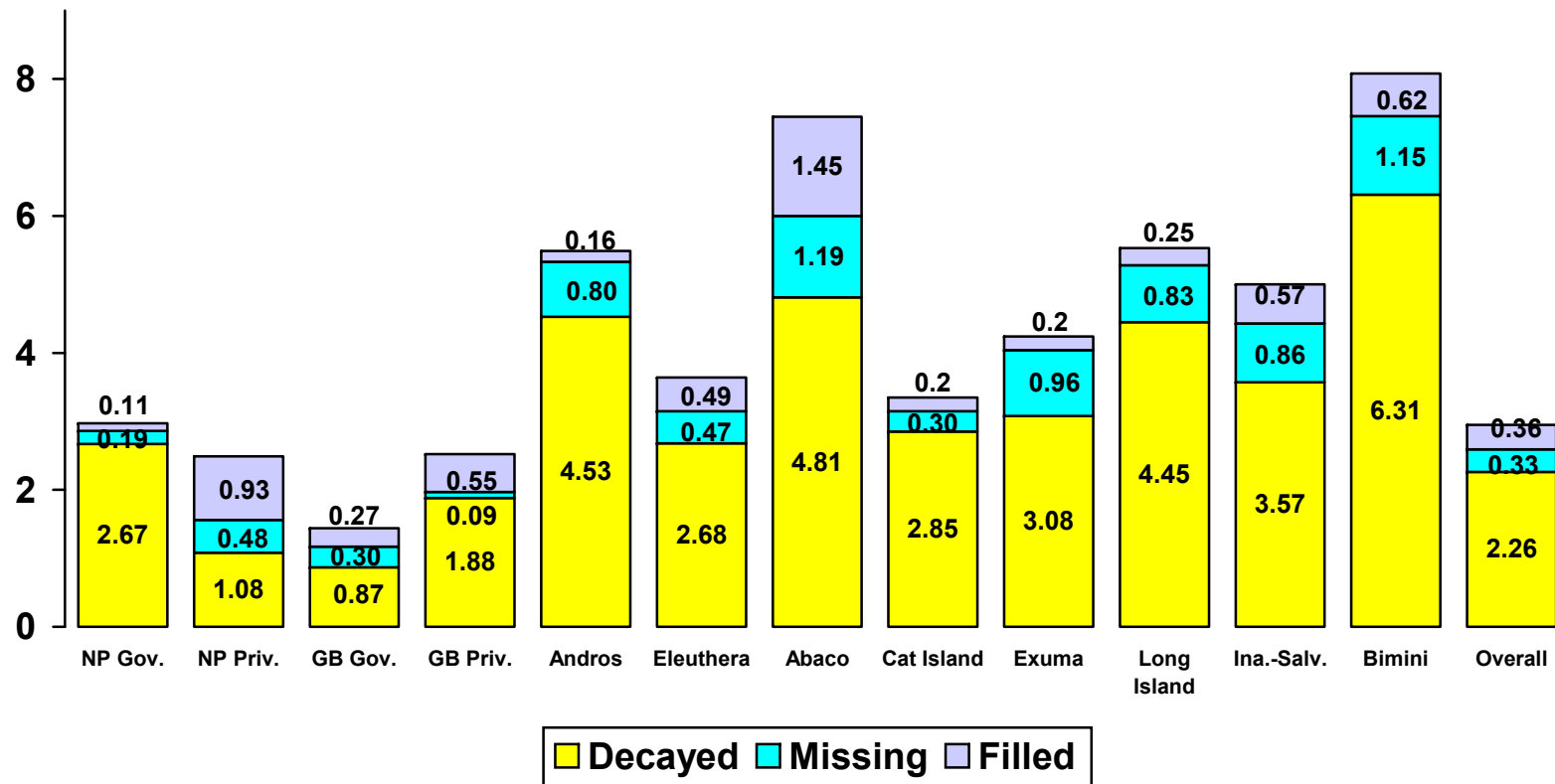


Figure 13
Mean Number of Decayed, Missing, and Filled Teeth in the Primary Dentition of 5-Year-Old Children (dmft) and in the Permanent Dentition of 12- and 15-Year-Old Children (DMFT)

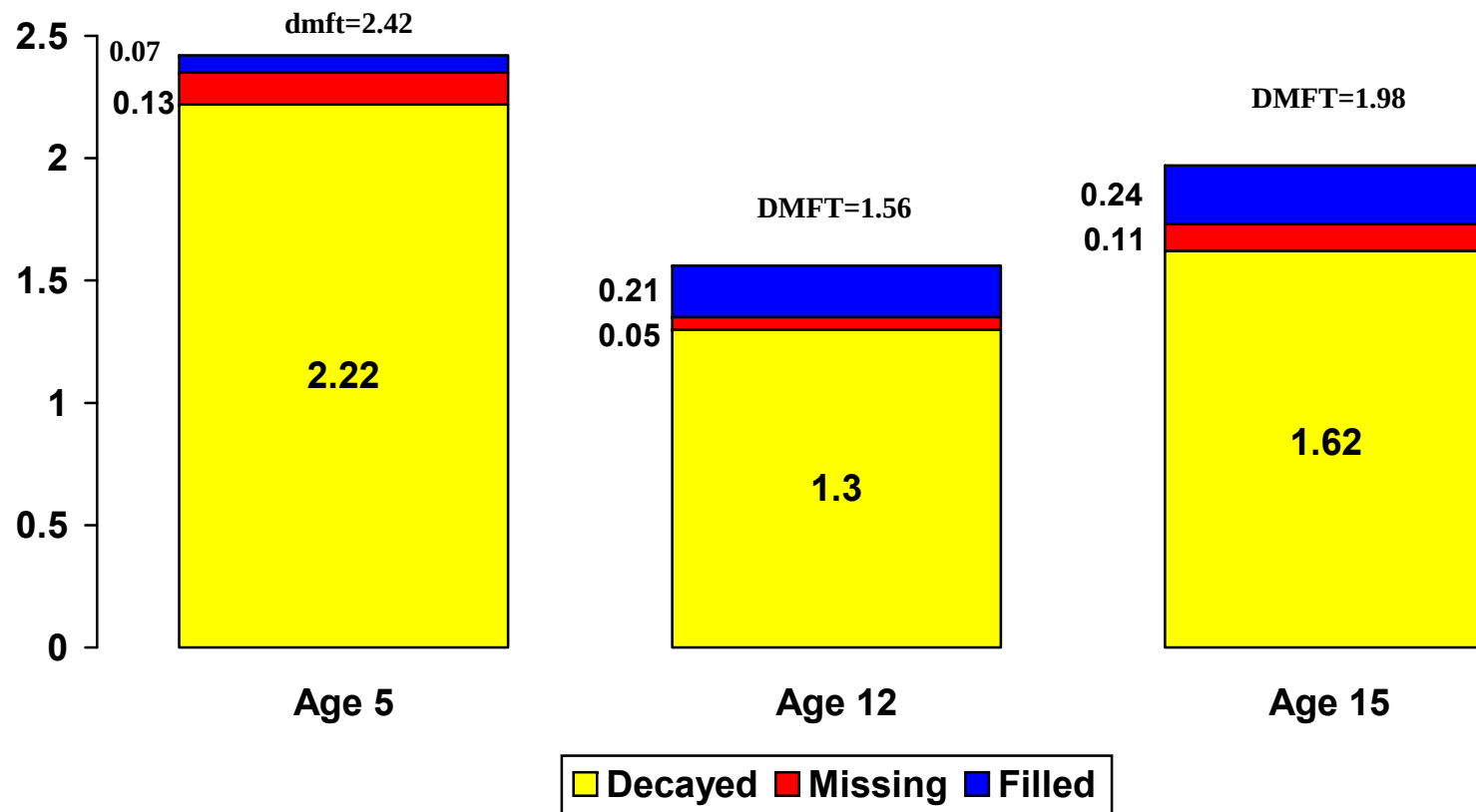


Figure 14

Mean Number of Decayed, Missing, and Filled Surfaces in the Primary Dentition of 5-Year-Old Children (dmfs) and in the Permanent Dentition of 12- and 15-Year-Old Children (DMFS)

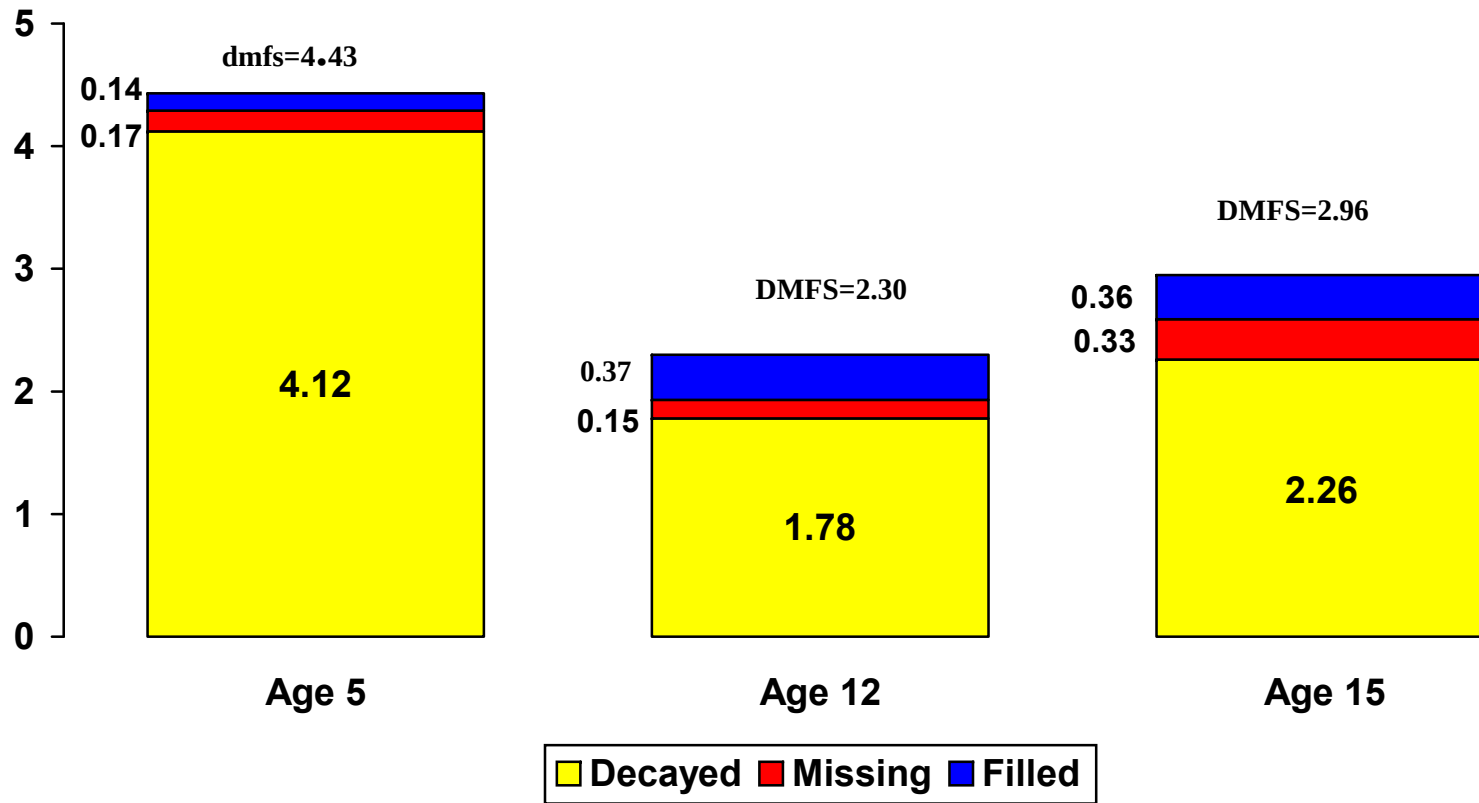


Figure 15
Percentage of 5- 12- and 15-Year-Old Children in Four Levels of Severity of the dmft (5) and DMFT (12 & 15)

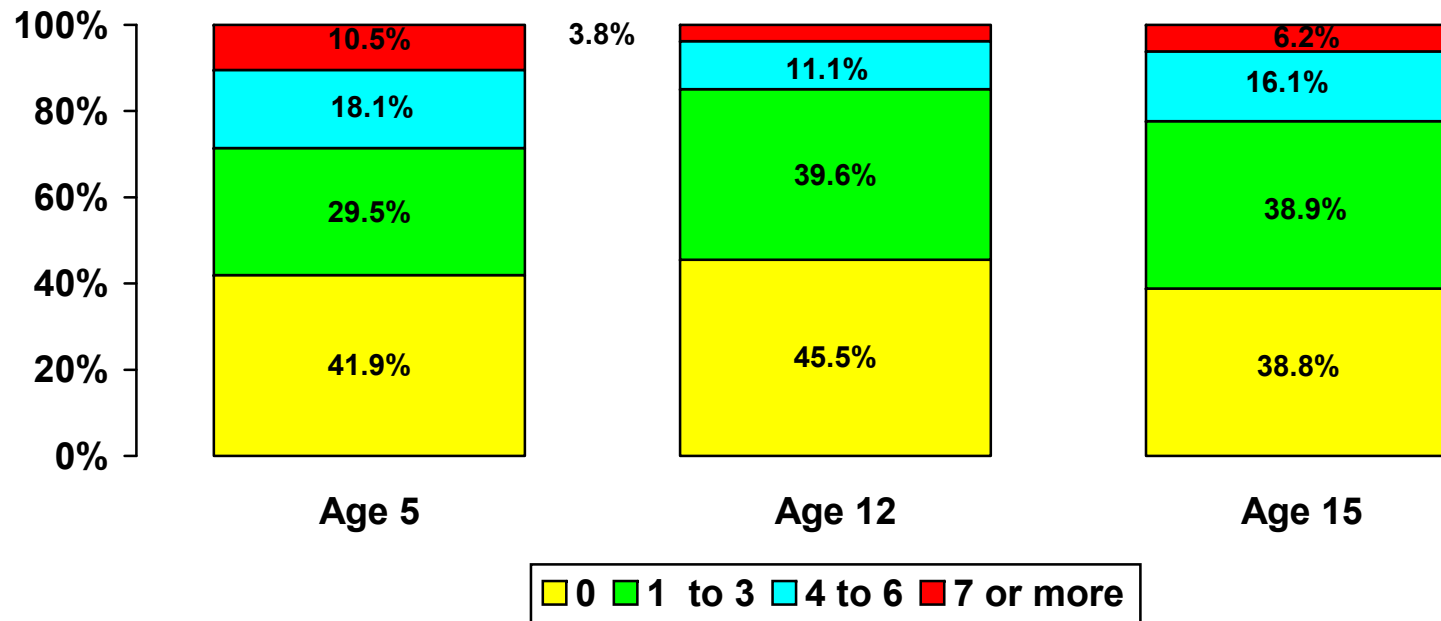


Figure 16
Relative Contribution of Decayed, Missing and Filled Teeth in 5- 12- and 15-Year-Old Children with History of Caries (dmft>0 at 5 and DMFT >0 at 12 & 15)

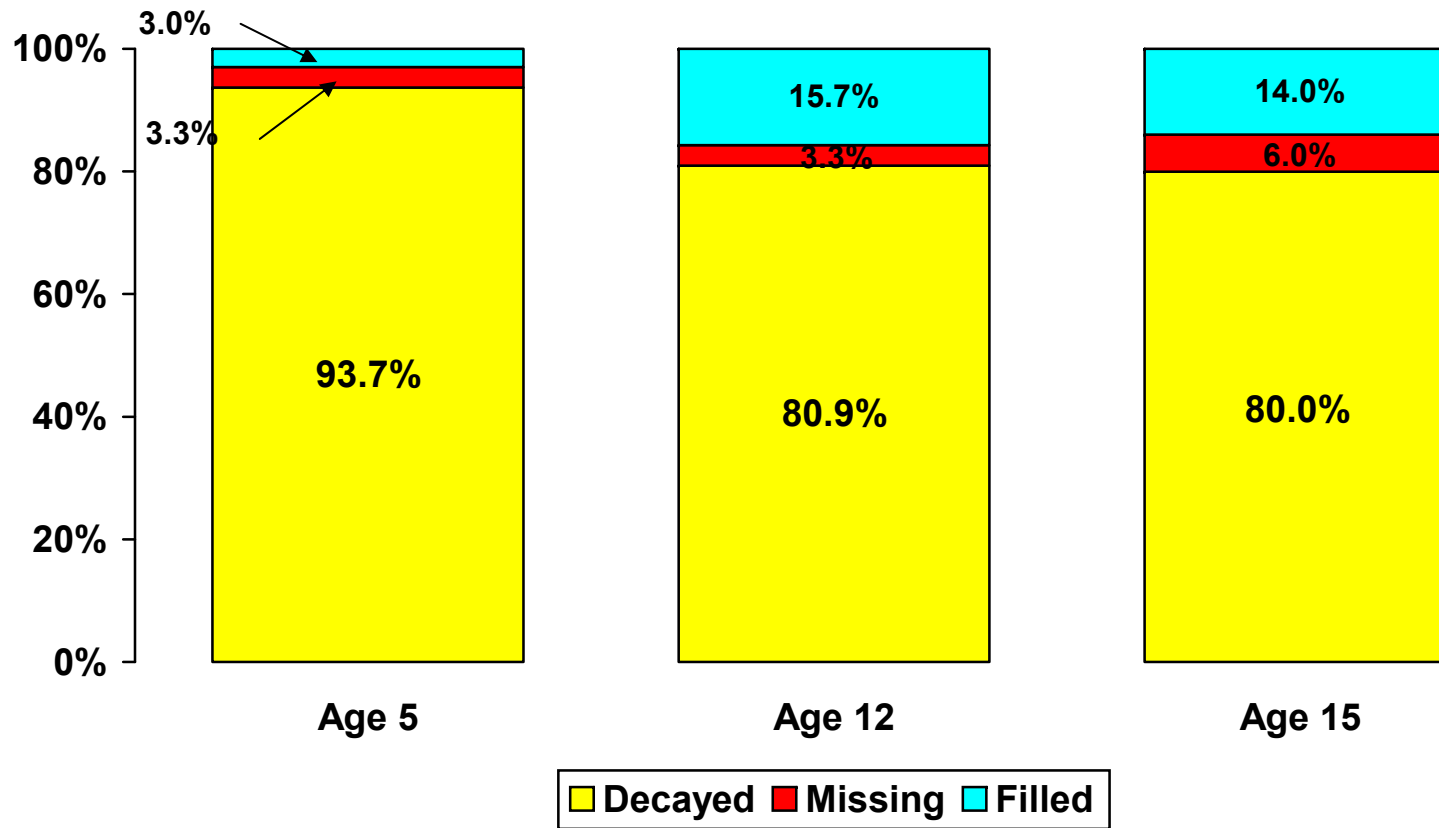


Figure 17
Relative Contribution of Type of Surface on the DMFS Index Among 12- and 15-Year-Old Children with History of Caries (DMFS>0)

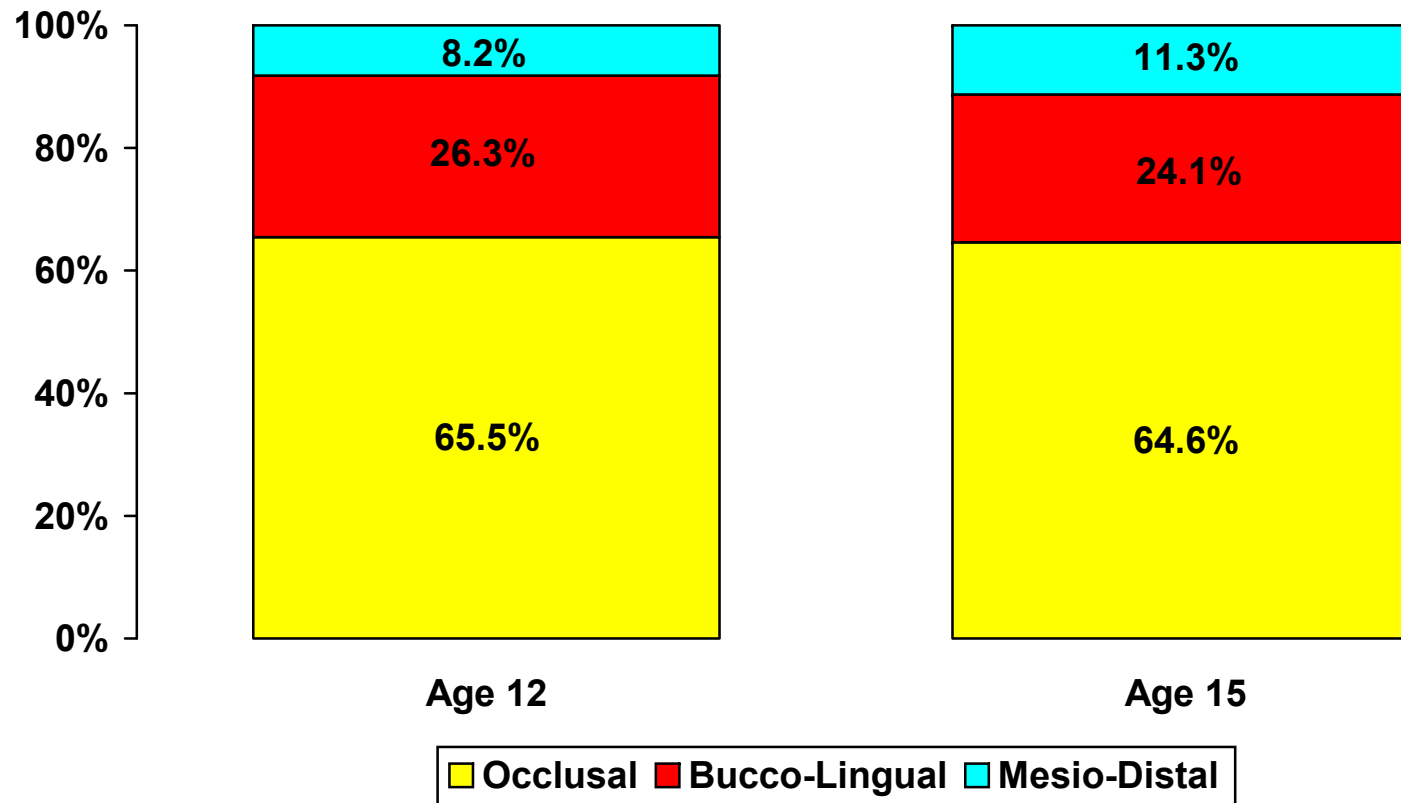


Figure 18
Percentage of 5-, 12-, and 15-Year-Old Children According to their Urgency of Treatment Needs

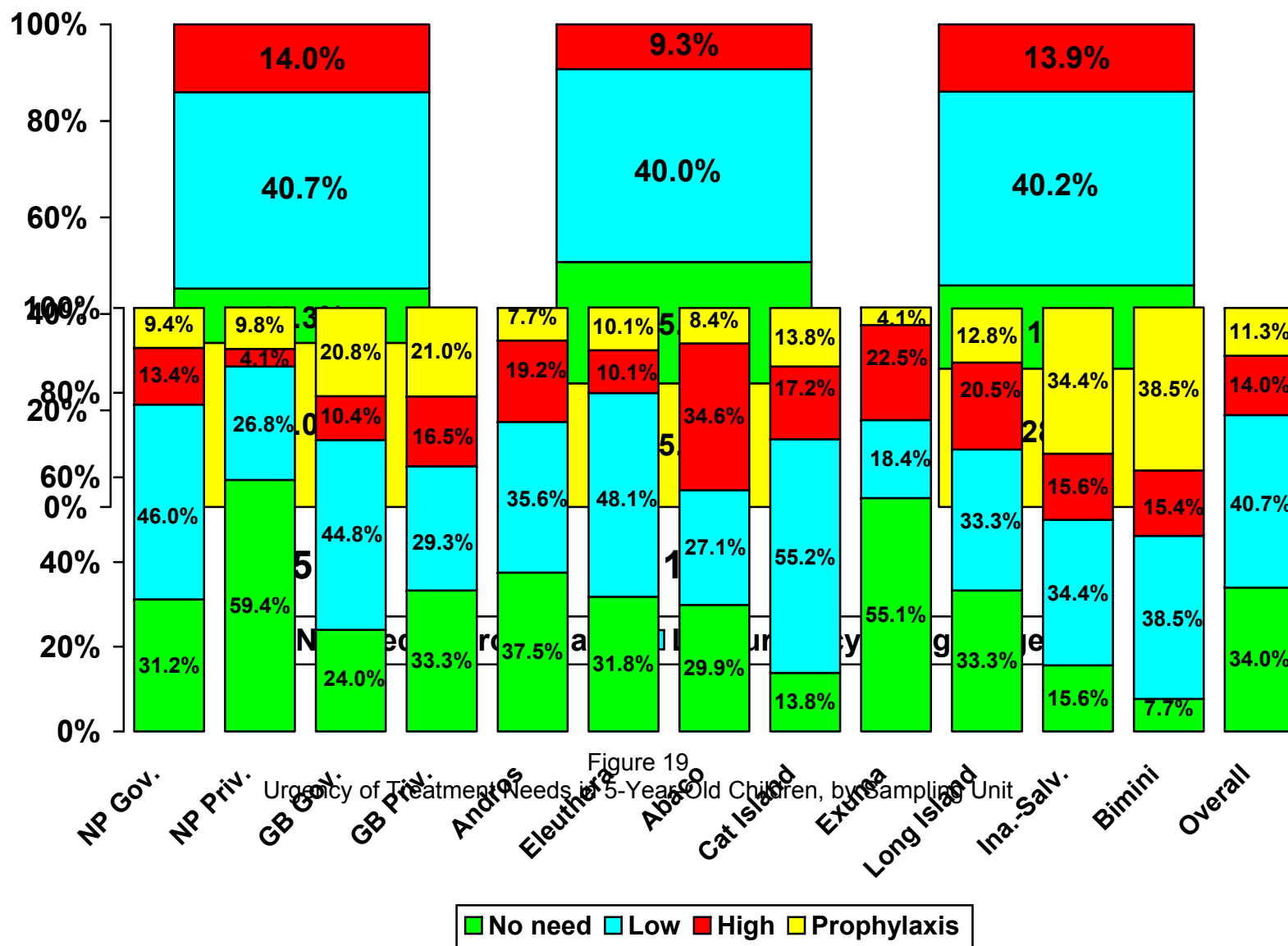


Figure 20
Urgency of Treatment Needs in 12-Year-Old Children, by Sampling Unit

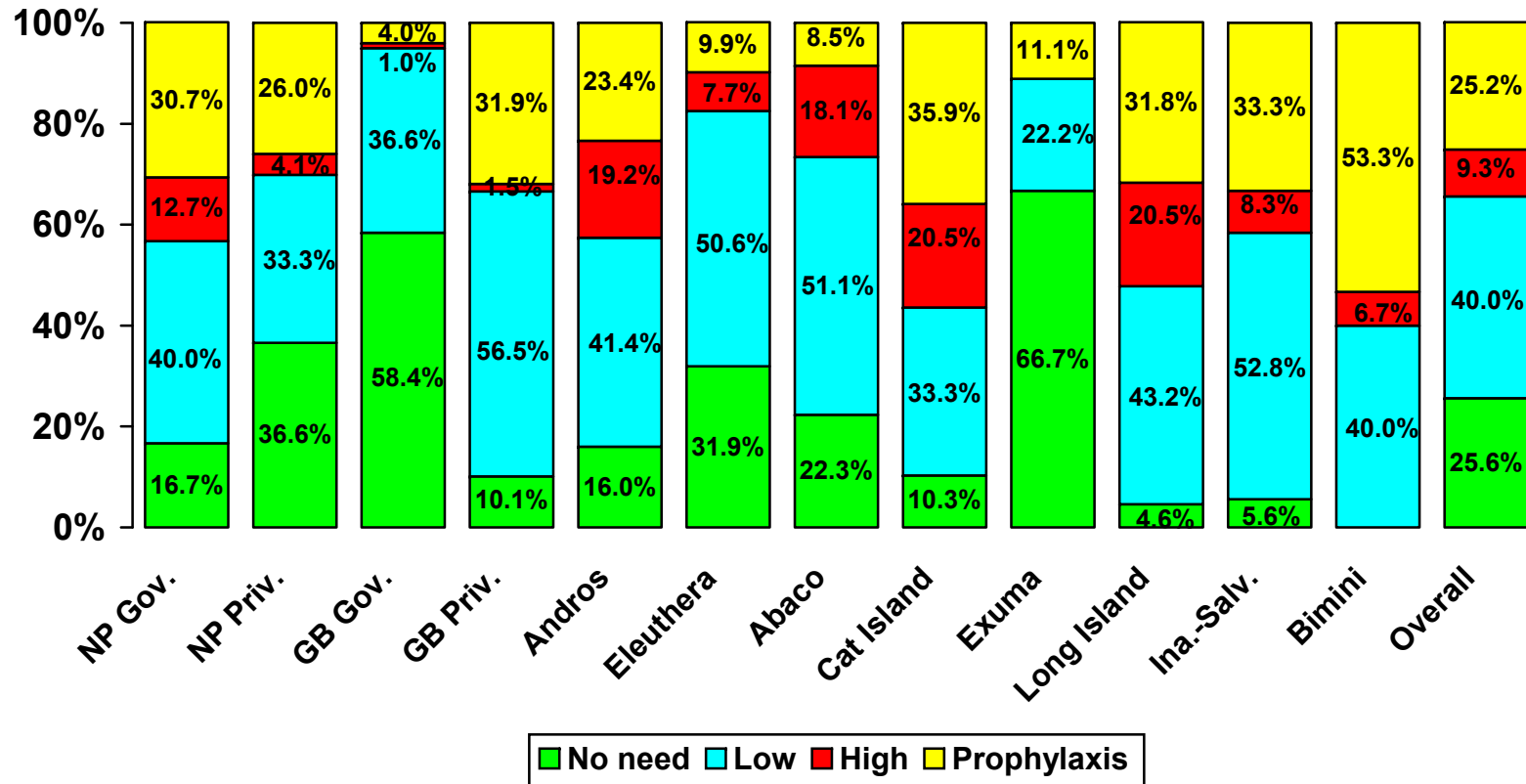


Figure 21
Urgency of Treatment Needs in 15-Year-Old Children, by Sampling Unit

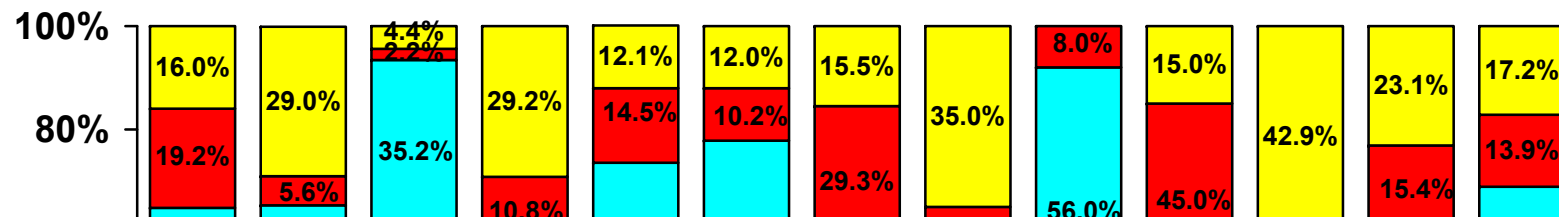


Figure 22
Maximum Enamel Fluorosis Scores (Dean's Index) Among Six Upper Anterior Teeth of 12- and 15-Year-Old Children

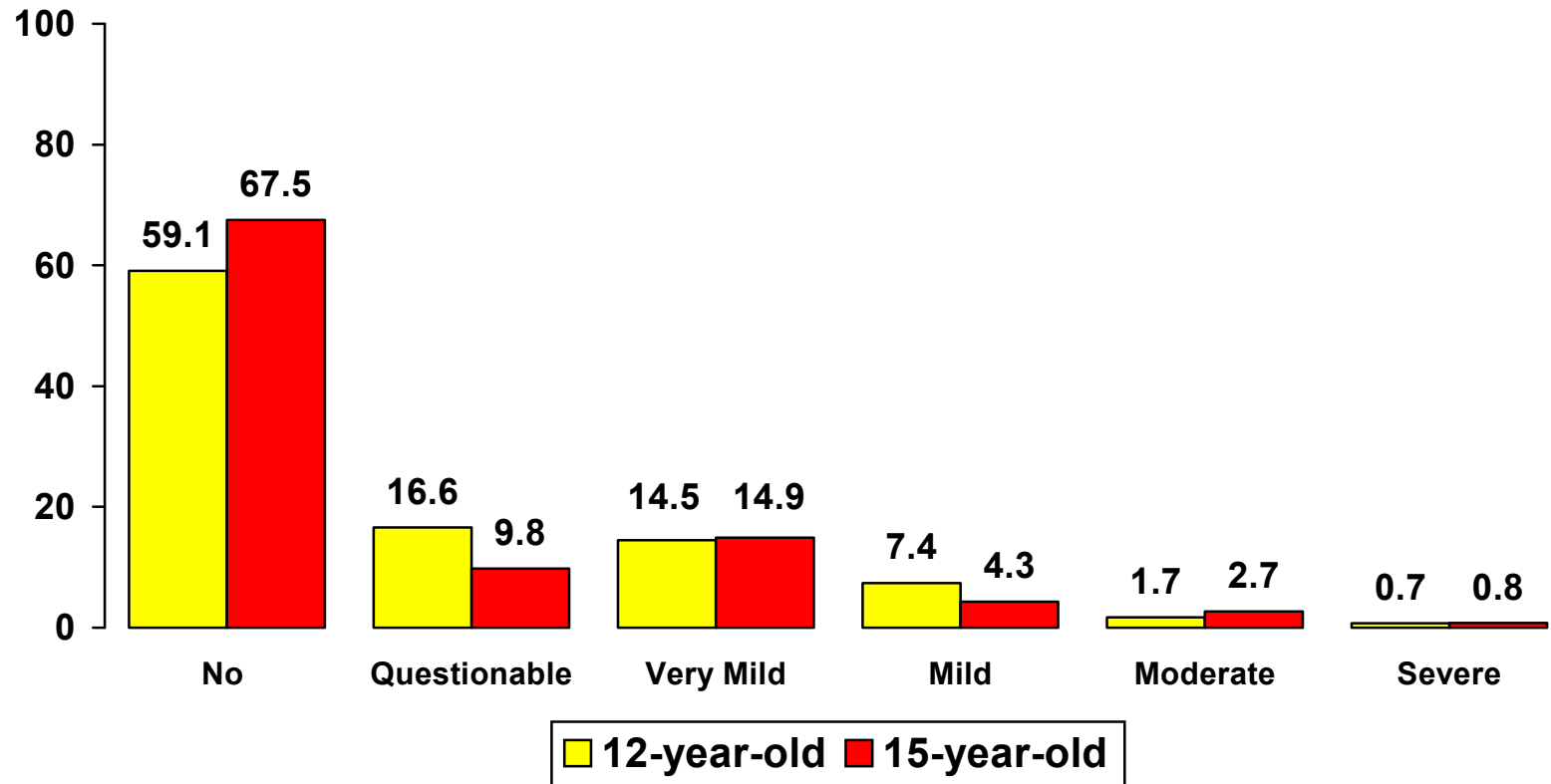


Figure 23
Prevalence of Enamel Fluorosis (Dean's Index: Very Mild to Severe) Among 12- and 15-Year-Old Children, by Sampling Unit

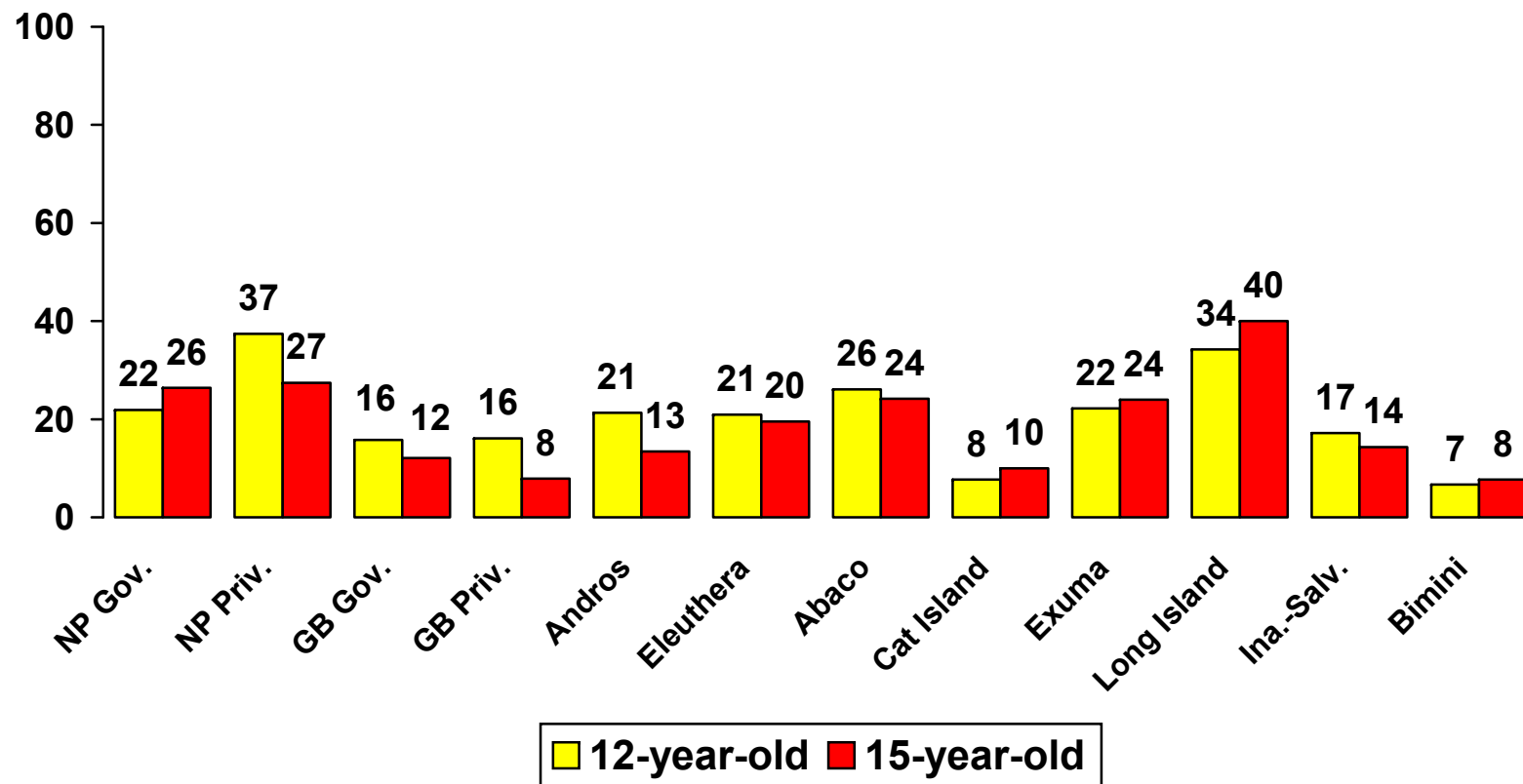
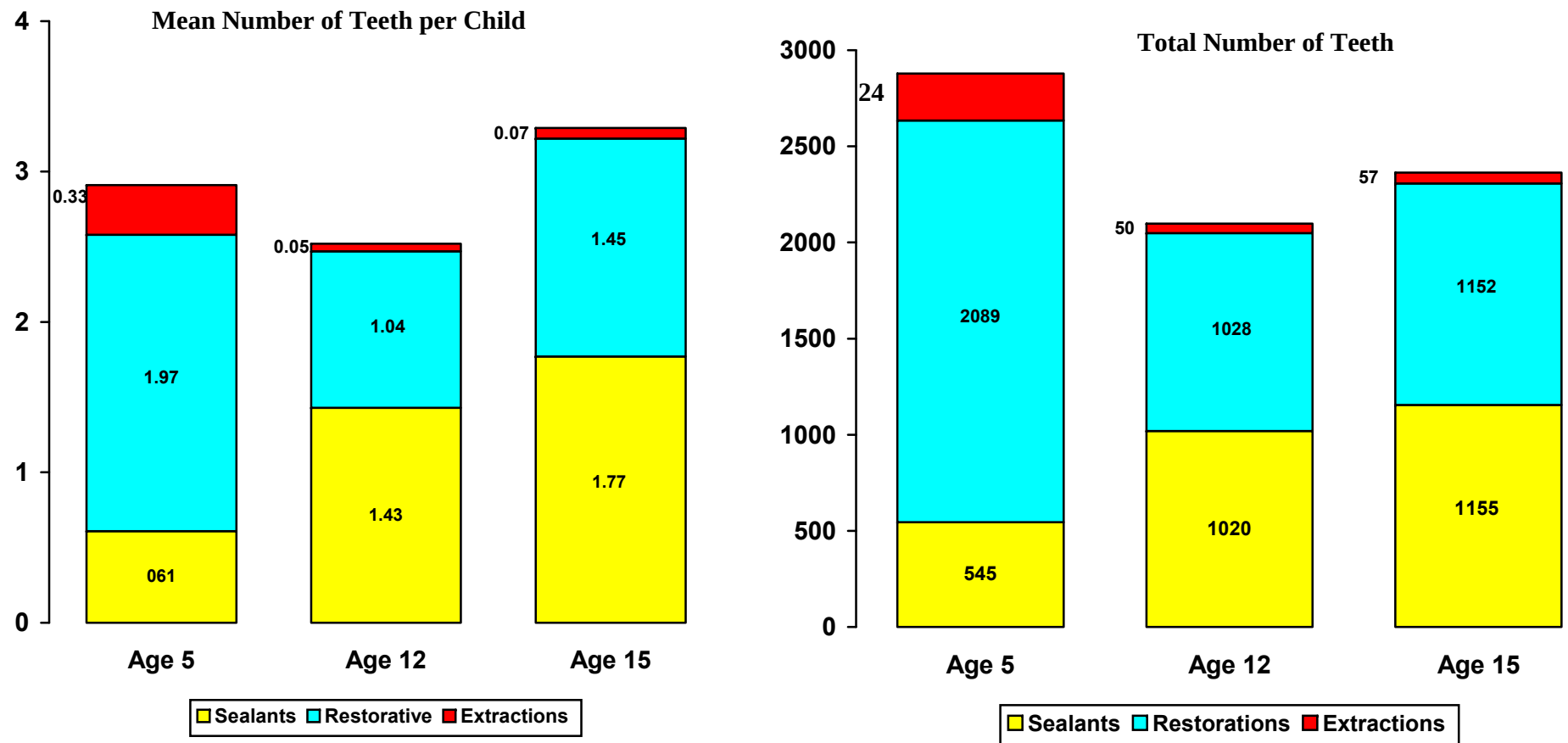


Figure 24
Tooth-Specific Treatment Needs



Appendix A

Sampling

The Commonwealth of the Bahamas is an archipelago of more than 1000 islands and Cays extended over more than 5,000 square miles. The overall population density is low, e.g., 48 inhabitants per square miles, but a large proportion resides in the Island of New Providence, where Nassau, the capital and administrative center of the country is located. Many islands, therefore, are sparsely populated. Table AI-1 displays the population density by island, taken from a report of the National Oral Health Interim Committee in 1997. These data, taken from two national censuses, show 68% of the population lives in New Providence and an additional 16% in the island of Grand Bahama.

Table AI-1. Population Distribution by Island

<u>Island</u>	<u>1980</u>	<u>1990</u>	<u>% Change</u>	<u>Proportion of Total Population in 1990</u>
New Providence	135,437	171,542	26.66	68.02%
Grand Bahama	33,12	41,035	23.96	16.27%
Abaco	7,271	10,061	38.87	3.97%
Andros	8,307	8,155	-1.83	3.23%
Eleuthera	8,331	8,017	-3.76	3.18%
Exuma	3,678	3,539	-3.78	1.40%
Long Island	3,404	3,107	-8.72	1.23%
Cat Island	2,215	1,678	-24.24	0.67%
Bimini Island	1,411	1,638	16.08	0.65%
Inagua	924	985	6.6	0.39%
Berry Island	509	634	24.55	0.25%
San Salvador	747	486	-34.93	0.19%
Acklins	618	428	-30.74	0.17%
Crooked Island	553	423	-23.50	0.17%
Mayaguana	464	308	-33.62	0.12%
Ragged Island	164	89	-45.73	0.04%
Rum Cay	78	53	-32.05	0.02%
All	207,205	252,178		

In coordination with Dr. Cyril Vanderpool, Director of Oral Health for the Bahamas, it was decided to include the islands of New Providence, Grand Bahama, Abaco, Andros, Eleuthera, Exuma, Long Island, Cat Island and Bimini. In addition, San Salvador and Inagua were merged into one unit and included in the survey. From the data displayed in Table AI-1, these islands cover over 98% of the population. The final sample was decided to represent each of these islands. Later, relative weights were used to estimate national weighted averages and proportions (see below).

Following the recommendation of World Health Organization, it was decided to include 5-, 12-, and 15-year-old schoolchildren as the population to be represented in the sample. In addition, in the islands of New Providence and Grand Bahama, two sub-samples representing children in government and private schools were selected from independent sampling frames (see below). Children attending private schools in the other islands were excluded because they were too few to stand as an independent sub-sample. The 1999 Ministry of Education

official school enrollment was used to construct a sampling frame for each island and to generate the weights used for aggregate national estimates (Table A-1 in the main document). Table AI-2 shows the distribution of the represented age groups in each island.

Table AI-2. Distribution of School Children for Selected Age Groups

	5	12	15	All
Other Islands *	211	150	145	506
Bimini	11	30	8	49
Cat Island	36	20	37	93
Inagua-Salvador	38	28	29	95
Long Island	47	62	49	158
Exuma	90	55	49	194
Andros	219	191	124	534
Eleuthera	222	168	161	551
Abaco	249	199	157	605
Grand Bahama Private	302	291	270	863
Grand Bahama Government	675	528	657	1860
New Providence Private	598	1043	787	2428
New Providence Government	2665	2472	2319	7456
Estimated Total	5363	5237	4792	15,392

Three strategies were used for sampling. First, the Islands of New Providence and Grand Bahama were sampled using probability proportional to size. All children enrolled in both private and government schools were grouped by school and listed in ascending order of size. From this list, a pre-determined number of schools, usually between 25% to 100% of all schools, were selected applying an interval of selection to a random start. For example, Table AI-3 shows the selection for 5-year-old children attending government schools in New

* These islands were excluded from the study because individually they had few enrolled children and collectively, represent a small contribution to the overall population. In this group we included: 1) Government schools in Acklins, Berry Island, Crooked Island, Harbour Island, Long Cay, Mayaguana, Ragged Island and Rum Cay; 2) Private schools in Abaco, Bimini, Eleuthera and Exuma; and 3) Children in special schools.

Providence.

Table AI-3**Government: 5 years-old**Target size = $25 \times 10 = 250$

Gambier Primary	25	25	10 sites to be selected and 25 children from each site
Adelaide Primary	34	59	Interval = $3227/10 = 322.7$
Naomi Batch Primary	61	120	
Woodcock Primary	86	206	Random start = 295
Palmdale Primary	94	300	* Selected
T.G. Glover Primary	94	394	
Mable Walker Primary	100	494	
Centreville Primary	107	601	
Albury/Sayle Primary	112	713	* Selected= $295 + 322.7 = 617.7$
C.W. Sawyer Primary	120	833	
Oakes Field Primary	121	954	* Selected= $617.7 + 322.7 = 940.4$
Sandilands Primary	123	1077	
Yellow Elder Primary	123	1200	
Ridgeland Primary	125	1325	* Selected= $940.4 + 322.7 = 1263.1$
Thelma Gibson Primary	133	1458	
Gerald Cash Primary	136	1594	* Selected= $1263.1 + 322.7 = 1585.8$
Carlton E. Francis Primary	143	1737	
Garvin Tynes Primary	144	1881	
Carmichael Primary	146	2027	* Selected= $1585.8 + 322.7 = 1908.5$
E.P. Roberts Primary	153	2180	
Stephen Dillet Primary	172	2352	* Selected= $1980.5 + 322.7 = 2231.2$
Claridge Primary	207	2559	* Selected= $2231.2 + 322.7 = 2553.9$
Uriah McPHee Primary	210	2769	

Cleveland Eneas Primary	224	2993	*	Selected= 2553.9 + 322.7 = 2876.6
Columbus Primary	234	3227	*	Selected= 2876.6 + 322.7 = 3199.3
		3227		

In this particular age group, it was decided to sample 250 children from 10 of the 25 eligible schools (25 children from each school). All schools were ordered by population size (column following school's name) and the cumulative population was calculated (column at the right of the population size). From the total eligible population ($n=3,227$) we calculated the selection interval ($3,227 \div 10 = 322.7$). A random number, i.e., 295 was selected using a programmable calculator. This number is included in the cumulative population corresponding to Palmdale Primary, which, therefore, was included in the sample. The following school was selected by adding the interval of selection to the random start, i.e., $295 + 322.7 = 617.7$ which corresponded to Albury/Sayle Primary. The next eight schools were selected accordingly. This process was followed independently for all age groups in both private and government schools in New Providence and Grand Bahama. In few cases, the same school was selected for two age groups; this happens mostly for 12- and 15-year-old children, as they attend the same schools. Also, in a few cases, mostly private schools, the originally selected school was denied participation in the survey. In these cases, the previous school in the list was selected as a replacement. In each school, the first 25 children from each age group were selected from the school rosters.

This was accomplished by creating lists of all eligible children in each age group and A second selection strategy was used in Andros, Eleuthera, and Abaco. These islands are moderately large, but not sufficient to obtain a sample large enough for stratification and small enough to fit the finite population fraction (i.e., in order to estimate the variance of a point estimator, the sample should be no larger than 10% of the entire population). Therefore, it was decided to census half of the population in each school and sampling half of them.

A third selection strategy was used in Cat Island, Exuma, Long Island, Inagua-San Salvador, and Bimini. In these islands full census were planned. In the particular case of Bimini, the number of children enrolled in the age groups selected exceeded the number in the statistics from the Ministry of Education.

Table A-2, in the main document, shows the final sample distribution for the selected islands. A total of 2,684 children were examined.

See the Appendix IV, Methods for Data Analysis, for an explanation on how the data were tabulated and analyzed to obtain island-specific and national statistics.

Appendix B

Training and Examiner Reliability

Training and standardization exercises were conducted in September 1999. Six examiners were selected (Table All-1) and provided with the diagnostic criteria and coding (See Appendix C) two weeks before the training session.

Table All-1 Examiners

ID	Name
1	Dr. Vincent Mc Weeney
2	Dr. William Lee
3	Dr. Catherine Adderley
5	Ms. LaGloria Ferguson RDN
6	Dr. Dante Bazard
8	Dr. H M Lockhart

Two standardized oral epidemiologists conducted the session - one from the Centers for Disease Control and Prevention (CDC) Atlanta, Georgia and the other from the University of Connecticut. Both are experts in the WHO and the United States diagnostic criteria for epidemiological surveys of oral/dental diseases and conditions. One of the examiners (no. 8) was selected as the local standard for future reference. Unfortunately, due to climatic problems (Hurricane Floyd) a day and a half of the originally planned five days of training were lost. In the additional three and a half days, all examiners conducted duplicate examinations against the standard to check for inter-examiner consistency. The first couple of examination rounds were used to discuss disagreements in the diagnosis. These data were not used to estimate reliability. After the first two rounds, examiners and the standards performed six rounds of examinations. These data were used to calculate two statistics of inter-examiner reliability: percent agreement and kappa. Table All-2 shows the results of these examinations.

Table All-2 Inter-Examiner Reliability (Kappa) Against the Standard. Results of standardization exercises in Days 2 and 3

Day 2

Examiner	Fluorosis	Caries
1	0.65	0.86
2	0.54	0.81
3	0.74	0.91
5	0.75	0.92
6	0.38	0.75
8	0.83	0.92

Day 3

Examiner	Fluorosis	Caries
3	Not available	0.98
5	0.82	0.96
6	0.71	0.71

Kappas for assessment of dental caries ranged from good to excellent. Kappas for fluorosis were more modest but acceptable for examiners 3, 5 and 8. Based on these result examiners 1, 2 and 6 were retrained.

Examiners conducted dental examinations according to the following distribution:

Table All-3 Allocation of Examiners by Sampling Unit

Sampling Unit	Examiner
New Providence	1,2,5,6,8
Grand Bahama	3,5
Andros	6,8
Eleuthera	5,6
Abaco	1
Cat Island	6
Exuma	2,5
Long Island	6,8
Inagua-San Salvador	6
Bimini	6

Duplicate examinations during data collection—to measure intra-examiner reliability—were not planned since at most sample sites examiners worked alone.

Appendix C

Diagnostic Criteria and Methods

**Examination Procedures and Coding
for Visual-Tactile Oral Health Surveys**

**Modified version of WHO Oral Health Surveys Basic
Methods**

Eugenio D. Beltrán-Aguilar, DMD, MPH, MS, DrPH

**For use in Epidemiological Evaluations Sponsored by the
Pan American Health Organization**

1999

Introduction

The diagnosis of populations using epidemiological methods parallels closely those methods used in any clinical setting. However, besides the size of the population examined they differ in important ways.

The clinician follows diagnostic criteria and procedures intended to determine the oral health needs of the patient. With that in mind, the practitioner compiles an entire inventory of signs and symptoms. Furthermore, he/she uses radiographs and other auxiliary diagnostic tools to supplement the information obtained by direct observation.

In contrast, an oral epidemiologist is concerned with descriptors of oral conditions in the population. The idea is to obtain an objective and reliable quantification of the degree of presence of the condition in the population and its changes over time. For that purpose, oral

epidemiology studies --such as open-mouth surveys-- require the examination of a large number of subjects and, usually, several examiners. Consequently, the diagnostic criteria and methods used need to emphasize the reproducibility of results rather than the meticulous detection of the earliest sign of disease. In general, to maximize reproducibility epidemiological methods use conservative diagnostic criteria, relying mainly on unambiguous visual evidence of pathology, rather than on the more sensitive clinical or radiographic diagnostic aids used in clinical practice. The process by which these criteria and methods are internalized by examiners and their recorders is called standardization and quantifying the level of standardization is called calibration.

Why standardization and calibration of examiners and recorders is so important in epidemiological studies?

Two important issues arise when data are collected: how valid and how reliable are these data. Bias is the main threat against the validity of the data. We all carry our own biases; they affect our capacity of being objective even after professional training. In order to diminish bias, we need to establish strict diagnostic criteria for each condition we intend to examine (standardization); we need to review these criteria, and make their application conscious at the time of examination.

However, having a strict standard criteria is not the only requirement to obtain high quality data. We know that physical and psychological factors such as fatigue, fluctuations in interest, difficulty in making decisions, and variations in visual acuity and tactile sense, affect the judgement of examiners from time to time and to different degrees. Obviously, we need to make efforts to reduce these factors and to implement, during examination, a system to check how reliable the examiners and recorders are in the application of the diagnostic criteria. In other words, we need to have a good (valid) criteria and check if we use it correctly (reliable). We approach the issue of reliability in two dimensions: between examiners (inter-examiner reliability) and within each examiner (intra-examiner reliability).

The standardization/calibration process has two phases. First, we need that you study and memorize the diagnostic criteria and procedures described in this document. Second, we need to expose you to a calibration exercise in which you will be asked to apply the criteria and methods in a setting similar to the one you will find during field data collection. After the exercise we will assure that all examiners and recorders apply diagnostic criteria and coding correctly and consistently.

Summarising the objectives of calibration for epidemiological studies are:¹

1. To ensure uniform interpretation, understanding, and application of the criteria for the various diseases and conditions to be observed and recorded.
2. To ensure that each examiner can examine to a "uniform" standard, and
3. To minimize variations within and between examiners.

This document is divided into two main sections. In the first section I provide a general explanation of the procedures immediately before the oral examinations. The second section provides the coding for the different conditions to be included in this survey. Each coding scheme is followed with notes and special considerations printed in *italics*. These notes are very important and I expect that you will come to a good understanding of when and why these are applicable before the calibration exercise.

I have included a copy of the latest version of the data entry form for your review and familiarization.

**Please Read and Study
this Manual and Bring it
to the Calibration
Exercise**

¹ Moller IJ, Eklund SA. Calibration of Examiners for the International Collaborative Study of Oral Health (ICS II). World Health Organization (limited distribution). 1991.

General Instructions and Procedure for Examination

As an examiner you will receive a list of schools you will visit and a procedure guide to select children from the school. It is very important that you follow these instructions, as the validity of the survey will depend on your ability to select by random children from every school selected.

Also, you will receive equipment and materials. The equipment should be assembled appropriately in a room within the school premises. This room should have some requirements, mainly access to power outlets, appropriate ventilation/cooling, a waiting area with chairs, proximity to a water faucet for washing hands and instruments and access to a garbage bin to dispose used material. You will receive an infection control protocol you must adhere to during the entire process.

The day of the examination you will arrive to the school and contact the principal, who has been notified ahead of time on the day and time of your visit. You will co-ordinate the classrooms selected and the most appropriate order to avoid conflict with classroom and outdoors activities. You will select a person from the school staff who will co-ordinate the movement of children from the classroom to the examination area. If your survey include a consent form, each child should bring them to the examination area.

You will have one or more chairs do carry out the examination. Each chair should have a person who will write down your diagnosis (codes) during examination. This person will be identified as the recorder. These codes will be written in a paper form (see appendix 1) or in a computer data entry file. Before the child is seat in the chair or examination table, the recorder will collect the consent form and transfer the information (i.e. number, sex, birth date, and age) to the data entry form or data entry program. (Appendix 2 explains the codes and procedures to assign an ID number to each person). Once gloved and before starting the examination you will ask for a final agreement in conducting the exam with the child. At this time, you are ready to collect data on the following conditions:

Dental Fluorosis: children 12, 15, and adults 35-44

Coronal Caries/sealants & Treatment needs: children 5, 12, 15, and adults 35-44

Prosthetic status: adults 35-44

Prosthetic needs: adults 35-44

Urgency of treatment: all

Once you have collected all the information, the recorder will transfer the value you have assigned in the variable "urgency of treatment" (the last one in the examination process) to a form containing the name of the person examined. This form will be return to the teacher for distribution or will be handed to the child or adult.

Each examination will take less than five minutes and will require from you a systematic visual/tactile observation and diagnosis of the teeth/surfaces selected. Once you have reached a diagnosis for each tooth/surface you will provide that information to the

recorder. Ideally, you do not need to identify the tooth you are providing the code because the examination is carried out sequentially and all boxes in the form or data entry program should be filled out accordingly. However, for matters of consistency we will identify each tooth following the FDI codes:

Upper right quadrant**Upper left quadrant**

17	16	15 55	14 54	13 53	12 52	11 51	21 61	22 62	23 63	24 64	25 65	2 6	2 7
47	46	45 85	44 84	43 83	42 82	41 81	31 71	32 72	33 73	34 74	35 75	3 6	3 7

**Lower right quadrant
quadrant****Lower****left**

For assessing dental fluorosis you will start always on tooth 13 (upper right cuspid), follow towards the midline, and continue to tooth 23 (upper left cuspid). A total of six codes will be provided to the recorder

For assessing dental caries/sealants and treatment needs you will start with tooth 17 (upper right 2d permanent molar) and continue toward the midline and then end the maxillary jaw with tooth 27 (upper left 2d permanent molar). Then you will continue with tooth 37 (lower left 2d permanent molar) and followed the inverse direction toward tooth 47.

You will provide first the code for each surface caries status, meaning five numbers for molars and premolars and four numbers for incisors and cuspids (no occlusal surface). In providing the surface code for each tooth you always will follow the same order, which is:

MESIAL, OCCLUSAL, DISTAL, BUCCAL, LINGUAL.

Once you have finished with the surface data you will provide ONE additional call that will correspond to the treatment need for that entire tooth.

For assessing prosthetic status and needs you will assess the entire mouth following the same pattern as in the assessment of caries and provide two codes, one for status and one for needs. These codes are applicable to the entire person.

Finally, based on your previous observations, you will provide a code to indicate to the child's parents or to the adult been examined about the urgency of need for treatment.

Important Notes:

1. *In this survey we will use the FDI codes that correspond to the permanent teeth. The same spaces (boxes) will be used for the primary dentition. Differentiation between a primary and a permanent tooth will be done based on the code used (mostly numbers for permanent teeth, and mostly letters for primary teeth).*
2. *Third molars are exclude from examination.*
3. *It is important that examination and recording follow the same path in all subjects. Do not skip teeth or surfaces.*

4. *When providing the codes the recorder should know that the examiner will provide “6” codes for the molars and “5” for anterior teeth (including treatment). Since this is done sequentially, it will be a good idea if the examiner says a key word after he/she have reached the final code for tooth 11, 27, and 31 (e.g., “check” or “midline”) so the recorder will check for his/her synchronization. If there is no congruency in the sequence, the examiner should restart in the first tooth of the quadrant.*
5. *The examiner will provide a total of 169 calls for each individual, regardless of his/her age. These correspond to the 169 available cells in the clinical section of the data entry form.*
6. *All spaces in the data entry form should be filled before the person leaves the examination area. There are special codes for each variable when the person, because of his/her age, does not qualify for a specific examination.*

Coding for Dental Fluorosis

(Tooth-based coding for upper anterior teeth cuspid to cuspid)

Code	Criteria
0	No Fluorosis: The enamel surface is smooth, glossy and usually a pale creamy-white color.
5	Questionable: The enamel shows slight aberrations from the translucency of normal enamel, which may range from a few white flecks to occasional spots localized most of the time, but not always, on the incisal third of the surface.
1	Very Mild: Opaque, paper-white areas or pencil-mark-thick lines scattered irregularly over the tooth but involving less than 25% of the surface. Many times the hypocalcifications follow the perikimata lines.
2	Mild: The white opacities of the enamel extend to more than 25% but less than 50% of the surface.
3	Moderate: The amount of enamel affected extends to more than 50% of the surface. Sometimes the hypocalcified enamel captures particles and chromogenic bacteria from the environment and saliva changing the color from white to brown.
4	Severe: This code is applicable to any of the previous classifications AND the presence of distinctive unique or confluent pits. Pits correspond to enamel that is lost after eruption. Single pits are diagnosed with an explorer and should have delimited walls in most of its circumference. The bottom of the pit can have normal enamel or fluorotic enamel with or without brown coloration. Brown coloration is not sufficient criteria to code severe.
8	Not recorded: This code is applicable to any partially erupted tooth or any tooth cover with a crown or orthodontic band/bracket.
9	Excluded. Applicable to any primary tooth.

Special diagnostic and clinical situations during examination for dental fluorosis:

1. Only fully erupted teeth are scored, using a good source of artificial light. The teeth should NOT be dried before scoring.
2. A tooth is not evaluated for fluorosis if one-third or more of the visible enamel area is replaced with a restoration or is destroyed by caries or covered with an orthodontic band.
3. Staining per se in otherwise intact enamel is not a diagnostic criterion specific to any of the classifications.
4. Fluorosed teeth do not erupt with pits. Instead, pitting occurs post-eruptively when the tooth is subject to masticatory forces. A pit is defined as a discrete, focal loss of outermost enamel. The defect is partly or wholly surrounded by a wall of enamel. Initially, the enamel wall is usually intact. With wear, however, the enamel wall can be abraded away, so that often only part of the enamel can be detected. In contrast to intact enamel on which the explorer tip can be moved easily across the smooth surface, pitted areas demonstrate a definite physical defect in which the base of the defective area may be either carious or sound. If it is sound, the base of the pit is rough and offers resistance to the lateral movement of the explorer tip, and a scratchy sound is detected when the explorer is moved across it. If the base is carious, it demonstrates softness upon being probed with moderate pressure. The pitted area is usually stained or demonstrates a different color compared with the surrounding enamel.

Coding for Dental Caries (Surface-based coding)

Code for Primary Teeth	Code for Permanent Teeth	Diagnostic Criteria
A	φ	Sound. A sound surface is a surface without any signs of cavitation due to decay, <i>sequelae</i> (restorations), or a sealant. If the surface has lost part of its structure due to fracture/trauma it is considered sound. Pit and fissures represent a special situation. Any surface with less than 25% of its entire pit and fissures with coloration will be considered sound, otherwise will be considered as a non-cavitated lesion (see codes N & U)
N	U	Non cavitated lesion. This code is reserved only for surfaces with pit and fissures with more than 25% of the pit showing coloration (brown to black) without clinical signs of decay, i.e., decalcification or undermining of surrounding enamel OR demineralized dentin at the bottom of the fossae/fissure.
B	1	Decayed. Three types of lesions can be coded as decayed: 1) <u>Pit and fissure caries lesions</u>: this is defined as the presence of a cavitation OR decalcification or undermining of the surrounding enamel (change of color to dark) or soft dentine at the bottom of the pit or fissure. The explorer should be used ONLY to confirm the presence of soft dentine and ONLY when the naked eye cannot reach a diagnosis. 2) <u>free-surface caries lesions</u>: lesion on any other surface that does not have pit or fissures. (These surfaces include the entire mesial and distal surfaces and the buccal surfaces of anterior teeth the lingual surfaces of upper anterior teeth and sometimes the lower anterior teeth have pits). In the buccal surfaces (non-proximal) the diagnosis is reached when there is clear evidence of cavitation. In the anterior proximal surfaces the diagnosis can be reached using the mirror to trans-illuminate the proximal area. In the posterior proximal surfaces the examiner need to detect the presence of the cavity with the explorer (changes in colour in the marginal reach are not enough to diagnose proximal decay). 3) <u>Secondary caries next to a previous restoration</u>. Diagnosis is reached if you can detect with the explorer the presence of soft dentine. A gap between the

		restoration and the tooth is not enough criteria to diagnose caries. Any temporary restoration is considered as decayed.
C	2	Filled. A filled surface includes any surface restored partially or completely with a restorative material as a <i>direct consequence of decay</i> . Restorative materials include silver amalgam, crowns (stainless steel or cast), inlays, composite resins, silicates, glass ionomers.
D	3	Missing due to caries. This code applies to all surfaces from any tooth that has been extracted as a direct consequence of caries. In the primary teeth the code D will be applied to ALL empty spaces in the primary molar area up to age 8 (8 and 11 months). If the child is 9 or older these spaces are coded as unerupted permanent (code 9). Any empty space in the primary anterior area at any age will be coded also as unerupted permanent (code 9). In older cohorts it will be difficult to assess if the tooth has been extracted due to caries, due to periodontal diseases, or because the dental professional decided to extract the tooth for prosthetic reasons. In all these cases the code assigned should be "3".
E	4	Missing for other reasons. This code applies to any surface from any tooth that has been lost due to reasons not related to caries, i.e., trauma or orthodontic reasons.
F	6	Sealant Present: total or partial sealant present ONLY in occlusal surfaces of permanent or primary teeth. Included here are sealants on parts of the occlusal surface that have been slightly enlarged using a round bur to eliminate suspicious carious tissue. Sealants on fissures from buccal or lingual surfaces of molars or incisors are NOT included. A restoration with a composite resin that required a full preparation is NOT considered a sealant.
H	7	Bridge abutment. We have restricted this code to be applicable only to any tooth prepared as an abutment in both anterior and posterior teeth.
	8	Implant. We have restricted this code to be applicable only to the presence of crowns associated with an implant.

	9	Unerupted tooth. Applicable only to spaces in the arch with absence of primary teeth due to normal shedding AND before any clinical signs of the erupted permanent can be distinguished.
K	T	Trauma. This code is applied to untreated fractures, change in color in the entire crown, restoration involving the incisal edge, and anterior crowns due to trauma.
L	X	Excluded. This code is applicable to all surfaces in very specific situations, including anterior crowns due to cometic reasons. Included teeth that cannot be assessed completely because they are partially cover with orthodontic bands or brackets.

Special Clinical Situations:

Incisal edges of anterior teeth are not considered separate surfaces. If a lesion or restoration is confined solely to the incisal edge its score should be assigned to the nearest adjacent surface.

When a filling or a lesion on a posterior tooth, or a caries lesion on an anterior tooth extends beyond the line angle onto another surface, then the other surface is also scored as affected. However, a proximal filling on an anterior tooth is not considered to involve the adjacent labial or lingual surface unless it extends at least one-third into these surfaces. The reason for this criterion is that tooth structure on adjacent surfaces must often be removed to provide access for the restoration of a proximal lesion on anterior teeth.

1. In this survey there is no independent code for crowns in either dentition. Therefore, if a posterior tooth has a full crown restoration placed because of caries you should provide code for three surfaces filled due to caries [code 2]. These surfaces are mesial, occlusal, and distal. If an anterior tooth as a full crown restoration placed because of caries you should provide codes for two surfaces filled: mesial and distal. By convention, all crowns on posterior teeth, excluding abutment teeth for fixed or removable prostheses, are considered to have been placed as a result of caries. On anterior teeth, however, the examiner should make the determination of the reason for crown placement. If the crown was placed for any reason other than caries, such as fracture, malformation, or esthetics, the tooth is coded [X] excluded. If a tooth has been restored with less than full coverage, all surfaces not involved should be scored in the usual manner.
2. Teeth that are banded or bracketed for orthodontic treatment are examined in the usual manner and all visible surfaces are scored.
3. Some teeth, typically the first bicuspid, are extracted due to orthodontic reasons. You should label these as "missing due to other reasons" [Code 4]. The best hint to identify these patients is to check the status of the contralateral bicuspid and look for evidence of orthodontic treatment. You should be aware that other teeth might also be extracted for

orthodontic reasons. In most cases, former or current orthodontic patients recall having extractions if so.

4. Non-vital teeth are scored in the same manner as vital teeth. Therefore, restorations on the lingual surfaces of anterior teeth used as entry for root canal therapy should not be recorded as restorations. This surface should be coded sound.
5. Hypoplastic teeth are scored in the usual manner. However, if a restoration on such a tooth was placed solely for esthetic reasons, that restoration will not be scored. If a hypoplastic tooth is restored with a full crown, the tooth is coded "excluded" [X].
6. Malformed teeth are scored in the usual manner except when they have been restored with a full crown for esthetic reasons, in which they are coded "excluded" [X].
7. When the tooth crown is destroyed by caries and only the roots remain, score all surfaces as carious.
8. There is a hierarchy in the coding when more than one code is possible. Sound surfaces/teeth are at the bottom. Sealed surfaces/teeth have precedence over sound surfaces/teeth. Restored surfaces/teeth have precedence over sealed surfaces/teeth. And, finally, untreated caries surfaces/teeth have precedence over restorations (See figure 1).
9. In general, when the same tooth surface is both carious and filled (e.g., upper permanent molar with mesial pit filled and distal pit with caries), caries is coded. When examining a filling for recurrent caries, a defective filling is not considered carious in the absence of definitive visual and tactile criteria for caries.
10. Fractured or missing restorations are scored as if the restorations were intact unless there is caries. If caries is found within or adjacent to the margins of a fractured or missing restorations, caries should be scored only in the surfaces involved.
11. In the case of supernumerary teeth, only one tooth is called for the tooth space. The examiner must decide which tooth is the "main" occupant of the space.
12. If both a primary and a permanent tooth occupy the same tooth space, only the permanent tooth is scored.
13. Third molars are not scored. When examining second molars it is important to note that a drifted molar may occupy the space of a missing second molar. In such cases, the diagnosis and call must relate to the status of the missing second molar, not the third molar. If the second molar, for example, was extracted due to caries and the space is now occupied by a sound third molar, the second molar is scored as "missing due to caries" [3] and the third molar is not scored.
14. A tooth is considered erupted if any of its clinical crown projects through the gum.
15. Stain and pigmentation alone should not be regarded as evidence of decay since either can occur on sound teeth.

16. A surface is coded as "sealed" if ANY part of the surface remains covered with the sealant. In most clinical situations, the sealant covers the pit and fissure of the surface. Remember that sealant products varied widely in color and you may need the tactile confirmation of the sealant present
17. If you are sure that a composite material has been used as restoration (i.e., it required a preparation using a rotary instrument) in all or part of the fissure then you should score the surface as filled. In case of doubt and there is composite material present code the surface/tooth as sealed.

A very important note in the coding of caries prevalence ONLY when paper forms are used:

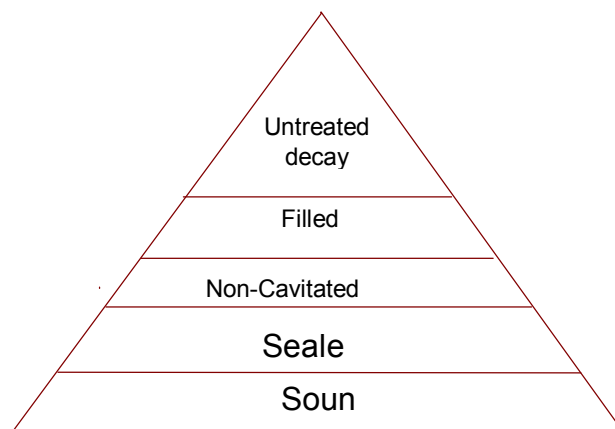
In this survey will be collecting surface data for caries. However, certain codes are applicable to all surfaces. In such cases, the examiner can save time if the code is followed by the word "ALL". The recorder will know that the preceding code is applicable to all surfaces and will write the code for the mesial surface and a horizontal line across the reminding surfaces. Then, The following number will correspond to the code for treatment need to that tooth. The codes for which this shortcut applies are:

Sound [A, 1], missing (both due to caries and for other reason) [D,E,3 and 4], bridge abutment [7], implant [8], unerupted tooth [9], and excluded [X].

For example for a sound permanent molar which may benefit from sealants, the examiner will say:

1-ALL-F where 1 is the diagnostic code for sound, ALL indicates that the code is applicable to all surfaces, and F indicates that a pit and fissure sealant is indicated for the occlusal surface

Figure
Hierarchy in the Coding for Dental Caries



BE CONSERVATIVE: For all diagnostic calls you should remember that, in case of doubt, you should always call the immediate less severe category. For example if you are not sure of the presence of caries and there are signs of non-cavitated lesion, the latter should be coded. If you are not sure that the pit and fissure qualifies as a non-cavitated lesion then it should be coded as sound. If you have doubt between Very Mild and Mild fluorosis, code as very mild.

**Coding for Need for
Treatment (tooth-based coding)**

Code	Criteria
0	No need for treatment: The crown is sound or have a restoration in good stand (no secondary caries).
F	Fissure Sealant: A permanent molar will be eligible for sealant if the following three conditions are present: (1) tooth is within 3 years of eruption; (2) there is a obvious “catch” during examination; and (3) there is at least one additional restoration in any other pit and fissure in the mouth. A primary molar will be eligible for sealants if conditions (2) and (3) are present.
1	The tooth needs one surface restoration
2	The tooth needs a two or three surface restorations OR multiple restorations in combinations of one, two or three surfaces.
3	The tooth needs a crown for any reason.
4	Veneer or laminate for aesthetic reasons (anterior teeth)
5	Pulpal care and post-treatment. The tooth probably needs pulpal care and later a restoration with a filling or a crown. Pulpal care could be need as a consequence of caries or trauma. Pulpal care include treatments in both primary (e.g., pulpotomy, pulpectomy) and permanent teeth.
6	Extraction. A tooth is <i>indicated for extraction</i> if caries has destroyed most of the crown or periodontal disease has progressed so a tooth is highly movable and nonfunctional. We do not include here teeth that need to be extracted due to prosthetic or orthodontic reasons.
7	Reserved code
8	Reserved code
9	Not recorded (excluded). This code should be marked if a code “9” (unerupted tooth) is assigned to the tooth in the diagnosis of caries.

Special Note on Treatment Needed:

A tooth will need a sealant or restoration of any kind (fillings, crowns, etc) for the treatment of primary and secondary caries, restorations lost (i.e., fractured restorations), the treatment of anomalies in shape and color of the tooth (e.g., when severe fluorosis is present), trauma, and to replace unsatisfactory fillings or sealants. However, the examiner needs to be realistic and avoid ideal treatment plans. The need for prosthesis will be evaluated separately and ONLY in the cohort of adults (35-44 years). The examiner should use their own criteria and clinical standards to assess the level and complexity of the treatment. However, in general terms, treatment for esthetic reasons should be avoided (the exception will be severe tooth malformation), as well as implants and crowns/veneers over teeth with change in color due to trauma. You will notice that orthodontic treatment is not indicated as well including space maintainer of any removable/fixed appliance.

Coding for Prosthetic Status
(Person-based coding for the 35-44 cohort)

Code	Criteria
0	No prosthesis present
1	One fixed bridge
2	More than one fixed bridge
3	Removable partial denture
4	Both bridge(s) and partial denture(s)
5	Full removable denture
9	Excluded (children)

Coding for Prosthetic Need
(Person-based coding for the 35-44 cohort)

Code	Criteria
0	No prosthesis needed
1	Need prosthesis for one tooth replacement
2	Need for multi-unit prosthesis (fixed or removable)
3	Need for full denture
9	Excluded (children)

Coding for Urgency of Treatment

Code	Criteria
0	No need for current treatment
1	Prophylaxis: Need for tooth cleaning and scaling.
2	Low urgency: Need for restorations and crowns. Include here any person in need of crowns or prosthesis.
3	High urgency: requires urgent care due to pain or infection. Include here any person in need of pulpal treatment or extraction.

Bahamas Oral Health Survey of School Children

Duplicate	Update	Date	Examiner		Recorder	
Strata		School	Grade		ID	
Gender	Race	Date birth			Age	
Fluorosis:	13:	12:	11:	21:	22:	23:

[illegible]

Prosthetic status	Prosthetic need	Tx urgency
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Appendix D

Methods for Data Analysis

The data were recorded in data entry forms (see Appendix C). A computer data entry program was written in the Epi Info software to transfer these data into computer files, one for each island, with the exception of New Providence and Grand Bahama which had three and two data files, respectively. All files were examined for consistency and missing data in Epi Info. Later, all files were transformed into SAS-readable files, which were used to compute the different indexes for dental caries, enamel fluorosis and treatment needs. Data for Andros, Eleuthera, Abaco, Cat Island, Exuma, Long Island, Inagua-San Salvador, and Bimini were analyzed in SAS assuming equal probability of selection for each student examined (half-census and census schemes). Due to the probability nature of the data from New Providence and Grand Bahama, weights were calculated for each child in both islands.

In order to estimate national means and proportions, data from each island were weighted against the relative weight in the population of reference. Table A-1 display the age-specific weights for each island estimated from the population distribution. Similar weights were constructed to estimate the age- and sex-specific estimators. Because these overall figures are weighted averages across all islands, and different sampling schemes were used, no standard errors were reported for the aggregated data. However, in the tables we report the island-specific standard deviations as reported by SAS.

Glossary of Terms

Dental caries prevalence. Caries Experience. History of dental caries. Defined as the proportion of the population with one or more decayed, missing and filled teeth ($dmft > 0$ or $DMFT > 0$). Dental caries prevalence could be estimated from either the tooth-based ($DMFT > 0$) or the surface-based ($DMFS > 0$) indicators.

Prevalence of untreated decayed teeth/surfaces. Defined as the proportion of the population with one or more decayed teeth ($dt > 0$ or $DT > 0$) or decayed surfaces ($ds > 0$ or $DS > 0$).

Severity of dental caries. Defined as the total number of decayed, missing and filled teeth/surfaces in each person. At the population level the indicator is expressed as the mean number of decayed, missing and filled teeth/surfaces. In the primary dentition this indicator is written as mean **dmft** or mean **dmfs**. In the permanent dentition it is written as mean **DMFT** or mean **DMFS**. Each element of the DMF index could be reported independently as a mean value, e.g., mean DS or mean FS.

Percent contribution of each component of the DMF index Among individuals with caries experience. This indicator selects those with history of dental caries (either $dmft > 0$ or $DMFT > 0$) and assesses the contribution of each element of the index. The sum of these percentages should add to 100%.

Percent contribution of each surface on the DMF index Among those with caries experience. This indicator is applicable only to surface-based indices. The indicator selects those with history of dental caries (either $dmfs > 0$ or $DMFS > 0$) and assesses the contribution of each surface-type, i.e., occlusal, buccal-lingual, and mesial-distal, to the overall index. The sum of these three percentages should add to 100%.