Dental Health of Louisiana Residents Based on the Ten-State Nutrition Survey

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THE NUTRITION SECTION of the Tulane University School of Public Health, in cooperation with the Louisiana State Department of Health, conducted the Louisiana phase of the Ten-State Nutrition Survey during the years 1968–70 *(1)*. Proposed and funded by the U.S. Congress, this survey sought answers to questions regarding the nutrition and health status of populations in the lower socioeconomic strata of our nation. Determination of the dental health status of these populations was one segment of the survey. The results of the study of the 10 States have already been reported collectively by grouping the data for the five high-income States and the data for the five low-income States. In this form, however, no individual State or census district could effectively use the data to plan its own preventive dental health programs. Our purpose is to report those results of the Ten-State Nutrition Survey that pertain specifically to the dental health status of residents of Louisiana from census districts where the average per capita income was in the lowest quartile for the nation.

Several factors have been shown to affect the prevalence of dental diseases among population groups. The prevalence of both dental caries and periodontal disease generally increases with age *(2–16)*. Males tend to have less caries experience *(2–6,17)*, but more periodontal disease than females *(4–6,18,19)*. Blacks have been shown to have less dental caries experience, but more periodontal disease than whites *(6–19)*.

The effect of socioeconomic status upon dental disease has been explored, but its effect is less definite than that of sex, age, or race. Fulton and associates *(6)* found that dental caries experience increased as socioeconomic status improved and that this trend generally applied for both black and white populations of all age groups. Stadt and associates *(20)* and Szwejda *(21)*, however, reported that a higher socioecomonic status produced a lower caries rate among school children. The National Center for Health Statistics *(4)* determined that low-income white adults had fewer decayed, missing, and filled permanent teeth than high-income white adults, but that this trend did not apply to blacks. In a study of the dental health of children *(5)*, the Center found that black children from high-income families had less caries experience than did those from low-income families. Fulton and associates *(6)* stated that periodontal disease was more prevalent among low-income groups. Russell and Ayres *(22)* also found more periodontal disease among low-income men than among men with higher incomes.

Methods

The basic sampling plan for the Ten-State Nutrition Survey was devised by the National Center for Health Statistics and was used in all 10 States included in the study. In Louisiana, five major population centers were selected—Metropolitan New Orleans, Shreveport, Baton Rouge, Lake Charles, and Monroe. The metropolitan areas included census enumeration districts from eight parishes. (A parish in Louisiana is the governmental unit equivalent to a county in other States.) Eleven of the remaining 56 parishes were then drawn at random to form a total of 19 parishes. Specific census enumeration districts that met the criterion of being in the lowest quartile of the nation as determined by average per capita income were then drawn at random from the 19 parishes until 96 such districts were identified. Maps were drawn showing every household unit within the district. Hotels, boardinghouses, temporary homes, and houses with five or more legally unrelated persons were not considered household units.

Once the household units in each district were identified, they were numbered in a specified sequence and divided into segments of 60 units. A table of random numbers was used to determine the sector to be surveyed and, in turn, the first household to be surveyed within that sector. Thereafter, each third household

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was taken until 20 households were designated for survey in each district. No substitution for the households drawn was allowed. Every effort was made to obtain the cooperation of the members of the sample households. The ages of the sample population ranged from 10 days to 100 years.

Each person in the sample households was examined by a dentist, who used the Decayed, Missing and Filled index *(23)*, the simplified oral hygiene index *(24)*, and the periodontal index *(25)*. Dr. Jorge Cabrera of the Institute of Nutrition for Central America and Panama examined 79 percent of the study population, and local dentists who were trained and calibrated in survey techniques examined the remainder. The dentists used No. 23 explorers, plane glass mirrors, and portable dental chairs and lamps in their examinations.

For each person examined, the following information was recorded on standard examination cards:

1. Age in years
2. Sex
3. Race
4. Name of examiner
5. Date of examination
6. Dental caries experience of each permanent tooth (DMF)
7. Oral hygiene index score
8. Periodontal index score

The dentist obtained information on each person's dental caries experience by direct examination, using the DMF index *(23)*. This index is a quantitative ex-

Table 1. Mean number of decayed, missing, and filled permanent and primary teeth for Louisiana residents examined, by age group, race, and sex, 1968–70

Age group (years)	Permanent teeth					Primary teeth		
	Number of persons	Mean DMF	Mean number decayed	Mean number missing	Mean number filled	Mean df	Mean number decayed	Mean number filled
All persons (*N* = 4,006)								
Under 7	864	0.3	0.2	0.0	0.0	2.9	2.7	0.1
7–17	1,621	6.9	6.1	.4	.3	1.4	1.3	.1
18–24	262	14.7	10.9	2.7	1.2			
25–34	331	18.1	8.6	6.8	2.7			
35–44	310	19.8	8.1	9.1	2.7			
45–59	363	20.2	7.0	11.1	2.2			
60 and over	255	23.1	6.7	15.1	1.3			
Black males (*N* = 1,313)								
Under 7	366	0.3	0.3	0.0	0.0	3.1	3.0	0.1
7–17	595	6.7	6.2	.3	.1	1.4	1.4	.0
18–24	67	14.0	11.0	2.3	.7			
25–34	51	14.9	7.7	6.0	1.2			
35–44	56	18.6	8.4	8.8	1.4			
45–59	83	18.1	8.0	9.3	0.9			
60 and over	95	21.6	7.9	13.3	0.4			
Black females (*N* = 1,869)								
Under 7	331	0.2	0.2	0.0	0.0	2.6	2.5	0.0
7–17	719	7.6	7.0	.5	.1	1.2	1.2	.0
18–24	161	15.1	12.1	2.5	.5			
25–34	176	19.0	11.2	6.9	1.0			
35–44	174	20.6	10.0	9.4	1.2			
45–59	191	20.9	8.0	11.6	1.3			
60 and over	117	24.2	6.6	16.8	0.8			
White males (*N* = 372)								
Under 7	88	0.2	0.2	0.0	0.0	2.9	2.6	0.3
7–17	151	5.0	3.3	.4	1.4	1.6	1.1	.5
18–24	10	15.5	7.6	5.1	2.8			
25–34	33	16.8	4.0	5.9	6.9			
35–44	33	16.3	2.9	6.7	6.7			
45–59	37	19.2	3.4	12.1	3.7			
60 and over	20	24.8	5.8	17.3	1.8			
White females (*N* = 452)								
Under 7	79	0.3	0.2	0.0	0.0	2.8	2.5	0.3
7–17	156	5.9	4.3	.4	1.2	1.5	1.2	.3
18–24	24	14.9	4.2	4.5	6.2			
25–34	71	18.3	4.9	7.4	6.0			
35–44	47	21.2	4.6	9.4	7.1			
45–59	52	21.2	3.7	11.2	6.3			
60 and over	23	22.1	4.1	13.0	5.0			

pression of the lifetime caries experience of a person's permanent teeth. "D" refers to the number of decayed permanent teeth that require filling plus the number that have been previously filled but have since become carious. "M" is the number of permanent teeth that have been extracted because of caries. "F" refers to permanent teeth that have been satisfactorily filled and show no caries on examination. The number of permanent teeth for each person who exhibits any caries experience — D, M, or F — is totaled to give the DMF for that person.

The income level of each family was determined by use of the poverty income ratio *(26)*. This ratio related certain income characteristics of the families to a poverty level as defined by such variables as size of the family, sex of head of household, and place of residence. A family with an income exactly at the poverty level had a ratio of 1.0. Thus, a family with a ratio of less than 1.0 would have an income below the poverty level, while a family with a ratio of more than 1.0 would have an income above the poverty level.

The data from the Louisiana phase of the Ten-State Nutrition Survey are summarized in the tables. It should be noted that all categories of information were not available for all subjects so that the total numbers vary somewhat from table to table. The dental caries experience among white and black males and females followed a similar pattern by age and showed no particular differences according to race and sex (table 1). Nevertheless, white persons in the survey had received considerably more dental care than had blacks, as reflected by the increased counts of filled teeth among whites and the subsequently lower counts of decayed teeth.

Table 2 indicates that there was no particular difference in the dental caries experience between persons with incomes above and below the poverty level used for this survey. A much greater proportion of blacks than whites had incomes below the poverty level. This difference in income does not, however, completely explain the lesser amount of dental care received by the blacks, since whites with incomes both above and below the poverty level had received more dental care than their black counterparts in each category. Further, whites with incomes below the poverty level generally had received more dental care than blacks with incomes above the poverty level, as shown by the mean numbers of filled teeth in each group.

Table 2. Mean number of decayed, missing, and filled permanent and primary teeth for Louisiana residents with incomes above and below the poverty level, by age group, and race, 1968–70

Age group (years)	Permanent teeth					Primary teeth		
	Number of persons	Mean DMF	Mean number decayed	Mean number missing	Mean number filled	Mean df	Mean number decayed	Mean number filled
Blacks with incomes above poverty level (*N* = 451)								
Under 7	76	0.1	0.1	0.0	0.0	2.6	2.6	0.0
7–17	173	7.6	7.1	.4	.1	1.0	1.0	.0
18–24	38	17.0	13.5	2.6	.9			
25–34	39	16.7	9.3	5.7	1.6			
35–44	39	19.8	8.1	9.8	2.0			
45–59	62	21.2	7.6	11.9	1.7			
60 and over	24	22.3	7.6	14.0	0.7			
Blacks with incomes below poverty level (*N* = 1,296)								
Under 7	289	0.2	0.2	0.0	0.0	2.8	2.8	0.0
7–17	565	7.5	7.0	.4	.1	1.4	1.4	.0
18–24	76	15.4	12.6	2.3	.5			
25–34	77	20.3	11.4	8.1	.7			
35–44	98	19.9	11.1	7.7	1.1			
45–59	85	20.8	8.8	11.1	.9			
60 and over	106	22.8	7.4	14.8	.6			
Whites with incomes above poverty level (*N* = 314)								
Under 7	61	0.1	0.1	0.0	0.0	2.5	2.0	0.6
7–17	108	5.3	3.3	.4	1.7	1.3	.9	.4
18–24	14	15.9	3.9	6.2	5.8			
25–34	146	17.8	4.0	7.0	6.9			
35–44	41	17.8	2.6	7.1	8.1			
45–59	37	18.9	2.7	9.6	6.6			
60 and over	7	22.3	8.0	9.6	4.7			
Whites with incomes below poverty level (*N* = 135)								
Under 7	27	0.1	0.1	0.0	0.0	2.9	2.9	0.0
7–17	54	6.3	5.6	.2	.5	1.5	1.5	.0
18–24	4	17.3	6.3	8.8	2.3			
25–34	12	15.8	8.4	5.8	1.5			
35–44	10	16.4	6.4	5.2	4.8			
45–59	13	19.8	6.5	10.5	2.9			
60 and over	15	23.3	5.1	16.2	1.9			

Table 3. Means scores for oral hygiene index, debris, and calculus for Louisiana residents, by age group, race, and sex, 1968–70

Age group (years)	Number of persons	Oral hygiene index	Debris	Calculus
All persons (N=2,385)				
10–14	767	2.03	1.72	0.31
15–17	333	2.14	1.45	.69
18–24	250	2.45	1.40	1.05
25–34	306	2.68	1.32	1.36
35–44	275	3.11	1.51	1.60
45–54	220	3.35	1.52	1.84
55–64	143	3.73	1.63	2.12
65–74	76	4.44	2.04	2.40
75 and over	15	4.36	2.08	2.28
Black males (N=683)				
10–14	298	2.23	1.90	0.33
15–17	103	2.28	1.59	.69
18–24	64	2.78	1.51	1.28
25–34	47	3.16	1.61	1.55
35–44	47	4.21	1.99	2.22
45–54	45	4.31	1.91	2.40
55–64	45	4.61	2.10	2.55
65–74	27	5.38	2.63	2.75
75 and over	7	4.64	2.19	2.46
Black females (N=1,177)				
10–14	321	2.09	1.72	0.37
15–17	168	2.28	1.51	.77
18–24	153	2.48	1.44	1.05
25–34	160	2.96	1.42	1.54
35–44	151	3.43	1.67	1.76
45–54	112	3.71	1.68	2.03
55–64	71	3.84	1.61	2.24
65–74	33	4.10	1.79	2.31
75 and over	8	4.11	1.99	2.13
White males (N=202)				
10–14	67	1.65	1.51	0.14
15–17	31	1.33	.87	.46
18–24	10	2.18	1.16	1.02
25–34	30	2.19	1.08	1.11
35–44	30	1.60	.77	.83
45–54	24	2.78	1.28	1.50
55–64	10	2.95	1.30	1.65
65–74	9	4.43	1.93	2.50
75 and over	0	.....	.....	.....
White females (N=314)				
10–14	81	1.32	1.20	0.12
15–17	31	1.67	1.09	.58
18–24	23	1.51	.94	.57
25–34	69	1.98	1.01	.97
35–44	47	1.91	.98	.93
45–54	39	1.53	.71	.82
55–64	17	1.86	.81	1.05
65–74	7	2.31	1.03	1.29
75 and over	0	.....	.....	.....

Table 3 shows that females in the survey generally had a slightly lower OHI (oral hygiene index) score than males, a result indicating a better oral hygiene status for females; the largest sex differences were found in the calculus scores. Blacks of both sexes generally had a higher OHI score than whites. The higher scores were found in both the debris and calculus components of the OHI index.

There was little difference by sex in PI (periodontal index) scores among the black persons examined or among the younger white groups (table 4). The older white groups showed a trend toward higher PI scores for males, but the numbers of persons examined in these groups were small. Black persons in the survey generally had higher PI scores than white persons.

Table 5 indicates that although the percentages of males and females with peridontal disease were similar, the proportion of males with periodontal pocket formation was generally somewhat greater than that of the females. This result seems to indicate that the periodontal disease of the males was more severe. In general, slightly higher percentages of the black persons surveyed than of the white persons surveyed had periodontal disease and pocket formation.

Table 6 indicates that higher percentages of both black and white persons with incomes below the poverty level had periodontal disease and pocket formation than those with incomes above the poverty level. When these data are compared with those in table 5, they appear to indicate that income level was a much stronger determinant of periodontal health than either race or sex.

Table 7 shows that higher percentages of females than males and higher percentages of whites than blacks were edentulous. Thus, the possibility must be considered that females and whites were more likely than males and blacks to have had teeth extracted because of decay or periodontal disease. This hypothesis is generally supported by the data concerning missing teeth in table 1. The results of examining the total population by race, sex, and age are also summarized in this table.

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Table 4. Mean periodontal index scores for Louisiana residents by age group, race, and sex, 1968–70

Age group (years)	Black males		Black females		White males		White females		All persons	
	Number	Score	Number	Score	Number	Score	Number	Score	Number	Score
10–14	293	0.75	316	0.71	66	.77	80	0.50	755	0.71
15–17	102	.95	171	.94	31	.50	31	.86	335	.89
18–24	67	1.19	158	1.09	10	1.10	24	.83	259	1.08
25–34	50	1.50	173	1.77	32	1.26	70	1.09	325	1.53
35–44	53	2.36	171	2.02	33	1.26	44	1.26	301	1.87
45–54	53	2.32	135	2.71	27	2.17	42	1.35	257	2.40
55–64	63	3.41	90	2.83	12	2.18	20	1.72	185	2.85
65–74	38	4.01	55	3.51	11	5.27	8	1.98	112	3.73
75 and over	12	3.80	12	5.08	2	7.00	1	6.00	27	4.62

Table 5. Percentages of Louisiana residents with periodontal disease (PI score < 0.2) and periodontal pockets, by age group, race, and sex, 1968–70

Age group (years)	Black males			Black females			White males			White females			All persons		
	Number examined	Percent with disease	Percent with pockets	Number examined	Percent with disease	Percent with pockets	Number examined	Percent with disease	Percent with pockets	Number examined	Percent with disease	Percent with pockets	Number examined	Percent with disease	Percent with pockets
5–9	305	49.8	5.6	323	47.4	3.4	90	70.0	5.6	74	47.3	5.4	792	51.3	4.7
10–14	298	56.0	19.5	326	52.5	17.2	67	59.7	20.9	81	40.7	11.1	772	53.5	17.8
15–17	105	60.0	26.7	172	64.0	26.7	31	38.7	3.2	31	54.8	22.6	339	60.0	24.0
18–24	68	67.6	39.7	165	63.0	38.2	11	63.6	36.4	24	58.3	16.7	268	63.6	36.0
25–34	53	81.1	49.1	188	83.0	52.7	37	67.6	37.8	77	63.6	28.6	355	76.8	45.6
35–44	59	89.8	72.9	190	79.5	54.2	35	54.3	37.1	61	65.6	26.2	345	76.5	49.9
45–54	65	98.5	58.5	179	92.2	52.0	36	80.6	44.4	64	76.6	25.0	344	89.3	47.9
55–64	83	98.8	62.7	153	92.2	38.6	43	100.0	18.6	57	87.7	17.5	336	93.7	38.1
65–74	67	98.5	52.2	122	95.1	32.8	36	100.0	30.6	36	91.7	11.1	261	96.4	34.7
75–79	15	93.3	20.0	23	100.0	34.8	7	100.0	28.6	10	100.0	10.0	55	98.3	25.9
80 and over	9	100.0	44.4	21	100.0	19.0	5	100.0	0	2	100.0	.0	37	100.0	19.0

Table 6. Percentages of Louisiana residents with incomes above and below the poverty level who had periodontal disease (PI score < 0.2) and peridontal pockets by age group and race, 1968–70

Age group (years)	Blacks			Whites		
	Number examined	Percent with disease	Percent with pockets	Number examined	Percent with disease	Percent with pockets
	Persons with incomes above poverty level					
5–9	75	37.3	2.7	51	66.7	9.8
10–14	85	55.3	22.4	53	35.8	5.7
15–17	36	55.6	27.8	25	40.0	12.0
18–24	38	50.0	34.2	15	60.0	13.3
25–34	40	70.0	45.0	48	61.4	29.2
35–44	39	74.4	59.0	51	49.0	21.6
45–54	63	92.1	58.7	44	75.0	22.7
55–64	38	92.1	39.5	34	94.1	23.5
65–74	15	100.0	26.7	5	100.0	.0
75–79	1	100.0	100.0	3	100.0	.0
80 and over	2	100.0	100.0	0	.....	
	Persons with incomes below poverty level					
5–9	268	43.7	5.2	29	69.0	3.4
10–14	270	50.0	16.7	27	70.4	37.0
15–17	112	59.8	26.8	11	63.6	36.4
18–24	80	63.8	43.8	4	75.0	25.0
25–34	84	85.7	59.5	12	91.7	75.0
35–44	105	84.8	66.7	11	81.8	54.5
45–54	75	92.0	48.0	12	100.0	41.7
55–64	91	97.8	50.5	23	100.0	30.4
65–74	106	94.3	35.8	41	100.0	24.4
75–79	27	96.3	25.9	10	100.0	10.0
80 and over	20	100.0	30.0	6	100.0	.0

Table 7. Percentages of Louisiana adults who were edentulous, by age group, race, and sex, 1968–70

Age group (years)	Blacks		Whites		All persons
	Males	Females	Males	Females	
18–24	1.4	2.4	9.1	0.0	2.1
24–34	3.6	6.0	10.8	7.6	6.5
35–44	5.0	8.1	5.4	23.0	10.2
45–54	17.9	22.8	25.0	32.3	23.6
55–64	23.8	37.6	65.9	61.7	41.6
65–74	38.8	52.0	66.7	77.8	53.2
75–79	50.0	58.3	71.4	80.0	61.7
80 and over	30.0	71.4	83.3	100.0	68.2

NOTE: Each percentage is based on the total number of persons examined of the specified age group, race, and sex (see table 5 for these totals).

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SYNOPSIS

MORGAN, P. M. (Oklahoma State Department of Health), MURPHY, R. F., WILLIS, R. A., HUBBARD, D. W., and MORTON, J. M.: *Dental health of Louisiana residents based on the Ten-State Nutrition Survey. Public Health Reports, Vol. 90, March-April 1975, pp. 173–178.*

The dental health status of 4,006 residents of Louisiana was analyzed, based on data in the 1968-70 Ten-State Nutrition Survey funded by the U.S. Government. These data were based on examinations of census districts in which the average per capita income was in the lowest quartile for the nation. A considerable variation in the prevalence of dental diseases was found among the Louisiana residents according to age. The females examined had a slightly higher DMF (decayed, missing, and filled permanent teeth) score, a lower OHI (oral hygiene index) score, and a slightly lower PI (periodontal index) score than did the males. The dental caries attack rate did not vary much by race, but the whites examined had received a much greater amount of dental care than had their black counterparts.

The OHI scores of the blacks were higher than those for the whites in both the debris and calculus components. The PI scores were higher for the blacks than for the whites. More white persons than blacks were edentulous; this result, however, tends to confirm the observation of increased dental care in white persons. The percentages of persons with periodontal disease and periodontal pockets were considerably higher among persons with incomes below the poverty level, and a greater percentage of blacks had incomes below that level. The data thus apparently indicate that the major determinants of dental health status in Louisiana are age and level of income; race appears to be the major determinant of the amount of dental care received.