A SOCIOECONOMIC CORRELATION OF ORAL DISEASE
IN SIX TO THIRTY-SIX MONTH OLD CHILDREN

by

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Submitted to the Faculty of the Graduate School in partial fulfillment of the requirements for the degree of Master of Science in Dentistry, Indiana University School of Dentistry, 1980.
ACKNOWLEDGMENTS
This study is dedicated to the eradication of dental disease in the mouths of young children and the encouragement of future dental research in this age group.

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Review of the Literature</td>
<td>2</td>
</tr>
<tr>
<td>Methods and Materials</td>
<td>8</td>
</tr>
<tr>
<td>Results</td>
<td>14</td>
</tr>
<tr>
<td>Figures and Tables</td>
<td>18</td>
</tr>
<tr>
<td>Discussion</td>
<td>36</td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td>40</td>
</tr>
<tr>
<td>Appendices</td>
<td>42</td>
</tr>
<tr>
<td>References</td>
<td>52</td>
</tr>
<tr>
<td>Curriculum Vitae</td>
<td></td>
</tr>
<tr>
<td>Abstract</td>
<td></td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS
## LIST OF ILLUSTRATIONS

| FIGURE 1 | Consent letter | 18 |
| FIGURE 2 | Information questionnaire | 19 |
| FIGURE 3 | Oral health pamphlet | 20 |
| FIGURE 4 | Caries record sheet | 21 |
| FIGURE 5 | Gingival record sheet | 22 |
| FIGURE 6 | Method of scoring papillary marginal gingival index | 23 |
| TABLE I | 1970 Census - Marion County | 24 |
| TABLE II | Hollingshead rankings - Marion County | 25 |
| TABLE III | Hollingshead rankings - Marion County and sample population | 26 |
| TABLE IV | Frequency summary and caries prevalence of children by age groups and sex | 27 |
| TABLE V | Mean deft and defs values by race | 28 |
| TABLE VI | Comparison of oral disease of children six to thirty-six months by socioeconomic groups | 29 |
| TABLE VII | Mean deft and defs by socioeconomic groups - Covariance adjusted data | 30 |
| TABLE VIII | Gingival condition of children by sex and age groups | 31 |
| TABLE IX | Caries prevalence of Caucasian children with or without gingivitis by age | 32 |
| TABLE X | Gingival condition of children breast-fed and bottle-fed | 33 |
| TABLE XI | Mean deft, defs and gingivitis by methods of feeding - Observed data | 34 |
| TABLE XII | Mean deft, defs and gingivitis by methods of feeding - Covariance adjusted data | 35 |
INTRODUCTION
Of the many reports in the literature which indicate a high prevalence and incidence of gingivitis and dental caries in children, few have dealt with the age group between six months and thirty-six months, in a fluoridated area. Only one study has been reported relative to gingivitis\textsuperscript{1} and another to the prevalence of caries.\textsuperscript{2} Therefore, there is an obvious lack of data\textsuperscript{3} for these children relative to:

1. The frequency distribution, by age, sex, race and socioeconomic status of dental caries and gingivitis prevalence.

2. A comparison of the prevalence of dental caries and gingivitis in children who were breast-fed and those who were not.

Therefore, the purpose of this investigation was to determine the prevalence of dental caries and the gingival health status in six to thirty-six month old children who have been born and reared in a community with an optimum fluoridated water supply. It was then determined whether a relationship existed between these data and the socioeconomic level of the family.
REVIEW OF THE LITERATURE
Gingivitis

Gingivitis is a biphasic phenomenon that is progressive, chronic and marginal in the adult. It is acute, transient, and papillary in the child. Clinic studies by Zappler, Bruckner, Massler, James, and Carter confirm that the most frequently observed periodontal disease entity in children is gingivitis.

Massler, Schour and Chopra reported that 64.5 percent of five to eight-year-old children examined had one or more affected papillae and almost all of 17,079 children six to sixteen years old had some degree of gingival involvement. Cohen and Green found gingivitis in 130 of 145 four to five-year-olds whom they examined. Parfitt, in a study of gingivitis in children aged two to seventeen years in England, stated that the prevalence of gingivitis increased from age three and peaks at eleven years.

The prevalence of periodontal disease in the deciduous dentition was studied by Jameson in 229 children ranging from five to fourteen years of age. He stated that almost three-fourths of the children with deciduous teeth have gingivitis which is distributed independently of the sex and educational status of the mother.

Moore reported that in 1,123 children, ages seven to thirteen years, gingivitis was present in 93 percent of the total and concluded that fluoridated water was non-contributory to the prevalence of this disease.
Tank and Storvick\textsuperscript{1} found the prevalence and incidence of gingivitis, in children aged one through six, to be less in the 1 ppm fluoridated community of Corvallis, Oregon, than in the non-fluoridated community of Albany. The PMA index was applied and the non-fluoridated community had a significantly higher incidence of gingivitis, except at the age of one. There was also a positive relationship between the prevalence of gingivitis and dental caries.

In 1970 Mieler and Reinmann\textsuperscript{16} found a 73 percent prevalence of "periodontal disease" in children 3 to 18 years of age, with the acute forms in the younger groups. According to Dilley,\textsuperscript{17} unpublished data from the Dental Health Task Force Project, 1970-1972, show that nearly all of the 11,228 children in the survey, ages 6 to 18 years and residing in Indiana, had some degree of gingivitis. Houwink and DeJager\textsuperscript{18} stated in 1971 that fluoridated water in Holland may have actually improved the condition of the gingival tissue.

In summary, there is little mention of gingival status in 6 to 36 month old children, born and reared in a fluoridated water supply. However, in the deciduous dentition there are reports of 64.5 percent to 89.6 percent of children with gingivitis present.

Caries prevalence

Little information is available concerning the prevalence of dental caries a fluoridated community in children less than three years of age. Finn\textsuperscript{19} reported the findings of the classic Newburgh-Kingston studies, prior to the fluoridation of the Newburgh water supply. Results of the examination of 6,762 two-to-fourteen year olds were reported. Only 59 two-year-old children were used in each group to report .19 deft for
children in Newburgh and .46 deft for the children in Kingston. In the three-year-olds, the 70 Newburgh children had 1.54 deft and the 59 Kingston children had .56 deft. Eight and one-half percent of the Newburgh two-year-olds had caries, and 38.6 percent of the three-year-olds. Caries prevalence for the Kingston children represented 13.6 percent of the two-year-olds and 19.3 percent of the three-year-olds.

Fulton\textsuperscript{20} reviewed examination findings from 3,000 children one to seventy-one months old. The 313 six-month-old children showed 0 deft; the 258 in the twenty-four-month group had .2 deft; and the 277 thirty-six-month-old children had 1.1 deft.

Hewat and others,\textsuperscript{21} using three surveys, showed that two-year-old children had a caries prevalence of 30 to 51.5 percent and the three-year-olds from 67.6 to 88.7 percent.

Savara and Suher\textsuperscript{22} investigated the incidence of dental caries in children one to six years of age. Of the 18 one-year-olds, 22.5 percent had dental caries experience, with an average of .67 deft. Of the 65 two-year-olds, 23.1 percent were afflicted with dental caries, averaging .83 deft. A significant jump to 61.8 percent was seen for three-year-olds with dental caries, averaging 2.72 deft.

Wisan, Lafell, and Colwell\textsuperscript{23} surveyed 2,677 Philadelphia children between two and five years of age. They found 18.4 percent of 200 two-year-olds with caries and .6 deft. By three years of age 52.9 percent of the children had dental caries, with an average deft of 2.20. They\textsuperscript{23} noted that caries incidence was less in higher socioeconomic groups than in lower socioeconomic groups. Their results supported earlier work by Cohen in 1936.\textsuperscript{24}
Toth and Szabo\textsuperscript{25} investigated dental conditions of one to six-year-olds in Szeged, Hungary. They found caries in 5 percent of the 206 one-year-olds, 25 percent of the 200 two-year-olds, and 50 percent of the 461 three-year-olds. The deft values were .15, .78, and 1.99, respectively.

Halikis,\textsuperscript{26} studying western Australian children two to six years of age, found a higher prevalence of decay than in earlier studies: 63.2 percent of the 19 two-year-olds were affected and 98.2 percent of the 55 three-year-olds.

Protic's results\textsuperscript{27} showed 82 one-year-olds with 13.4 percent caries and .16 deft; 71 two-year-olds with 25.4 percent caries and .53 deft; and 100 three-year-olds with 54 percent caries and 2.20 deft.

According to Hara et al.,\textsuperscript{28} in a study of children receiving fluoride therapy in Japan, the two-year-old children had 26.7 percent caries prevalence and the three-year-olds had 36.7 percent.

In a prevalence study of dental caries in South African white children, aged one to five years, and living in a low fluoride environment (0.02 ppm), Cleaton-Jones et al.\textsuperscript{29} found caries in 37.5 percent of the 12 to 23-month-old children, 53.1 percent of the 24 to 35 month-olds, and 78.9 percent of the 36 month-olds and older.

In another study by Cleaton-Jones et al.\textsuperscript{30} concerning dental caries in urban and rural black preschool children, they reported caries in 16.7 percent of the one-year-old urban children and 12 percent of the rural one-year-olds, 21 percent of the urban, and 30 percent of the rural three-year-olds.

Tank and Storvick\textsuperscript{2} compared two Oregon communities for the effect of fluoridation of the water supply upon caries experience, eruption of
teeth, hypoplasia, malocclusion and gingivitis. For the nonfluoridated community of Albany, children with caries in the age group of one, two and three years made up 11 percent, 46 percent and 89 percent of their respective groups. In Corvallis, with 1 ppm fluoride added to the community water supply, 3 percent of the one-year-olds, 21 percent of the two-year-olds and 45 percent of the three-year-olds had dental caries.

Other studies\textsuperscript{31-34} show deft values and percent with caries at three years, but nothing at an earlier age. However, Hennon, Stookey and Muhler\textsuperscript{35} studied the prevalence and distribution of dental caries in preschool children. A total of 915 children between 18 and 39 months were examined, and 8.3 percent of the 48 children in the 18 to 23 month-old group had dental caries. Of the 159 children in the 36 to 39 month-old group, 57.2 percent had caries.

Winter et al.\textsuperscript{36,37} studied the prevalence of dental caries in British children between the ages of one and four. In the 36 to 47 month-old group, 36 percent were affected by dental caries. Poulsen and Møller,\textsuperscript{38} in a study of caries in three-year-old Danish children, found that 82.5 percent had caries in a fluoridated environment. Their deft and deft values were 3.3 and 4.9, respectively. However, this is not representative of data from the United States due to the diet of the Danish children and the controls of the study.

These studies all show some indication of caries prevalence in children three years old and younger. Many of these studies have used a limited sample and varying diagnostic criteria. However, only one study\textsuperscript{2} is known to exist which identifies dental caries prevalence in children within artificially fluoridated areas between the ages of 6 and 36 months.
Socioeconomic status

Hollingshead and Redlich\textsuperscript{39} first developed the Index of Social Position by examining a number of previously conducted studies of New Haven, Connecticut. The need existed for an objective, easily applicable procedure to estimate the socioeconomic status of individuals. The two sociologists independently examined each of 552 family schedules in detail and obtained agreement in 96 percent of the cases. They placed each into one of five classes. Their final criteria were the family's address, the occupation of its head, and the years of school completed. This became known as the Three Factor Index of Social Position.

However, the Two Factor Index has been used widely because of the difficulty in obtaining residential information from the family's address where adequate ecological maps do not exist.\textsuperscript{40} This index utilized the occupation of the head of household and the years of school completed. Factor-weights have been changed to compensate for the two factor variation.

The Three Factor and Two Factor Indices have been validated. In a study about social stratification and schizophrenia by Hollingshead and Redlich,\textsuperscript{41} the index was utilized to obtain reliable information. In a comparison study by Lawson and Boek\textsuperscript{42} of seven indices of socioeconomic status, the Two Factor Index measured second to the best measured one (Three Factor Index). It was concluded that "Hollingshead's seven point occupational classification provided a practical and sufficiently reliable measure of social class for most analysis."\textsuperscript{42} Also, in a study of child-rearing in families of working and non-working mothers by Yarrow et al.,\textsuperscript{43} the Hollingshead index was used and found quite adequate and reliable.
METHODS AND MATERIALS
Four hundred and forty-one Indianapolis area children were selected for the study. Some were seen at the private pediatric offices of Drs. Roth, Kahn, Young and Cheung. Others were seen at Riley Hospital Well Baby Clinic, Fountain Square Well Baby Clinic, Metro Health Center, Morgan Street Health Center, Fall Creek Health Center, People's Health Center and Indiana University School of Dentistry. A child's participation was dependent on a voluntary commitment by the accompanying parent. The subjects were examined at the time of their periodic health visits, or the parent was asked to bring them to the Dental School at a designated time. A socioeconomic, medical background questionnaire, and consent form were completed by the parent (Figures 1 and 2). Each patient's accompanying parent received a brief consultation and a pamphlet on the proper care of their child's oral health (Figure 3). When the findings of the examination indicated a need for dental care, the parents were so informed.

Subjects

The criteria for selection of the 441 subjects were as follows:

1. Six to thirty-six months of age.
3. Children born and reared in the fluoridated water supply area of Indianapolis, Indiana.

Examination

One dentist examined all of the subjects while an assistant did all the recording. For the examination, the child was either cradled on the
lap of the parent or examined on an examining table. A mouth mirror, explorer, and chip blower were utilized. If the child had posterior teeth with closed contacts, bitewing radiographs were made at Indiana University School of Dentistry. The data were recorded on diagnostic sheets which were developed and used at the Indiana University Oral Health Research Institute (Figures 4, 5 and 6).

**Examination of the teeth**

Starting on the right, each maxillary tooth was thoroughly examined. Then dropping to the lower left, each mandibular tooth was also examined. The criteria for diagnosis of dental caries were the ones used by Radike, which include changes in enamel translucency, retention of the explorer point and softness at the base of the questionable area. (When bitewing radiographs were examined, any definite radiolucency indicating a break in the continuity of the enamel surface was scored as carious.)

The teeth were scored on all five surfaces: 1 - occlusal or incisal, 2 - buccal or labial, 3 - distal, 4 - lingual and 5 - mesial. All erupted tooth surfaces were recorded as: S - sound, A - incipient caries, and B - frank caries. Unless sound or carious, each tooth was either recorded as: U - unerupted, X - missing, F - restored, and N - non-applicable, hypoplastic, hypocalcified, fractured.

**Gingival examination**

The Papillary - Marginal - Gingivitis - Index (PMGI) was employed for scoring gingivitis. This is a combination of the Gingival Index by Loe and Silness and the PMA Index by Massler and Schour.
First, the examiner noted which teeth were missing. All gingival tissues were then carefully examined, beginning at the upper right posterior facial tissue, proceeding around the arch to the left and then back to the right from the lingual. Next, the mandibular facial tissues were examined from right to left, then continuing on the lingual gingiva from left to right. Apart from the decision as to whether gingivitis was present, the relative severity of papillary and marginal inflammation was graded as follows:

0 - No inflammation, normal tissue.
1 - Mild inflammation, slight change in color (erythema) and little change in texture.
2 - Moderate inflammation, moderate glazing, redness, edema and hypertrophy. Bleeding on pressure with blunt instrument (e.g., side of explorer).
3 - Severe inflammation, marked redness and hypertrophy; tendency to bleed spontaneously, ulceration.

The gingival examination was limited to the tissue surrounding the number of deciduous teeth present. If 20 deciduous teeth were present, there were 44 gingival papillae (including 4 "midline") and 40 gingival margins to be examined. A total of 84 gingival units which were at risk were scored and divided into the four areas of the mouth as follows:

Upper Anterior - The distal papillae of the right cuspid to the distal papillae of the left cuspid.

Upper Posterior - The gingival margin of both first primary molars to the distal papillae of both second molars.
Lower Anterior - The distal papillae of the right cuspid to the distal papillae of the left cuspid.

Lower Posterior - The gingival margin of both first primary molars to the distal papillae of both second molars.

In this method, the severity of gingivitis as rated by the PMGI is the severity score for a subject. This is the sum of all inflammation scores divided by the number of papillary and marginal units examined per subject (Figures 5 and 6). Black subjects were not used for gingivitis recordings due to their inconsistent gingival colors.

Socioeconomic evaluation

A Two Factor Index of social position was developed by Hollingshead\textsuperscript{39} for an objective, easily applicable procedure to estimate positions that individuals occupy in the status structure of the community. The validity and reliability of these indices in dealing with more than 100 variables have been proven by Hollingshead\textsuperscript{39-41} and others.\textsuperscript{42,43} The Two Factor Index utilizes occupational and education scales as follows:

Rankings - Occupational Scale (Constant factor = 7, see Appendix IV).

1. Higher executives of large concerns, proprietors and major professionals.
2. Business managers, proprietors of medium-size businesses and lesser professionals.
3. Administrative personnel, owners of small businesses and minor professionals.
4. Clerical and sales workers, technicians and owners of little businesses.
5. Skilled manual employees (Plumber*).
7. Unskilled employees.
8. Unemployed (category added as a modification).

Rankings - Educational Scale (Constant factor = 4)
1. Professional (M.A., M.S., M.E., M.D., Ph.D., L.L.B., D.D.S., etc.)
2. Four year college graduation (A.B., B.S., B.M.)
3. 1 - 3 year college (Plumber*)
4. High school graduate
5. 10 - 11 years of school
6. 7 - 9 years of school
7. Under 7 years of school

The score that each family head received on each scale was multiplied by an approximate constant-factor for each scale. To illustrate: a plumber* who went to trade school two years receives a "5" on the occupational scale ranking and a "3" on the educational scale ranking. The "5" is multiplied by the constant occupational factor of 7, resulting in a partial score of 35. The "3" is multiplied by the constant educational factor of 4, resulting in a partial score of 12. These partial scores total 47, which falls into the Class III* range (34-51), representing an index of middle socioeconomic status. The range of total scores in each class on the Two Factor Index follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Range of Total Scores</th>
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<tr>
<td>High</td>
<td>I: 11 - 18</td>
</tr>
<tr>
<td></td>
<td>II: 19 - 33</td>
</tr>
<tr>
<td>*Middle</td>
<td>III: 34 - 51</td>
</tr>
<tr>
<td></td>
<td>IV: 52 - 66</td>
</tr>
<tr>
<td>Low</td>
<td>V: 67 - 84</td>
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Based on the Hollingshead index distribution of occupational and educational scales of the 1970 Census of Marion County (Table I), a prediction of the distribution for the inhabitants of Marion County was completed and compared to the examined study population to insure similar representativeness (Table II).
RESULTS
All parents' requests for an examination of their children were honored for humanitarian reasons. However, the results of only 441 were included due to the strict criteria of the survey. The more common reasons for exclusion were: subject on well water, subject living outside the fluoridated Indianapolis water supply area, subject on fluoridated water and a fluoride supplement, subject too young or too old, or subject severely compromised medically.

Table III presents a comparison of the socioeconomic status of the actual children examined in Marion County versus the estimate based on the 1970 Marion County Census. A Chi-square analysis indicates no significant difference between the sample distribution and the distribution of all Marion County families. Therefore, we can assume that the children reported in this study are representative of all children in Marion County in terms of socioeconomic factors.

In Table IV, column A shows a relatively equal distribution of children by age groups, although the 6 to 11 month-old group shows a slight under-representation. Columns B and C demonstrate a relatively equal frequency of males and females with caries. Columns D and E show that the number and percentage of children with caries increased with the age of the child. Caries were found in 68 of the 441 children (15.42 percent). Caries increased in geometric progression from 0 percent at 6 to 11 months to 36.4 percent at the 30 to 36 months age group. Columns F and G show an increase in deft and defs values with age. The deft
value increased from 0 in the 6 to 11 months age group to 1.101 in the 30 to 36 month age group, while the defs went from 0 to 1.444 in the same age groups. There were no significant differences in deft and defs values between Blacks and Caucasians (Table V).

Table VI lists the mean deft, def, and severity of gingivitis by socioeconomic groups. The results of a Newman-Keul's sequential ranking test on these data showed no significant group differences. However, there were individual differences (p = 0.06), with a trend toward the middle and middle low socioeconomic groups having higher caries values (deft = 0.63 and 0.69, def = 1.01 and 1.09) than the high, middle high, and low socioeconomic groups (deft = 0.23, 0.23 and 0.27, def = 0.26, 0.27 and 0.36). Age is an important factor in relation to caries prevalence. The mean ages of the different groups in this study varied; therefore, it was difficult to make comparisons between these groups. One statistical tool which can be employed to "adjust" the main variable, i.e. caries prevalence, for existing differences in a concomitant variable, i.e. age, is the Analysis of Covariance. The effect of this analysis is to offset the age differences and make a valid comparison of the caries prevalence possible. Using this analysis, Table VII also shows no significant statistical group differences at the .05 level. The main impact of this analysis was to change the low socioeconomic group's status from the low to the average caries prevalence range.

Gingival scores were divided into four areas by severity and frequency and compared by age groups, sex and methods of feeding (Tables VI to XI). Black subjects were not included in gingivitis scores due to their inconsistent gingival colors. Although the data are not presented, there
were no significant differences among age groups for gingival severity in either the overall or area scores. The overall frequency of the children with gingivitis was 28.1 percent. Area 4 (mandibular posterior) had the greatest frequency (17.4 percent), with the most common site being the lingual of the lower deciduous molars (Table VIII). Area 1 (maxillary anterior) had 14.4 percent, with the most common site being the lingual of the maxillary incisors. Area 2 (maxillary posterior) had an overall frequency of 8 percent, with the buccal of the deciduous first molars being the most common site. Area 3 (mandibular anterior) had a 7 percent frequency, with the most frequent site being the lingual of the deciduous incisors. When age groups are compared, area 1 (maxillary anterior) was the most common site for gingivitis in children 6 to 17 months of age with a 12.4 percent frequency. In the 18 to 23 month group there were no apparent differences among the various areas, but the total gingivitis had increased to 33.9 percent. At 24 to 36 months, 31.5 percent of the children had more gingivitis in area 4 (mandibular posterior) with a 38.5 percent overall frequency. The frequency of gingivitis in relation to sex indicated no significant differences among areas, except that in area 4 (mandibular posterior) females had the greater frequency of gingivitis (26.8 percent versus 11.1 percent).

Caucasian children with gingivitis had significantly higher deft and defs values than those without gingivitis (Table IX). Children in the 24 to 36 month old group with gingivitis had a deft value (1.66) more than 3 times greater than the group without gingivitis (0.525); the total group had 5 times the deft value (1.15) of the group without
gingivitis (0.23). The younger groups with gingivitis also had more teeth and surfaces involved but had too few decayed teeth to be significant.

Table X shows the frequency of gingivitis by areas in relation to method of feeding. There were no significant differences between children who were breast fed and those who were bottle fed. However, area 4 (mandibular posterior) was the most frequent site of gingivitis overall, with 17.4 percent frequency.

Tables XI and XII present the observed and adjusted mean deft, defs and gingivitis scores of children by methods of feeding. As the average age of these groups varied, Table XII adjusts the data to make a valid comparison of the caries prevalence. Using the Analysis of Covariance, no statistically significant differences existed in mean gingivitis severity in the bottle or breast fed groups. There were significantly higher deft and defs values in the bottle fed group than the breast fed group. Comparisons within the bottle fed children showed significantly lower deft and defs values in children bottle-fed up to 14 months (deft = 0.36, defs = 0.46) than in children who were being bottle fed longer than 15 months (deft = 0.87, defs = 1.51).
FIGURES AND TABLES
Figure 1. Consent letter.
Dear Parent:

During the past few years, an increase in the number of very young children with dental caries and other oral health problems has been noted. Therefore, we are asking you to allow your child to participate in a research program designed to provide information which will help dentists to better understand the dental health status of young children.

The procedures in this examination are easily accomplished, quite comfortable for your child, and at no charge to you. We will ask you to fill-out a brief questionnaire about your child in strictest confidence; then a thorough dental examination of the teeth and of the soft tissues of the child's mouth will be completed. If necessary, and the child is old enough, we will take one cavity-detecting x-ray of the back teeth on each side of the mouth. In addition, you will receive information on the proper dental home care of your youngster. Of course, we strongly urge you to continue or begin regular dental visits for your child.

During the course of these procedures, we may wish to take photographs of your child for educational or scientific publication purposes and would appreciate your consent to do so.

Your authorization for the child's participation in this project is entirely voluntary. Please feel free to ask any questions about our program and thank you for your assistance and participation in this research project!

Sincerely,

James A. Weddell, D.D.S.
Graduate Pedodontic Resident

I grant permission for my child to participate in the Dental Health Study of Children 3 - 36 Months of Age. I understand that my child's name will not be used in any analysis of the results or in the identification of any photographs in this project.

DATE ____________________________ Parent's Signature (Legal Guardian)

Witnessed by ____________________________
Figure 2. Information questionnaire.
## INFORMATION QUESTIONNAIRE

<table>
<thead>
<tr>
<th>Child's Name</th>
<th>Sex</th>
<th>Age</th>
<th>Date of Birth</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>months-days</td>
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<table>
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<tr>
<th>Child's Address</th>
<th>How long?</th>
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</table>

Describe in detail the occupation (job) of head of your household. 

Indicate Industry: 

Circle highest level of education of head of household: 1 2 3 4 5 6 7 8 9 10 11 12

Circle highest level of education of spouse: 1 2 3 4 5 6 7 8 9 10 11 12

How long have you bottle fed your child? _______ months

How long have you breast fed your child? _______ months

Is your child supervised by a baby sitter? _______ Hours per week

If yes, is the baby sitter one of the following? Circle: Family, Paid Baby Sitter, Child Care Center

Does your baby sitter have city or well water? 

In your home do you have city or well water? 

Has your child ever resided outside of Indianapolis? 

If yes, where? How long?

Do you routinely give your child vitamins? _______ What brand? _______

Do you routinely give your child a fluoride supplement? _______ Brand? _______

Has your child ever been hospitalized or had a serious illness? 

If yes, explain: 

Has your child had any history of the following? (If yes, please check)

- [ ] Heart trouble
- [ ] Asthma
- [ ] Anemia
- [ ] Hepatitis
- [ ] Allergies
- [ ] Epilepsy
- [ ] Nervousness
- [ ] Tuberculosis
- [ ] Kidney or Liver Disease
- [ ] Diabetes
- [ ] Rheumatic Fever
- [ ] Bleeding Disorders
Figure 3. Oral Health pamphlet.
HELP YOUR BABY TO A HAPPY SMILE

DENTAL HEALTH FOR YOUR BABY'S FIRST YEAR

Breast Feeding

While you are nursing, your diet will play a role in determining how good your baby's teeth will be. Since your baby will be getting his food through you, he will get a well-balanced diet only if you are on a balanced diet. A nursing mother should have the following each day:

* Four servings of milk or cheese
* Four servings of fruits and vegetables, including at least one dark green vegetable and one fruit high in Vitamin C
* Two servings of meat
* Four servings of bread and cereal products.

Bottle Feeding

After your baby's first teeth come in, avoid letting him sleep with a bottle in his mouth. Acid forms from the milk or juice in the bottle and causes cavities.

Pacifiers

Some pacifiers can affect the way your baby's teeth grow by causing a change in the shape of his mouth. A pacifier is not necessary for every child. However, if you feel he needs one, ask your dentist or physician about the correct style. Avoid putting sweets like honey on a pacifier, nipple or teething ring because they can cause cavities.

Fluoride Supplements

Fluoride helps to make teeth strong and to prevent cavities. It is important that your child receive fluoride from birth so that his or her teeth will receive optimum protection. The amount of fluoride in the water varies in each community and will also vary depending on what feeding method is used (breast or bottle). It is recommended that you check with your family physician or dentist so that he may advise you as to the need for supplementation.

Toothbrushing

The teeth can be wiped with a small piece of gauze or a washcloth. When your child is about one year of age and has adjusted to having someone clean his teeth, you can start using a small soft toothbrush. Toothpaste is not necessary and is not used when the parent cleans their child's teeth.

A child does not develop the hand movement necessary to handle the toothbrush and dental floss until he is nine or ten years old. As a result, he cannot be depended on to thoroughly clean his teeth.
It is the parents' responsibility to clean their child's teeth until the child is about nine years of age. Getting teeth cleaned should become a part of the daily routine early in life.

Birth to 6 Months

Use a proper bottle nipple. Beware of a free-flowing nipple. No sucrose containing additives in the formula. Use sucrose-free teething cookies, etc. Baby should not go to sleep with milk or food in the mouth (if possible). If bottle is needed, use water.

6 to 12 Months

Make sure baby does not habitually sleep on fist or other firm objects under face.

If traumatic injury, take child to the dentist.

Teeth should be cleaned by wiping with gauze or soft wash cloth wrapped around your finger.

Make sure the child is receiving the proper amount of fluoride in the water supply or by supplements.

The First Tooth

The front teeth will usually be the first ones to come in, between 6 months and 1 year. At this time, bacteria (germs) start to form on the teeth. Bacteria may combine with sugar to form acid which can cause cavities. Therefore, foods containing sugar should be limited and the teeth cleaned daily.

12 Months

FIRST VISIT TO THE DENTIST SHORTLY AFTER THE FIRST TOOTH ERUPTS.

Your dentist will examine the child's mouth, teach you proper tooth cleaning procedures for your baby, make certain that dental plaque is under control, and suggest a list of substitute snack foods for the common sucrose (sugar) containing foods.

Fluoride supplementation should be continued possibly with the dentist applying fluoride topically to the baby's teeth.

REGULAR DENTAL CARE SHOULD BEGIN BY THE AGE OF ONE YEAR.

Your dentist will determine how often your baby should be seen after the twelve-month examination.
Moderate quantities of food may be prepared ahead of time and frozen in ice cube trays -- you may easily remove one cube at a time to use as needed.

Cereals: Baby cereals and any home cooked cereals (oatmeal, farina, cream of rice, etc.) are especially nutritious and easy to prepare. Cereals may be thinned with milk and strained if necessary.

Fruits: Remove the skins, core, and cut into small pieces. Blend, grind or mash with 1 tablespoon of water. Many fruits may also be cooked into a sauce. Bananas may be mashed with small amounts of orange juice or lemon juice to prevent them from turning brown. Other fruits: pears, peaches, apples, apricots, plums, prunes, strawberries, melon.

Vegetables: Cook thoroughly in small amount of water. Many vegetables may be easily mashed after cooking. After mashing, remove any fibrous or stringy parts. Small amounts of milk or water may be added. Vegetable suggestions are: carrots, peas, beets, asparagus, broccoli, green and wax beans, squashes, white and sweet potatoes.

Soups: Thick creamed soups can be made with pureed vegetables and adding a medium white sauce (1 tablespoon flour, 3 tablespoons butter, 2 1/2 cups milk). Suggestions: carrots, broccoli, asparagus, spinach, beets, etc.

Meats should be well-cooked before being ground or pureed. Most any meats the family uses (including weiners) may be adapted for use for the young child. To make the meat mixture smoother, add milk, water, vegetables, fruits, or fruit juices.

Mixed food dishes: Macaroni or any noodles may be mashed or blenderized with any combination of vegetables and meats. Canned soups or cream sauce may be used as a binding agent.

Desserts: Homemade pudding made with whatever formula or milk the child drinks. Fruits or fruit juice mixed with plain gelatin. Applesauce or pureed fruit sauce mixed with plain gelatin. Custard.
Figure 4. Caries record sheet.
<table>
<thead>
<tr>
<th>Card</th>
<th>Exam.</th>
<th>Subj. No.</th>
<th>Study</th>
<th>Group</th>
<th>Examiner</th>
<th>Previous Product</th>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Date Exam.</td>
<td>Date X-ray</td>
<td>32</td>
<td>Age</td>
<td>Sex</td>
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<td>1st Bi.</td>
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<td>Lat.</td>
<td>Cent.</td>
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<td>2nd M.</td>
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<td>1st M.</td>
<td>2nd Bi.</td>
<td>1st Bi.</td>
<td>Cusp.</td>
<td>Lat.</td>
<td>Cent.</td>
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<th>7</th>
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<td>2nd Bi.</td>
<td>1st M.</td>
<td>2nd M.</td>
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<th>7</th>
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<tr>
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<td>2nd Bi.</td>
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<td>2nd M.</td>
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</table>

**PLEASE RECORD IN BLACK BALL POINT INK**
Figure 5. Gingival record sheet.
### Study Card

<table>
<thead>
<tr>
<th>Name</th>
<th>Study</th>
<th>Examiner</th>
<th>Product Code</th>
<th>Group</th>
<th>Exam</th>
<th>Subject No.</th>
<th>Age</th>
<th>Sex</th>
<th>Race</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

#### Exam Date

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>28.22</td>
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#### Upper Facial

<table>
<thead>
<tr>
<th>Card</th>
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</thead>
</table>

#### Upper Lingual

<table>
<thead>
<tr>
<th>Card</th>
<th>Right</th>
</tr>
</thead>
</table>

#### Lower Facial

<table>
<thead>
<tr>
<th>Card</th>
<th>Left</th>
</tr>
</thead>
</table>

#### Lower Lingual

<table>
<thead>
<tr>
<th>Card</th>
<th>Right</th>
</tr>
</thead>
</table>

---

**PLEASE RECORD IN BLACK BALL POINT INK**

**PMGL SEV.**

**EXAM DATE**

**EXAM.**

**SUBJECT NO.**

**AGE**

**SEX**

**RACE**

---

**REPEAT COLUMNS 3-30**

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**REPEAT COLUMNS 3-30**

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**REPEAT COLUMNS 3-30**

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**REPEAT COLUMNS 3-30**

---
Figure 6. Method of scoring Papillary Marginal Gingivitis Index (PMGI).
PAPILLARY MARGINAL GINGIVITIS INDEX (PMGI)

Severity Scale

0 - None
1 - Mild
2 - Moderate
3 - Severe
9 - Missing or Ungradable tooth

Each papilla and margin or each erupted deciduous tooth will be graded. To provide uniformity in this assessment, each papilla is considered the gingival structure distal to a tooth. An exception is the papilla between the central incisors. Since it is not distal to a tooth, it is labeled the "midline papilla."
**TABLE I**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Higher Executives and Major Professionals</td>
<td>74,554</td>
<td>15</td>
</tr>
<tr>
<td>2. Business Managers</td>
<td>50,062</td>
<td>10</td>
</tr>
<tr>
<td>3. Administrative Personnel and Minor Professionals</td>
<td>18,004</td>
<td>4</td>
</tr>
<tr>
<td>4. Clerical and Sales Workers</td>
<td>145,726</td>
<td>29</td>
</tr>
<tr>
<td>5. Skilled Manual Employees</td>
<td>46,920</td>
<td>9</td>
</tr>
<tr>
<td>6. Semi-Skilled Employees</td>
<td>71,942</td>
<td>14</td>
</tr>
<tr>
<td>7. Unskilled Employees</td>
<td>77,026</td>
<td>15</td>
</tr>
<tr>
<td>8. Unemployed</td>
<td>13,882</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Education/Years of School Completed</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Professional School</td>
<td>21,584</td>
<td>6</td>
</tr>
<tr>
<td>2. College Graduate</td>
<td>29,749</td>
<td>7</td>
</tr>
<tr>
<td>3. 1 - 3 College</td>
<td>46,788</td>
<td>10</td>
</tr>
<tr>
<td>4. High School Graduate</td>
<td>145,435</td>
<td>32</td>
</tr>
<tr>
<td>5. 10 - 11</td>
<td>91,951</td>
<td>20</td>
</tr>
<tr>
<td>6. 7 - 9</td>
<td>69,596</td>
<td>15</td>
</tr>
<tr>
<td>7. Under 7</td>
<td>44,777</td>
<td>10</td>
</tr>
</tbody>
</table>

*The number and percentage of the population of Marion County which can be identified in terms of the Occupational and Educational Scales of Hollingshead Two Factors of Social Position.*
TABLE II
HOLLINGSHEAD RANKINGS - MARION COUNTY
Percentages based on 1970 Census - Marion County*

<table>
<thead>
<tr>
<th>Class</th>
<th>Index Scores</th>
<th>Percentage of Population</th>
</tr>
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<tbody>
<tr>
<td>Low</td>
<td>Class V</td>
<td>84 - 67</td>
</tr>
<tr>
<td></td>
<td>Class IV</td>
<td>66 - 52</td>
</tr>
<tr>
<td>Middle</td>
<td>Class III</td>
<td>51 - 34</td>
</tr>
<tr>
<td></td>
<td>Class II</td>
<td>33 - 19</td>
</tr>
<tr>
<td>High</td>
<td>Class I</td>
<td>18 - 11</td>
</tr>
</tbody>
</table>

*An effort was made to select a sample population for this study which reflected similar percentages of the above Hollingshead rankings.
**TABLE III**

**HOLLINGSHEAD RANKINGS - MARION COUNTY AND SAMPLE POPULATION**

Percentages based on 1970 Census of Marion County and Sample Population

<table>
<thead>
<tr>
<th>Class</th>
<th>Census Percentage Population</th>
<th>Percentage of Sample</th>
<th>No. of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Class V</td>
<td>11.7</td>
<td>12.70</td>
</tr>
<tr>
<td></td>
<td>Class IV</td>
<td>34.2</td>
<td>26.98</td>
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<tr>
<td>Middle</td>
<td>Class III</td>
<td>28.5</td>
<td>23.13</td>
</tr>
<tr>
<td></td>
<td>Class II</td>
<td>15.0</td>
<td>19.0</td>
</tr>
<tr>
<td>High</td>
<td>Class I</td>
<td>10.6</td>
<td>18.14</td>
</tr>
</tbody>
</table>

*Chi-square analysis showed no significant difference at the 0.05 level of percentages between the 1970 Census of Marion County and the sample population.*
TABLE IV

FREQUENCY SUMMARY AND CARIES PREVALENCE OF CHILDREN BY AGE GROUPS AND SEX

<table>
<thead>
<tr>
<th>Age Range in Months</th>
<th>(A)</th>
<th>(B)</th>
<th>(C)</th>
<th>(D)</th>
<th>(E)</th>
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</thead>
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<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Percentage</td>
<td>Deft</td>
<td>Defs</td>
</tr>
<tr>
<td>6 - 11</td>
<td>64</td>
<td>22</td>
<td>42</td>
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<td>0</td>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>12 - 17</td>
<td>94</td>
<td>34</td>
<td>60</td>
<td>2</td>
<td>4</td>
<td>4.2</td>
<td>0.128</td>
</tr>
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<td>18 - 23</td>
<td>88</td>
<td>36</td>
<td>52</td>
<td>4</td>
<td>9</td>
<td>10.23</td>
<td>0.238</td>
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<td>24 - 29</td>
<td>96</td>
<td>45</td>
<td>51</td>
<td>8</td>
<td>19</td>
<td>19.79</td>
<td>0.604</td>
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<td>30 - 36</td>
<td>99</td>
<td>46</td>
<td>53</td>
<td>16</td>
<td>36</td>
<td>36.4</td>
<td>1.101</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>441</td>
<td>183</td>
<td>30</td>
<td>258</td>
<td>68</td>
<td>15.42</td>
<td>0.453</td>
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</tbody>
</table>
### TABLE V

**MEAN DEFT AND DEFS VALUES BY RACE**

<table>
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<tr>
<th></th>
<th>N*</th>
<th>Deft**</th>
<th>Defs**</th>
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</thead>
<tbody>
<tr>
<td>Blacks</td>
<td>113</td>
<td>0.46 ± 0.12</td>
<td>0.63 ± 0.21</td>
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<tr>
<td>Caucasian</td>
<td>328</td>
<td>0.45 ± 0.09</td>
<td>0.69 ± 0.15</td>
</tr>
<tr>
<td>Total</td>
<td>441</td>
<td>0.45 ± 0.07</td>
<td>0.67 ± 0.12</td>
</tr>
</tbody>
</table>

*N = Number

**Deft and defs are shown as mean and standard error of mean.**

The differences using a standard t-test were not statistically significant at the .05 level.
### Table VI

**Comparison of Oral Disease of Children* Six to Thirty-Six Months by Socioeconomic Groups**

<table>
<thead>
<tr>
<th>Group (Score)</th>
<th>Index</th>
<th>N</th>
<th>Average Age</th>
<th>Deft**</th>
<th>Defs**</th>
<th>Gingivitis**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - (11-18) High</td>
<td>80</td>
<td>21.79</td>
<td>0.23 ± 0.08</td>
<td>0.26 ± 0.10</td>
<td>0.02 ± 0.044</td>
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<tr>
<td>2 - (19-33) Middle High</td>
<td>84</td>
<td>22.27</td>
<td>0.23 ± 0.09</td>
<td>0.27 ± 0.13</td>
<td>0.05 ± 0.0183</td>
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</tr>
<tr>
<td>3 - (34-51) Middle</td>
<td>102</td>
<td>22.97</td>
<td>0.63 ± 0.18</td>
<td>1.01 ± 0.36</td>
<td>0.03 ± 0.0092</td>
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</tr>
<tr>
<td>4 - (52-66) Middle Low</td>
<td>119</td>
<td>20.94</td>
<td>0.69 ± 0.17</td>
<td>1.09 ± 0.32</td>
<td>0.04 ± 0.0086</td>
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</tr>
<tr>
<td>5 - (67-84) Low</td>
<td>56</td>
<td>18.20</td>
<td>0.27 ± 0.11</td>
<td>0.36 ± 0.15</td>
<td>0.05 ± 0.0203</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>441</td>
<td></td>
<td>0.45 ± 0.07</td>
<td>0.67 ± 0.12</td>
<td>0.04 ± 0.0054</td>
<td></td>
</tr>
</tbody>
</table>

*Blacks not included in gingivitis scores, number of missing observations = 113.

**Deft, defs, and gingivitis included as mean and standard error of mean.

The Newman Keul's multiple t-test showed no significant differences at the .05 level. The deft and defs values between the high and middle low groups showed a statistical difference at the .06 level.
TABLE VII

MEAN DEFT AND DEFS BY SOCIOECONOMIC GROUPS -
COVARIANCE ADJUSTED DATA

<table>
<thead>
<tr>
<th>Group (Score) Index</th>
<th>N</th>
<th>Deft*</th>
<th>Defs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - (11-18) High</td>
<td>80</td>
<td>0.21 ± 0.08</td>
<td>0.25 ± 0.10</td>
</tr>
<tr>
<td>2 - (19-33) Middle High</td>
<td>84</td>
<td>0.19 ± 0.09</td>
<td>0.24 ± 0.13</td>
</tr>
<tr>
<td>3 - (34-51) Middle</td>
<td>102</td>
<td>0.56 ± 0.18</td>
<td>0.94 ± 0.36</td>
</tr>
<tr>
<td>4 - (52-66) Middle Low</td>
<td>119</td>
<td>0.71 ± 0.16</td>
<td>1.12 ± 0.31</td>
</tr>
<tr>
<td>5 - (67-84) Low</td>
<td>56</td>
<td>0.40 ± 0.11</td>
<td>0.50 ± 0.15</td>
</tr>
</tbody>
</table>

*Deft and defs included as mean and standard error of mean.

Newman Keul's multiple t-test showed no significant statistical differences at the .05 level.
## TABLE VIII

GINGIVAL CONDITION OF CHILDREN* BY SEX AND AGE GROUPS

<table>
<thead>
<tr>
<th>Areas</th>
<th>% Gingivitis Male</th>
<th>% Gingivitis Female</th>
<th>% Gingivitis 6-17 months</th>
<th>% Gingivitis 18-23 months</th>
<th>% Gingivitis 24-36 months</th>
<th>% Gingivitis All Age Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary Anterior</td>
<td>13.33</td>
<td>15.96</td>
<td>12.4</td>
<td>21.4</td>
<td>13.1</td>
<td>14.4</td>
</tr>
<tr>
<td>Maxillary Posterior</td>
<td>8.33</td>
<td>7.56</td>
<td>0</td>
<td>10.7</td>
<td>13.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Mandibular Anterior</td>
<td>5.55</td>
<td>9.24</td>
<td>1.8</td>
<td>19.6</td>
<td>6.1</td>
<td>7.0</td>
</tr>
<tr>
<td>Mandibular Posterior</td>
<td>11.11**</td>
<td>26.84**</td>
<td>0.9</td>
<td>17.8</td>
<td>31.5</td>
<td>17.4</td>
</tr>
<tr>
<td>Total Areas</td>
<td>22.22</td>
<td>36.97</td>
<td>13.2</td>
<td>33.9</td>
<td>38.5</td>
<td>28.1</td>
</tr>
</tbody>
</table>

*Blacks not included, number of missing observations = 113.
Sign. = Significance

**Significant at the 0.05 level using a standard t-test.
### TABLE IX

**Caries Prevalence of Caucasian Children* with and without Gingivitis by Age**

<table>
<thead>
<tr>
<th></th>
<th>Total N</th>
<th>Def</th>
<th>Defs</th>
<th>24-36 Months N</th>
<th>Def</th>
<th>Defs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Gingivae</td>
<td>215</td>
<td>0.232</td>
<td>0.326</td>
<td>80</td>
<td>0.525</td>
<td>0.737</td>
</tr>
<tr>
<td>Gingivitis</td>
<td>84</td>
<td>1.154</td>
<td>1.833</td>
<td>50</td>
<td>1.667</td>
<td>2.141</td>
</tr>
</tbody>
</table>

Level of Significance using t-test: .001, .01, .05, .05

*Blacks not included, number of missing observations = 113.*
### TABLE X

**GINGIVAL CONDITION OF CHILDREN BREAST-FED AND BOTTLE-FED**

<table>
<thead>
<tr>
<th>Areas</th>
<th>Breast-Fed**</th>
<th>Bottle-Fed***</th>
<th>Total % Gingivitis</th>
<th>Sign.****</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior</td>
<td>9.2</td>
<td>15.8</td>
<td>14.4</td>
<td>.2552</td>
</tr>
<tr>
<td>Posterior</td>
<td>9.2</td>
<td>7.7</td>
<td>8.0</td>
<td>.8841</td>
</tr>
<tr>
<td>Mandibular</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior</td>
<td>6.1</td>
<td>7.3</td>
<td>7.0</td>
<td>.9741</td>
</tr>
<tr>
<td>Posterior</td>
<td>10.7</td>
<td>19.2</td>
<td>17.4</td>
<td>.1594</td>
</tr>
</tbody>
</table>

| Total Areas | 20.0         | 30.3          | 28.1               | .1375     |

*Blacks not included, number of missing observations = 113.

**Breast-fed children in study = 65.

***Bottle-fed children in study = 234.

****Level of significance as determined by a Chi-square test.
TABLE XI

OBSERVED DATA
MEAN DEFT, DEF5, AND GINGIVITIS BY METHODS OF FEEDING

<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Age (months)</th>
<th>Deft</th>
<th>Defs</th>
<th>Gingivitis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-fed</td>
<td>79</td>
<td>20.47 ± 0.97</td>
<td>[0.228 ± 0.077]</td>
<td>0.241 ± 0.077</td>
<td>0.024 ± 0.0082</td>
</tr>
<tr>
<td>Bottle-fed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-36 months</td>
<td>341</td>
<td>21.81 ± 0.84</td>
<td>-0.516 ± 0.079</td>
<td>0.806 ± 0.138</td>
<td>0.039 ± 0.013</td>
</tr>
<tr>
<td>6-14 months</td>
<td>245</td>
<td>20.63 ± 0.58</td>
<td>[0.355 ± 0.072]</td>
<td>0.46 ± 0.107</td>
<td>0.031 ± 0.0075</td>
</tr>
<tr>
<td>15-24 months</td>
<td>87</td>
<td>24.23 ± 0.76</td>
<td>[0.873 ± 0.224]</td>
<td>1.51 ± 0.444</td>
<td>0.060 ± 0.0130</td>
</tr>
<tr>
<td>25-36 months</td>
<td>9</td>
<td>30.75 ± 1.41</td>
<td>1.444 ± 0.988</td>
<td>3.33 ± 2.734</td>
<td>0.028 ± 0.0220</td>
</tr>
<tr>
<td>Total</td>
<td>422**</td>
<td>21.45 ± 0.07</td>
<td>0.462 ± 0.070</td>
<td>0.700 ± 0.130</td>
<td>0.035 ± 0.0054</td>
</tr>
</tbody>
</table>

*Blacks not included, number of missing observations = 113.
**Subjects not included due to use of both methods of feeding = 19.

Deft, def5, and gingivitis included as mean and standard error of mean.

Note: Means within brackets are significantly different at P = 0.05, using the Newman Keul multiple t-test.
<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Deft</th>
<th>Defs</th>
<th>Gingivitis*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast-fed**</td>
<td>79</td>
<td>[0.27 ± 0.08]</td>
<td>[0.27 ± 0.08]</td>
<td>0.02 ± 0.01</td>
</tr>
<tr>
<td>Bottle-fed** 6-36 months</td>
<td>341</td>
<td>[0.50 ± 0.08]</td>
<td>[0.79 ± 0.16]</td>
<td>0.04 ± 0.01</td>
</tr>
<tr>
<td>6-14 months</td>
<td>245</td>
<td>[0.39 ± 0.07]</td>
<td>[0.49 ± 0.11]</td>
<td>0.03 ± 0.01</td>
</tr>
<tr>
<td>15-24 months</td>
<td>87</td>
<td>[0.78 ± 0.24]</td>
<td>[1.43 ± 0.48]</td>
<td>0.06 ± 0.01</td>
</tr>
<tr>
<td>25-36 months</td>
<td>9</td>
<td>[1.10 ± 2.89]</td>
<td>[3.05 ± 8.09]</td>
<td>0.02 ± 0.07</td>
</tr>
</tbody>
</table>

*Blacks not included, number of missing observations = 113.

**Subjects not included to use of both methods of feeding = 19.

Deft, defs, and gingivitis included as mean and standard error of mean.

Note: Means within brackets are significantly different at \( P = 0.05 \), using the Newman Keul multiple \( t \)-test.
DISCUSSION
The findings of this study in one-year-old children show caries experience and deft scores comparable to those of previous caries prevalence studies from non-fluoridated communities (Appendix I). This survey's deft value of 0.13 is similar to those of Hennon et al., Toth et al., and Tank and Storvick. The defs value of 0.34 in this survey is higher than Hennon et al. and Tank and Storvick, probably due to the increased number of one-year-old children in the present study. This would indicate that we observed an increased number of carious surfaces per carious tooth as compared to previous surveys. The 4.8 percent of children with caries are in the lower overall range.

As shown in Appendix II, the most recent prevalence surveys of dental caries of two-year-old children in the United States are those by Hennon et al. in 1969 and Tank and Storvick in 1965. In the present study, which is included in Appendix II, caries prevalence values in a fluoridated area show a decrease from Hennon's values in a non-fluoridated area and an increase over those reported by Tank and Storvick.

Appendix III compares dental caries among three-year-olds. The low values in the present study reflect the fact that the sample size was non-representative due to the dissimilar number and age of subjects (31 children at 36 months only), while other surveys included hundreds of children from 36 to 48 months of age. As Hennon et al. indicated, most of the earlier values reported by other investigators are deft values only.
This study indicates that sex and race are not important factors in caries and it is apparent that caries experience increase with age. The small number (less than 10) of one, two and three year-old children who have actually visited dental offices is indicative of the limited interest in dental needs of these children. It was also noted that no children presented for examination with previously restored teeth, despite an observed caries range from 4.8 percent in one year olds to 31 percent in thirty-six month olds. This is in agreement with the findings of Savara and Suher\textsuperscript{22} in 1954, Wisan et al.\textsuperscript{23} in 1957, and Tank and Storvick\textsuperscript{2} in 1965.

Although no statistically significant group differences were apparent, individual groups showed a trend for the high and middle-high groups to have lower deft and defs values than the middle and middle-low socioeconomic groups ($p = 0.06$). These findings are similar to those of Wisan et al.\textsuperscript{23} and Winter et al.\textsuperscript{36} with one exception: Moderate caries values were found in the low socioeconomic group of this study.

These data could be influenced by such factors as age, fluoridated water supply,\textsuperscript{2} urban environment, dental I.Q. of the parent and child,\textsuperscript{37} diet, sample size, and variability of diagnosis due to different methods and examiners.\textsuperscript{36}

**Gingivitis**

The data indicated that there was no difference in mean gingival severity scores in relation to age groups, sex, methods of feeding, and socioeconomic groups. Even though eruption gingivitis was excluded, there seems to be a correlation with gingivitis present and the most recently erupted teeth. These findings could possibly be due to the
acute, transitory nature of gingivitis in young children and agrees with the findings of Poulsen. Table VIII illustrates that females had a higher frequency of gingivitis in the mandibular posterior area, which is not significant considering the dissimilar size and age of the groups.

Other investigators have demonstrated an increase in the prevalence and incidence of gingivitis with increasing age. This study shows an increase in the prevalence of gingivitis with increasing age and with varying age groups (Table VIII). The 12.4 percent prevalence of gingivitis in the 6 to 17 month-old group in the maxillary anterior area correlates with location of teeth present, lack of hygiene, and perhaps pooling of liquids in that area. The next two age groups (18 to 36 months) show a sharp rise in frequency to 38 percent, with a shift in the location frequency to the mandibular posterior and the maxillary anterior areas. This is slightly higher than Poulsen's value of approximately 25 percent.

In contrast to the study by Tank and Storvick, the present study of 6 to 36 month-old children demonstrates that marginal gingival units were affected, although the findings are in agreement in that the papillary gingival units were the most commonly affected.

Methods and duration of feeding

In comparing methods of feeding, significant differences existed between the bottle-fed and the breast-fed group. There was a trend in the breast-fed group to have lower defs and deft values which is in agreement with Tank and Storvick. However, since the breast group
was possibly unrepresentative due to sample size and overall low caries rates, an adequate comparison could not be made. This survey indicates a need for a more controlled study of breast and bottle-fed groups.

One study\textsuperscript{36} has been done which compared the duration of bottle feeding. The present study shows significant differences in defs and deft between children who were bottle-fed up to 14 months and those fed from 15 to 24 months. The defs increased more than three-fold, and the deft increased two and one-half times. There appeared to be a great difference in deft and defs in children bottle-fed from 25 to 36 months, but due to limited sample size no definite conclusions can be drawn.

This study also shows that children who were breast fed and bottle fed did not differ significantly in the frequency of gingivitis. Gingivitis in these groups was as common in the mandibular posterior as in the maxillary anterior area.
SUMMARY AND CONCLUSIONS
A study of 441 children between the ages of 6 and 36 months, born and reared in a fluoridated water supply, revealed the presence of dental caries in 0 percent of group 1 (6 to 11 months old), 4.2 percent of group 2 (12 to 17 months old), 10.23 percent of group 3 (18 to 23 months old), 19.79 percent of group 4 (24 to 29 months old), and 36.4 percent of group 5 (30 to 36 months old). Regarding caries data in children 6 months to 36 months of age in this study, the following conclusions can be made:

1. Caries prevalence is independent of sex, race, and socioeconomic status, although middle and middle-low socioeconomic groups have trends toward higher caries frequencies.

2. Caries prevalence increases with age, and the number of decayed surfaces is higher than the number of decayed teeth.

3. Caries prevalence may be affected by methods of feeding. Breast feeding had a lower overall caries rate but a more controlled study is indicated to resolve this question.

4. Caries prevalence is increased with prolonged bottle feeding.

5. Parents, dentists, and other health professionals involved with the care of young children need to be more aware of their dental needs and the necessity for much earlier treatment for the prevention of dental disease.

An examination of gingival condition of the 299 children in the study (Blacks not included) showed that 13.2 percent of groups 1 and 2 (6 to 17 month olds), 33.9 percent of group 2 (18 to 23 month olds), and
38.5 percent of groups 4 and 5 (24 to 36 month olds) had gingivitis.

Regarding gingivitis in this study, the following conclusions can be made:

(1) There is no significant difference in the severity of gingivitis relative to age group, sex, socioeconomic status, and methods of feeding.

(2) The prevalence of gingivitis increases with the age of the child. The prevalence is not affected by sex, socioeconomic status, and method of feeding.

(3) There is an increased prevalence of gingivitis in young children with dental caries.
**APPENDIX I**

**RESULTS OF DENTAL CARIES PREVALENCE SURVEYS OF ONE-YEAR-OLD CHILDREN**

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Year</th>
<th>N</th>
<th>Deft</th>
<th>Defs</th>
<th>% Caries</th>
<th>Fluoride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulton (USA)</td>
<td>1952</td>
<td>313</td>
<td>0.02</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Savara et al. (USA)</td>
<td>1954</td>
<td>18</td>
<td>0.67</td>
<td>--</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>Toth et al. (Hungary)</td>
<td>1959</td>
<td>206</td>
<td>0.15</td>
<td>--</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Protic (NoviSad)</td>
<td>1964</td>
<td>82</td>
<td>0.16</td>
<td>--</td>
<td>13.4</td>
<td></td>
</tr>
<tr>
<td>Tank et al. (USA)</td>
<td>1965</td>
<td>96</td>
<td>0.08</td>
<td>0.09</td>
<td>3.0</td>
<td>+</td>
</tr>
<tr>
<td>Hennon et al. (USA)</td>
<td>1969</td>
<td>48</td>
<td>0.13</td>
<td>0.15</td>
<td>8.3</td>
<td>-</td>
</tr>
<tr>
<td>Weddell (USA)</td>
<td>1980</td>
<td>246</td>
<td>0.13</td>
<td>0.34</td>
<td>4.8</td>
<td>+</td>
</tr>
</tbody>
</table>
## APPENDIX II

### RESULTS OF DENTAL CARIES PREVALENCE SURVEYS OF TWO-YEAR-OLD CHILDREN

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Year</th>
<th>N</th>
<th>Deft</th>
<th>Defs</th>
<th>% with Caries Fluoride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finn (MSA)</td>
<td>1947</td>
<td>59</td>
<td>0.19</td>
<td>--</td>
<td>8.9</td>
</tr>
<tr>
<td>Fulton (USA)</td>
<td>1952</td>
<td>258</td>
<td>0.22</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td>1952</td>
<td>132</td>
<td>2.99</td>
<td>--</td>
<td>51.5</td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td>1952</td>
<td>431</td>
<td>2.22</td>
<td>--</td>
<td>45.9</td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td>1952</td>
<td>69</td>
<td>1.19</td>
<td>--</td>
<td>30.4</td>
</tr>
<tr>
<td>Savara et al. (USA)</td>
<td>1954</td>
<td>65</td>
<td>.83</td>
<td>--</td>
<td>23.1</td>
</tr>
<tr>
<td>Wisan et al. (USA)</td>
<td>1957</td>
<td>201</td>
<td>.60</td>
<td>--</td>
<td>18.4</td>
</tr>
<tr>
<td>Toth et al. (Hungary)</td>
<td>1959</td>
<td>200</td>
<td>.78</td>
<td>--</td>
<td>25.0</td>
</tr>
<tr>
<td>Halikis (Australia)</td>
<td>1963</td>
<td>19</td>
<td>3.79</td>
<td>4.42</td>
<td>63.2</td>
</tr>
<tr>
<td>Protic (NoviSad)</td>
<td>1964</td>
<td>71</td>
<td>0.53</td>
<td>--</td>
<td>25.4</td>
</tr>
<tr>
<td>Toth et al. (Hungary)</td>
<td>1965</td>
<td>319</td>
<td>0.68</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Tank et al. (USA)</td>
<td>1965</td>
<td>73</td>
<td>0.59</td>
<td>0.56</td>
<td>21.0</td>
</tr>
<tr>
<td>Hennon et al. (USA)</td>
<td>1969</td>
<td>708</td>
<td>1.36</td>
<td>1.81</td>
<td>35.3</td>
</tr>
<tr>
<td>Weddell (USA)</td>
<td>1980</td>
<td>164</td>
<td>0.85</td>
<td>1.146</td>
<td>25.6</td>
</tr>
</tbody>
</table>

*Note: Deft = Defects, Defs = Defs*
APPENDIX III

RESULTS OF DENTAL CARIES PREVALENCE SURVEYS OF THREE-YEAR-OLD CHILDREN

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Year</th>
<th>N</th>
<th>Deft</th>
<th>Defs</th>
<th>% with Caries Fluoride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finn (USA)</td>
<td>1947</td>
<td>70</td>
<td>1.54</td>
<td></td>
<td>38.6</td>
</tr>
<tr>
<td>Fulton (USA)</td>
<td>1952</td>
<td>277</td>
<td>1.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td>1952</td>
<td>256</td>
<td>8.32</td>
<td></td>
<td>86.3</td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td>1952</td>
<td>565</td>
<td>4.38</td>
<td></td>
<td>67.6</td>
</tr>
<tr>
<td>Hewat et al. (N. Zealand)</td>
<td></td>
<td>53</td>
<td>6.23</td>
<td></td>
<td>88.7</td>
</tr>
<tr>
<td>Savara, et al. (USA)</td>
<td>1954</td>
<td>123</td>
<td>2.72</td>
<td></td>
<td>61.8</td>
</tr>
<tr>
<td>Wisan, et al. (USA)</td>
<td>1957</td>
<td>380</td>
<td>2.20</td>
<td></td>
<td>52.9</td>
</tr>
<tr>
<td>Toth, et al. (Hungary)</td>
<td>1959</td>
<td>461</td>
<td>1.99</td>
<td></td>
<td>50.0</td>
</tr>
<tr>
<td>Halikis (Australia)</td>
<td>1963</td>
<td>55</td>
<td>8.87</td>
<td>15.62</td>
<td>98.2</td>
</tr>
<tr>
<td>Protic (NoviSad)</td>
<td>1964</td>
<td>100</td>
<td>2.20</td>
<td></td>
<td>54.0</td>
</tr>
<tr>
<td>Toth, et al. (Hungary)</td>
<td>1965</td>
<td>418</td>
<td>1.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nord (Sweden)</td>
<td>1965</td>
<td>79</td>
<td></td>
<td></td>
<td>51.1</td>
</tr>
<tr>
<td>Tank (USA)</td>
<td>1965</td>
<td>66</td>
<td>1.30</td>
<td>1.45</td>
<td>45.0</td>
</tr>
<tr>
<td>Gray, et al. (Canada)</td>
<td>1967</td>
<td>359</td>
<td>1.69</td>
<td></td>
<td>28.9</td>
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<td>Hennon, et al. (USA)</td>
<td>1969</td>
<td>159</td>
<td>2.66</td>
<td>.53</td>
<td>57.2</td>
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<td>Weddell (USA)</td>
<td>1980</td>
<td>31</td>
<td>.81</td>
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The Occupational Scale

1. Higher executives, proprietors of large concerns, and major professionals.
   a. Higher executives
      Bank presidents; vice-presidents
      Judges (superior courts)
      Large business, e.g., directors, presidents, vice-presidents, assistant vice-presidents, executive secretary, treasurer
      Military, commissioned officers, major and above, officials of the executive branch of government, federal, state, local, e.g., major, city manager, city plan director, Internal Revenue directors
      Research directors, large firms
   b. Large proprietors (value over $100,000).
      Brokers
      Contractors
      Dairy owners
      Lumber dealers
   c. Major professionals
      Accountants (C.P.A.)
      Actuaries
      Agronomists
      Architects
      Artists, Portrait
      Astronomers
      Auditors
      Bacteriologists
      Chemical engineers
      Chemists
      Clergyman (professionally trained)
      Dentists
      Social worker (six years education)

2. Business managers, proprietors of medium sized businesses, and lesser professionals.
   a. Business managers in large concerns
      Advertising directors
      Branch managers
      Brokerage salesmen
      District managers
      Executive assistants
      Executive managers, government officials, minor, e.g., Internal Revenue agents
APPENDIX IV, CONTINUED

2. **Business managers, proprietors of medium-sized businesses, and lesser professionals.**
   
a. **Business managers in large concerns** (continued)
   - Farm managers
   - Office managers
   - Personnel managers
   - Police chief; sheriff
   - Postmaster
   - Production managers
   - Sales engineers
   - Sales manager, national concerns
   - Sales managers (over $100,000)

   b. **Proprietors of medium-sized business** (value $35,000 - $100,000)
   - Advertising owners (-$100,000)
   - Clothing store owners (-$100,000)
   - Contractors (-$100,000)
   - Express company owners (-$100,000)
   - Fruits, wholesale (-$100,000)
   - Jewelers (-$100,000)
   - Labor relations consultants
   - Furniture business (-$100,000)

   c. **Lesser professionals**
   - Accountants (not C.P.A.)
   - Chiropractors
   - Correction officers
   - Director of community house
   - Engineers (not college graduate)
   - Finance writers
   - Health educators
   - Librarians
   - Military, commissioned officers, Lts., Captains
   - Musicians (symphony orchestra)
   - Nurses, R.N.
   - Opticians
   - Pharmacists
   - Public health officers (M.P.H.)
   - Research assistants, university, (full-time)
   - Social workers
   - Teachers (elementary and high)

3. **Administrative personnel, small independent businesses, and minor professionals.**
   
a. **Administrative personnel**
   - Adjusters, insurance
   - Advertising agents
   - Chief clerks
   - Credit managers
   - Insurance agents
   - Managers, department stores
   - Passenger agents - R.R.
   - Private secretaries
   - Purchasing agents
   - Sales representatives
   - Mail supervision, director of department
   - Section heads, federal, state and local government offices
   - Section heads, large businesses and industries
   - Service managers
   - Shop managers
   - Store managers (chain)
   - Traffic managers
APPENDIX IV, CONTINUED

b. Small business owners ($6,000-$35,000)

Art gallery  Cigarette machines
Auto accessories  Cleaning shops
Awnings  Clothing
Bakery  Coal businesses
Builder  Convalescent homes
Beauty shop  Decorating
Boatyard  Dog supplies
Brokerage, insurance  Dry goods
Cabinet shop owner  Electrical contractors
Car dealers  Engraving business
Cattle dealers  Feed
Finance company, local  Fire extinguishers
5 & 10  Florist
Food equipment  Food products
Foundry  Funeral directors
Furniture  Garage
Gas station  Glassware
Grocery-general  Hotel proprietors
Institute of music  Jewelry
Machinery brokers  Manufacturing
Monuments  Package store (liquor)
Painting contracting  Plumbing
Poultry producers  Publicity and public relations
Real estate  Records and radios
Restaurants  Roofing contractor
Shoe  Shoe repairs
Signs  Tavern
Taxi company  Tire shop
Trucks and tractors  Trucking
Upholstery  Wholesale outlets
Window shades  Paralegal
Police officers (city police)

C. Semi-professionals

Actors and showmen  LPN
Army M/Sgt; Navy C.P.O.  Morticians
Artists, commercial  Oral hygienists
Appraisers (estimators)  Photographers
Clergymen (not professionally trained)  Programmer analyst
Concern managers  Physio-therapists
Deputy sheriffs  Piano teachers
Dispatchers, R.R. Train  Radio, television announcers
I.B.M. Programmers  Reporters, court
Interior decorators  Reporters, newspaper
Interpreters, court  Surveyors
Laboratory assistants  Title searchers
Landscape planners (tree surgeon  Tool designers
Police officers (city police)  Travel agents
Wildaw  Yard masters, R.R.
APPENDIX IV, CONTINUED

d. Farmers
Farm owners ($25,000-$35,000)

4. Clerical and sales workers, technicians, and owners of little businesses (value under $6,000).
   a. Clerical and sales workers
      Bank clerks and tellers
      Bill collectors
      Bookkeepers
      Business machine operators, offices
      Claims examiners
      Clerical/stenographic
      Conductors, R.R.
      Employment interviewers
      Computer technicians
      Receptionist
      Factory storekeeper
      Post office clerks
      Route managers (salesmen)
      Assistant managers
      Sales clerks
      Assistant manager - sales
      Shipping clerks
      Toll station supervisors

   b. Technicians
      Camp counselors
      Dental technicians
      Draftsmen
      Driving teachers
      Expeditor, factory
      Experimental tester
      Instructors, telephone company, factory
      Instructors, weights, sanitary inspectors, R.R., factory
      Investigators
      Laboratory technicians
      Factory storekeeper
      Factory supervisor
      Post office clerks
      Route managers (salesmen)
      Assistant managers
      Sales clerks
      Assistant manager - sales
      Shipping clerks
      Toll station supervisors
      Locomotive engineers
      Operators, P.B.X.
      Proofreaders
      Safety supervisors
      Supervisors of maintenance
      Technical assistants
      Telephone company supervisor
      Timekeepers
      Tower operators, R.R.
      Truck dispatchers
      Window trimmers (store)

   c. Owners of little businesses
      Flower shop ($3,000-$6,000)
      Newsstand ($3,000-$6,000)
      Tailor shop ($3,000-$6,000)

   d. Farmers
Owners ($10,000-$20,000)

5. Skilled manual employees
   Adjusters, typewriter
   Auto body repairers
   Bakers
   Barbers
   Blacksmiths
   Bookbinders
   Boilermakers
   Brakemen, R.R.

   Glassblowers
   Glaziers
   Gunsmiths
   Gauge makers
   Hair stylists
   Heat treaters
   Horticulturists
   Linemen, utility
APPENDIX IV, CONTINUED

Brewers
Bulldozer operators
Butchers
Cabinet makers
Carpenters
Casters (founders)
Cement finishers
Cheese makers
Chefs
Compositors
Diamakers
Diesel engine repair and maintenance (trained)
Diesel shovel operators
Electricians
Electrotypists
Engravers
Exterminators
Fitters, gas, steam
Firemen, city
Firemen, R.R.
Foremen, construction, dairy
Gardeners, landscape (trained)
Printer (typesetter)
Radio, television, maintenance
Repairmen, home appliances
Riggers
Rope splicers
Sheetmetal workers (trained)
Shipsmiths
Shoe repairmen (trained)
Stationary engineers (licensed)
Stewards, club
Switchmen, R.R.
Telephonemen

Linoleum layers (trained)
Linotype operators
Lithographers
Locksmiths
Loom fixers
Lumberjacks
Machinists (trained)
Maintenance foreman
Installers, electrical appliances
Masons
Masseurs
Mechanics (trained)
Millwrights
Moulders (trained)
Painters
Paperhangers
Patrolmen, R.R.
Pattern and model makers
Piano builders
Piano tuners
 Plumbers
Policemen, city
Postmen
Tailors (trained)
Teletype operators
Toolmakers
Track supervisors, R.R.
Tractor-trailer trans.
Typographers
Upholsterers (trained)
Watchmakers
Weavers
Welders
Yard supervisors, R.R.

Small farmers
Owners (under $10,000)
Tenants who own farm equipment

6. Machine operators and semi-skilled employees

Aides, hospital
Apprentices, electricians, printers, steamfitters, toolmakers
Assembly line workers
Bartenders
Bingo tenders
Building superintendents (custodial)

Transport Department
Photostat machine operators
Practical nurses
Pressers, clothing
Pump operators
Receivers and checkers
Roofers
Set-up men, factories
Shapers
APPENDIX IV, CONTINUED

Bus drivers
Checkers
Clay cutters
Coin machine fillers
Cooks, short order
Delivery men
Dressmakers, machine
Drill press operators
Duplicator machine operators
Elevator operators
Enlisted men, military services
File cutters, benders, buffers
Foundry workers, fork lift driver
Garage and gas station assistants
Greenhouse workers
Guards, doorknobs, watchmen
Hairdressers
Housekeepers
Meat cutters, and packers
Meter readers
Operators, factory machine
Schoolhelper
Farmers
Smaller tenants who own little equipment

7. Unskilled employees
Amusement park workers (bowling alleys, pool rooms)
Ash removers
Attendants, parking lots
Cafeteria workers
Car cleaners, R.R.
Carriers, coal
Car helpers, R.R.
Countermen
Dairy workers
Deck hands
Dock workers
Domestics
Farm helpers
Fishermen (clam diggers)
Freight handlers
Garbage collectors
Grave diggers
 Hodg carriers
 Hog killers
 Hospital workers, unspecified
 Hostlers, R.R.
 Mower
 Janitors, sweepers
Oiler, R.R.
Paper rolling machine operators
Signalmen, R.R.
Solderers, factory
Sprayers, pain
Steelworkers (not skilled)
Strainers, wire machines
Strippers, rubber factory
Taxi drivers
Testers
Timers
Tire moulders
Trainmen, R.R.
Truck drivers, general
Waiters-Waitresses ("Better places")
Weighers
Welders, spot
Winders, machine
Wire drawers, machine
Wine bottlers
Wood workers, machine
Wrappers, stores, and factories

Laborers, construction
Laborers, unspecified day work
Laundry workers
Messengers
Platform men, R.R.
Peddlers
Porters
Roofers' helpers
Shirt folders
Shoe shiners
Sorters, rag and salvage
Stagehands
Stevedores
Stock handlers
Street cleaners
Unskilled factory workers
Truckmen, R.R.
Waitresses - "Hash Houses"
Washers, cars
Window cleaners
Woodchoppers
Relief, public, private
Unemployed (no occupation)

Farmers
Share croppers

This scale is premised upon the assumption that occupations have different values attached to them by the members of our society. The hierarchy ranges from the low evaluation of unskilled physical labor toward the more prestigious use of skill, through the creative talents of ideas, and the manipulation of men. The ranking of occupational functions implies that some men exercise control over the occupational pursuits of other men. Normally, a person who possesses highly trained skills has control over several other people. This is exemplified in a highly developed form by an executive in a large business enterprise who may be responsible for decisions affecting thousands of employees.
REFERENCES


CURRICULUM VITAE
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Professional Societies and Offices

Academy of Dentistry for the Handicapped
American Academy of Pedodontics
American Dental Association
American Society of Dentistry for Children
Indiana Dental Association
Indiana Society of Dentistry for Children
Indiana Society of Pedodontics
ABSTRACT
A SOCIOECONOMIC CORRELATION OF ORAL DISEASE
IN SIX TO THIRTY-SIX MONTH OLD CHILDREN

by
James A. Weddell

A survey of 441 children between the ages of 6 and 36 months, born and reared with a fluoridated water supply, revealed dental caries in 2.5 percent of those 6 to 17 months of age, 9.1 percent of those 18 to 23 months of age, and in 38.7 percent of the children 24 to 26 months of age. No significant differences were found in defs and deft relative to sex, race, or socioeconomic status. Caries prevalence is affected by method of feeding; children who had prolonged bottle-feeding (more than 15 months) had significantly increased caries. In 299 Caucasian children, gingivitis was present in 13.2 percent of those 6 to 17 months of age, 33.9 percent of those 18 to 23 months of age, and in 38.5 percent 24 to 36 months of age. There was little difference in the severity of the gingivitis, although significant difference in the frequency of gingivitis was demonstrated. The prevalence of gingivitis increased with age. Young children with dental caries also showed an increased prevalence of gingivitis. The presence of gingivitis, the presence of dental caries, and the absence of professional dental care in these young children all illustrate the necessity for prevention and treatment of oral disease in children under 36 months of age.