

## ORIGINAL ARTICLES

## Adolescent Health in Alameda County

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A cross-sectional study of 194 adolescents in Alameda County, California, was performed to investigate health care behavior, personal adjustment, substance abuse, and medical and dental morbidity. A multivariate analysis of this sample using age, sex, ethnic group, and family type as independent variables was carried out. Females were less likely than males to have a regular place for medical care, and youths belonging to single parent families were less likely than those from intact families. Older adolescents, blacks and Hispanics used hospitals and clinics more frequently, while whites used private physicians more frequently than did other ethnic groups. Also blacks and Hispanics were less likely to have received recent dental care than whites. Levels of substance abuse were comparable to national levels, and increased significantly with age. Though overall medical morbidity was low, the study confirms previous findings of significant levels of dental decay particularly in black youth. A significant relation exists between less dental care and dental decay, though no such relation exists between medical care and medical morbidity. The study has potential implications for better preventive approaches to adolescent health care.

## KEY WORDS:

Adolescence  
Dental health  
Drug abuse  
Health care  
Morbidity  
Psychological adjustment

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## Introduction

Adolescence has been increasingly recognized as a period of life with its own particular health characteristics and needs. Adolescence also poses a challenge to health care providers because of the health care behavior of adolescents (1-3), which has been the subject of several studies. The National Health Survey (4) using a representative sample of the nation's households, reported that 66% of those less than 15 years old and that 73% of those 15-24 years old visited a physician within a year. The National Health Survey (5) also reported that 58.8% of youths age 5-14 years old had dental visits within the previous year compared to 55.7% for those 15-24 years old.

Brunswick and Josephson (6) carried out a cross-sectional study of 752 black adolescents in one neighborhood area. They reported that 70% of youths 12-15 years old had visited a physician within a year, and that 57% had seen a dentist within a year. Regarding health care utilization, Brunswick et al. (7) reported that the utilization of health care by Black youths was related to social variables. Parcel et al. (8) in a study of black, Hispanic, and white adolescents found that while white youths used private physicians, black youths used public health care facilities; Hispanics used health care of all types less frequently than the other groups. Sternlieb and Munan (9) carried out a community study of self-reported health needs and health care utilization among Quebec youths. They found that most did not consult a physician once a year. The most frequently reported health problems in their study group were emotional, dental, and skin problems in that order.

Substance abuse has become an area of increasing concern in adolescent health. Johnston and Bach-



man (10) studied a nation-wide sample of high school seniors. They found that 71% had used alcohol, 38% cigarettes, 35% marijuana, and 9% non-prescription stimulants within the previous 30 days. Abelson et al. (11) in a representative survey of all U.S. adolescents 12-17 years of age found, that within the previous 30 days 31.2% had used alcohol, 22.3% cigarettes, 16.1% marijuana, and 5.2% other stimulants.

The health status of adolescents based on medical examinations has been the subject of a number of studies. Eisner et al. (12) reported on 165 Neighborhood Youth Corps members. They found that 26% of the enrollees required medical and 18% dental services. Brunswick and Josephson (6) reported that dental disorders were the most frequently found health problems, with 4 out of 5 having dental caries. This was followed by vision disorders (1 in 5), skin problems (1 in 10), and emotional disorders (1 in 12). A recent study by Schonberg and Cohen (13) included the results of a medical screen of 1250 New York City secondary school students. The most prevalent health abnormalities found were dental caries (35%), infections (7%), hypertension (6%), abnormal urine findings (5%), and heart murmurs (4%).

The results of the National Health Examination Survey of 6768 adolescents (14-17) using a multi-stage stratified probability sample of households showed that two-thirds of the youths they studied were in very good or excellent health. Based on physical examinations they found that one-fifth had some cardiovascular, neurological, musculoskeletal, or other significant abnormality. Black youths were found to have more abnormalities than white youths, although the differences were not statistically significant.

We designed a comprehensive study based on the premise that adolescent health is a multifaceted entity determined not only by biological factors but by health care behavior and social determinants as well. The present study is designed to assess: (a) adolescent health and dental care behavior, (b) personal and social adjustment problems, (c) drug and substance abuse, and (d) medical and dental morbidity. We have studied these factors in a triethnic group consisting of white, black, and Hispanic youth. Since family structure and composition has been recognized as an important variable for investigation because of the dramatic change in the structure of the American family, the role of the single parent family versus intact family structure in relation to adolescent health was investigated.

## Materials and Methods

### Sample:

A random sample of adolescents was selected from Alameda County, California. The Random Digit Dialing technique (18,19) was used to select a representative sample of Alameda County noninstitutionalized adolescents. In areas with a high proportion of households with phones, this method has been shown to be comparable to probability household-to-house surveys. Six hundred households with eligible adolescents were obtained by this method. Eligible adolescents were those residing in the household between 12 and 17 years old at the time of first contact. Thirty-eight percent of eligible contacts participated in the study. While the participation rate is relatively low, the final sample appears to be representative of adolescents in Alameda County (Table 1). The sample size and the rate of participation limit the generalizability of the sample to all Alameda County youth.

### Assessment and Statistical Techniques

A self-administered questionnaire, health history interview, and physical examination were administered at several health facility study sites. The self-administered health history questionnaire covered health behavior and health history information and a variety of demographic information. The health history interview and physical examination were carried out by a pediatrician or pediatric nurse-practitioner. The questionnaire was in English and all respondents were able to respond.

Self-reported health history and health behavior was not subject to external checks and this may reduce the certainty of this information. Family type was classified as "intact" if two parents were present and "single" for any other situation. For blood pressure data subjects were supine and pressure was taken on the left arm with a mercury sphygmomanometer by a pediatrician or pediatric nurse practitioner.

Multivariate analyses were used. For binary outcome dependent variables, i.e., variables having only two possible responses, a procedure for logistic regression (20) was used to assess the effects of the independent variables. Similarly, for continuous dependent variables an analysis of covariance was used (21). For the analysis of covariance and logistic regression, a multiple classification analysis was used to generate adjusted comparisons for each in-



Table 1. Age and Race of Examinees, 1978-1979, and of Adolescents in the 1970 Alameda County Census

	Examinees						Alameda County Census*					
	Total	Percent	12-14 yr	Percent	15-17 yr	Percent	Total	Percent	12-14 yr	Percent	15-17 yr	Percent
White <sup>b</sup>	147	75.7	64	78.0	83	74.1	86,660	76.2	44,324	76.2	42,336	76.4
Black	35	18.0	13	15.9	22	19.6	21,024	18.5	10,845	18.6	10,179	18.4
Other	12	6.4	5	6.1	7	6.3	5,865	5.2	3,000	5.2	2,864	5.2
Total	194	100.0	82	100.0	112	100.0	113,549	100.0	58,170	100.0	55,379	100.0

\*From 1970 Census of Population: Number of Inhabitants: California, Part 6A-B, Vol. 1, U.S. Department of Commerce, Bureau of the Census, Table 35, Age by Race and Sex for Counties, 1970: Alameda County.

<sup>b</sup>White includes Hispanic white.

dependent variable. Multivariate analysis permitted the assessment of the effect of a given variable independent of the effects of co-variables. Following Mantel and Haenszel (22) for studies with exploratory aims, probability levels were cited for individual rather than simultaneous comparisons.

Analysis of covariance was used with blood pressure data and the index of decayed, missing, and filled teeth (DMF Index). This technique was probably appropriate for blood pressure since data from the National Health Survey (18) shows blood pressure to be approximately normally distributed, with age, sex, and ethnic group having approximately equal variances. According to data from the National Health Survey (17), the DMF Index has similar properties, except for skewing during early adolescence, which may affect the validity of the statistical procedure. Diagnostic impressions and the physical examination protocol were checked for completeness and reliability by a study team physician.

## Results

### Health Care Behavior

A variety of aspects of medical care utilization behavior was assessed. The results of this analysis are shown in Table 2. The figures for age require special qualification. They are levels derived from using ages 13 and 17 in a linear or logistic model. The results are therefore dependent on these models and may be inaccurate if the data does not have linear or logistic characteristics. Overall, 87.9% of the sample reported having one regular place where they received medical care. When this response is analyzed by the independent variables, three show significant differences; sex, ethnic group (white and Hispanic), and family unit. Females, Hispanics, and those from a single-parent family reported a lower likelihood of having a regular place for health care. Information regarding utilization of medical care

showed that 67.9% had reportedly seen a doctor within the last year which is close to the figure of Brunswick and Josephson (6).

The youths were also asked from whom they had received medical care last. 38.2% reported seeing a pediatrician, 26.7% saw another type of physician, and 17.8% reported using a clinic, primarily the Kaiser-Permanente self-insured health care program. When the independent variables for this questionnaire are examined, age and ethnic group differences were found. With increasing age, adolescents are less likely to see a pediatrician, and more likely to use a clinic. This being a cross-sectional study, no longitudinal statements can be made with confidence. Black youths are less likely to utilize a pediatrician or other physician, whereas white youths are less likely to use a clinic. These findings are consistent with those of Parcel et al. (8).

The question was asked whether the adolescents had ever seen a physician in the absence of disease, and 85.3% responded in the affirmative. This is higher than reported by Brunswick and Josephson (6). Only the Hispanic/white difference (86.18% versus 60.47%) was statistically significant.

The adolescents were asked who had made the arrangements for medical appointments. Fourteen percent of youths reported making the appointment themselves compared to the 5% figure of Brunswick and Josephson (6). Table 2 shows there is considerable variation with age on this item. With increasing age the adolescent tended to take increasing responsibility for his/her own health care.

### Dental Care Behavior

Dental care utilization was assessed. For the total sample, 79.7% reported seeing a dentist within the previous year. This figure is higher than the 50% reported by Brunswick and Josephson (6). Blacks show significantly less frequent visits than whites (Table 2). Also single parent families show signifi-

Table 2. Health Care and Health Status.

Question	Sex		Ethnic Group			Family Unit		Age		N
	Male	Female	Black	White	Hispanic	Single	Intact	13	17	
Regular place medical care?	92.6% z = 2.42 P = .01	* 78.9% z = -.48 P = .63	90.3% z = -.48 P = .63	* 87.3% z = -.151 P = .13	76.3% z = -1.51 P = .13	73.8% z = -2.48 P = .01	* 90.9% z = .83 P = .05	88.4% z = .83 P = .05	* 86.9% z = .83 P = .05	190
Have seen a MD in last year?	64.8% z = -.63 P = .53	69.2% z = .08 P = .93	67.6% z = .08 P = .93	66.7% z = .08 P = .93	72.3% z = .61 P = .54	62.0% z = -.76 P = .44	68.4% z = -.76 P = .44	65.1% z = .48 P = .63	70.0% z = .48 P = .63	187
Last saw a pediatrician.	43.5% z = 1.44 P = .14	32.2% z = -2.17 P = .03	20.7% z = -2.17 P = .03	* 41.6% z = -.126 P = .21	26.9% z = -1.26 P = .21	32.1% z = -.92 P = .36	40.6% z = -.92 P = .36	53.5% z = -3.64 P = .0003	* 22.2% z = -3.64 P = .0003	193
Last saw other type of MD.	24.4% z = -.72 P = .47	29.2% z = -2.57 P = .01	9.1% z = -2.57 P = .01	* 30.3% z = -.47 P = .64	22.7% z = -1.26 P = .21	36.8% z = 1.62 P = .10	23.4% z = 1.62 P = .10	22.2% z = 1.34 P = .18	32.6% z = 1.34 P = .18	193
Last went to hospital or clinic.	12.5% z = -1.61 P = .11	21.9% z = 3.69 P = .0002	47.0% z = 3.69 P = .0002	* 13.5% z = 1.21 P = .22	26.5% z = 1.21 P = .22	15.2% z = -.20 P = .84	16.5% z = -.20 P = .84	10.0% z = 2.42 P = .02	* 28.0% z = 2.42 P = .02	193
Who made arrange- ments for MD?	12.3% z = -.72 P = .47	17.1% z = .42 P = .68	13.6% z = .42 P = .68	19.0% z = .64 P = .51	21.4% z = .64 P = .51	21.4% z = -1.20 P = .23	12.0% z = -1.20 P = .23	4.6% z = 3.89 P = .0001	* 59.7% z = 3.89 P = .0001	185
Gone to MD when not sick?	88.9% z = 1.41 P = .15	81.0% z = -.33 P = .73	83.4% z = -.33 P = .73	86.2% z = -.33 P = .73	* 80.5% z = -3.06 P = .002	90.6% z = 1.10 P = .27	83.6% z = 1.10 P = .27	88.8% z = -1.23 P = .22	78.0% z = -1.23 P = .22	189
Have seen dentist in last year?	81.2% z = .95 P = .34	75.2% z = -2.38 P = .02	59.4% z = -2.38 P = .02	* 81.9% z = -1.78 P = .08	63.2% z = -1.78 P = .08	88.7% z = 2.03 P = .04	74.0% z = 2.03 P = .04	77.1% z = .47 P = .64	81.3% z = .47 P = .64	192
Who made arrange- ments for dentist?	10.9% z = -1.27 P = .20	18.1% z = 1.68 P = .09	25.5% z = 1.68 P = .09	11.8% z = -.09 P = .92	13.1% z = -.09 P = .92	24.1% z = 1.58 P = .11	12.5% z = 1.58 P = .11	20.7% z = 3.16 P = .002	* 75.5% z = 3.16 P = .002	189
Worries about school?	15.7% z = 1.44 P = .15	10.3% z = -.06 P = .95	12.8% z = -.06 P = .95	13.1% z = -.122 P = .22	7.8% z = -1.22 P = .22	12.8% z = -.32 P = .75	13.1% z = -.32 P = .75	15.3% z = -1.07 P = .28	10.7% z = -1.07 P = .28	191
Worries about things at home?	21.4% z = -.19 P = .85	22.6% z = -.34 P = .73	21.1% z = -.34 P = .73	24.0% z = -.39 P = .70	19.3% z = -.39 P = .70	22.0% z = -.44 P = .66	22.5% z = -.44 P = .66	19.7% z = .83 P = .40	25.9% z = .83 P = .40	188
Worries about the future?	39.2% z = -2.09 P = .04	* 55.1% z = 1.03 P = .30	54.9% z = 1.03 P = .30	44.3% z = -.61 P = .54	40.5% z = -.61 P = .54	44.9% z = -.36 P = .72	46.7% z = -.36 P = .72	37.4% z = 2.38 P = .02	* 58.0% z = 2.38 P = .02	188
Problems making friends?	6.7% z = .21 P = .83	5.9% z = -.24 P = .81	5.5% z = -.24 P = .81	6.5% z = -.60 P = .55	3.7% z = -.60 P = .55	6.8% z = .17 P = .87	6.3% z = .17 P = .87	6.4% z = .04 P = .97	6.2% z = .04 P = .97	190
Problems about dating?	11.5% z = -1.23 P = .22	18.2% z = -.43 P = .67	11.4% z = -.43 P = .67	14.8% z = .78 P = .43	19.5% z = .78 P = .43	7.1% z = -1.52 P = .13	17.6% z = -1.52 P = .13	10.1% z = 1.57 P = .12	20.7% z = 1.57 P = .12	184
Ever felt like hurting yourself?	13.7% z = -1.53 P = .123	22.7% z = -.87 P = .38	12.0% z = -.87 P = .38	18.7% z = 1.74 P = .08	30.7% z = 1.74 P = .08	16.8% z = -.24 P = .81	17.5% z = -.24 P = .81	15.3% z = .71 P = .47	20.1% z = .71 P = .47	190
Do you drink alcohol?	33.9% z = .59 P = .55	29.2% z = -1.36 P = .17	20.3% z = -1.36 P = .17	34.8% z = -.15 P = .88	30.3% z = -.15 P = .88	27.0% z = -.59 P = .56	32.5% z = -.59 P = .56	10.2% z = 5.78 P < .0001	* 72.5% z = 5.78 P < .0001	189
Do you take drugs?	7.2% z = -1.03 P = .30	12.0% z = -.60 P = .55	0.0% z = -.60 P = .55	9.5% z = .08 P = .44	9.0% z = .08 P = .44	8.9% z = -.52 P = .60	9.2% z = -.52 P = .60	3.2% z = 3.14 P = .002	* 27.7% z = 3.14 P = .002	187
Do you smoke cigarettes?	9.5% z = -2.77 P = .005	* 27.9% z = .51 P = .61	19.1% z = .51 P = .61	15.2% z = 1.51 P = .13	28.9% z = 1.51 P = .13	15.5% z = -.58 P = .56	16.7% z = -.58 P = .56	3.2% z = 2.98 P = .003	* 32.7% z = 2.98 P = .003	182
Do you smoke marijuana?	21.5% z = -.59 P = .55	25.4% z = -.86 P = .39	17.0% z = -.86 P = .39	24.3% z = .20 P = .84	22.7% z = .20 P = .84	22.7% z = -.72 P = .47	23.3% z = -.72 P = .47	11.6% z = 3.87 P = .0001	* 45.2% z = 3.87 P = .0001	190



Table 2. Health Care and Health Status [cont.]

Question	Sex		Ethnic Group			Family Unit		Age		N
	Male	Female	Black	White	Hispanic	Single	Intact	13	17	
Diastolic blood pressure	79.2%	68.2%	69.5	70.5	66.7	69.9	69.1	69.0	70.4	186
	<i>df</i> = 1,172		<i>df</i> = 2,172			<i>df</i> = 1,172		<i>df</i> = 1,172		
	<i>F</i> = 2.80 <i>P</i> = .10		<i>F</i> = 1.82 <i>P</i> = .17			<i>F</i> = .31 <i>P</i> = .57		<i>F</i> = 1.40 <i>P</i> = .24		
Systolic blood pressure	108.1%	*113.0	111.0	110.2	113.7	111.2	111.2	108.5	*114.7	186
	<i>df</i> = 1,172		<i>df</i> = 2,172			<i>df</i> = 1,172		<i>df</i> = 1,172		
	<i>F</i> = 2.11 <i>P</i> = .01		<i>F</i> = .35 <i>P</i> = .71			<i>F</i> = .09 <i>P</i> = .77		<i>F</i> = 10.93 <i>P</i> = .001		
Accidents	20.1%	14.3%	14.7%	18.0%	14.1%	17.2%	17.4%	14.7%	21.3%	190
	<i>z</i> = 1.04		<i>z</i> = -.43			<i>z</i> = -.03		<i>z</i> = .98		
	<i>P</i> = .30		<i>P</i> = .67			<i>P</i> = .93		<i>P</i> = .33		
Decayed missing and filled teeth	5.88	6.49	6.67	6.14	5.14	5.91	6.81	4.88	* 7.68	177
	<i>df</i> = 1,163		<i>df</i> = 2,163			<i>df</i> = 1,163		<i>df</i> = 1,163		
	<i>F</i> = 1.38 <i>P</i> = .24		<i>F</i> = .95 <i>P</i> = .39			<i>F</i> = .90 <i>P</i> = .35		<i>F</i> = 14.7 <i>P</i> = .001		

\**P* < .05.

cantly less frequent visits than intact families. When the percentage for blacks is examined, the picture closely resembles the findings of Brunswick and Josephson (6). The significance of the finding for single versus intact families is unclear, and may reflect economic differences.

Dental appointment arrangements followed the same pattern as for medical care. Thirteen percent (13%) reported taking responsibility themselves for making an appointment. By the age of 17 years, most adolescents were taking responsibility for this task.

#### Personal and Family Concerns

A series of questions was asked regarding personal and social concerns (Table 2). The most prevalent concerns were about the future. The male/female and age differences were significant. Though the approach of adulthood could explain the age difference, the reason for a sex difference is unclear. An ethnic difference also appeared with the black population having the greatest concern but this was not statistically significant. Problems at school (28.8%) and at home (22.3%) and self-destructive impulses (17.4%) were the next highest ranked problems.

#### Substance Abuse

The study subjects were asked about their use of various types of substances. The results are shown in Table 2. The highest prevalence rates were for alcohol (31.7%), marijuana (23.2%), cigarettes

(15.9%), and drugs (9.1%). Age appears as a statistically significant variable with all these factors. For example, smoking goes from 3.2% at age 13 years old to 32.7% at 17 years of age and drinking from 10.2% at 13 to 72.5% at 17 years of age.

#### Morbidity

The aspects of adolescent morbidity assessed were blood pressure, accidents, dental health, and medical morbidity. The relationship of health care services utilization with morbidity was analyzed.

Blood pressure measurements were taken at the beginning and end of the interview. The measurements used for analysis were the average of the initial and final diastolic and systolic pressures. The Statistical Package for the Social Sciences (SPSS) analysis of covariance procedure (21) was used to analyze the data. The results are shown in Table 2. As can be seen, no independent variable was significant for the diastolic blood pressure. For the systolic blood pressure females had significantly higher readings than males, and the increase of systolic blood pressure with age was also significant.

When the youths were asked if in the past year they had had an accident that kept them out of school for a day or longer, 17.3% responded in the affirmative. The results of our analysis are shown in Table 2. No independent variable reached significance.

A number of measures of dental morbidity were used. The assessment of dental health by nondental

Table 3. Decay and Dental Care

	Sex		Ethnic Group			Family Unit		Age		Dental visit		N
	Male	Female	Black	White	Hispanic	Single	Intact	13	17	<1 yr	>1 yr	
Decayed teeth.	10.7%	8.6%	32.5%	*8.8%	6.53%	8.2%	10.3%	8.4%	11.7%			185
	z = .46		z = 3.08		z = .64	z = -.46	z = -.41					
	P = .65		P = .002		P = .64	P = .68	P = .55					
Decayed teeth and dental visits.	11.3%	8.7%	28.1%	*7.6%	5.4%	10.4%	9.6%	8.2%	12.2%	7.3%	*24.7%	185
	z = -2.54		z = .67		z = 2.56	z = -.67	z = .14		z = .68			
	P = .01		P = .01		P = .01	P = .50	P = .88	P = .49		P = .01		

\*P &lt; .05.

personnel may be less reliable and may increase the probability of more conservative estimates of dental problems. The DMF Index is the average number of decayed, missing, and filled teeth. The DMF Index for this sample was analyzed by analysis of covariance using the SPSS covariance procedure (21). The results are shown in Table 2. The mean DMF Index for this sample was 6.14 which was comparable to that reported by the National Health Survey (17).

A separate analysis was also carried out for the presence of decayed teeth. In our sample, 9.7% of youth had carious teeth. A logistic regression was carried out (Table 3). The dependent variable was therefore binary, whether the youth had none or some dental caries. Only the comparison of black and white youths was significant. Of the white population, 8.76% had some carious teeth compared to 32.3% of the black population. Another analysis was carried out as to whether or not the adolescent had had dental care within the year prior to assessment. For those having had dental care within a year, 7.3% had dental caries in contrast to 24.7% for those who had not. Although black/white differentials are reduced, they are not eliminated.

Any significant medical problems found on physical examination were recorded. The prevalence of diseases or abnormalities greater than or equal to 2% are shown in Table 4. In our survey 34.2% of adolescents were "well". The most prevalent condition was acne, followed by malocclusion, dental caries, refractive errors, anemia, and scoliosis. Brunswick and Josephson (6) found that one-third of their population had no abnormal health condition.

Most of the health conditions found were not a serious health risk nor a cause of serious disability. An analysis of the sample was carried out excluding such nonsignificant conditions as acne, dental conditions, obesity, refractive errors, hay fever, viral or other minor infections, adolescent adjustment reactions, etc. When this was done, 64.9% of adoles-

cents could be classified as having no significant health condition.

A logistic analysis was also carried out as described above for whether or not any condition was present. This is shown in Table 5. Little variation was evident among any of the independent variables except for a nonsignificant difference among ethnic groups and an increase with age. An analysis was also carried out eliminating nonsignificant conditions. Health care variables were also added to the logistic regression. Again, no variables significant but the ethnic group differences still existed and the family structure differences were increased. Health care utilization behaviors were not significantly related to the health conditions.

### Discussion

The goal of this study was to carry out a comprehensive assessment of adolescent health within a "normal" population. With regard to health care behavior, in general, the results were consistent with the national data showing that medical and dental care

Table 4. Medical Conditions

Condition	Percentage
Well adolescent	34.5%
Acne	31.7%
Malocclusion	24.0%
Dental caries	9.6%
Obesity	8.8%
Refractive error	8.8%
Scoliosis	6.7%
Anemia	6.2%
Upper respiratory infection	4.1%
Adolescent adjustment reaction	3.6%
Hayfever	3.1%
Asthma	2.5%
High blood pressure	2.5%
Cardiac abnormality	2.5%
Ear or hearing abnormality	2.5%



Table 5. Medical Morbidity

Morbidity	Sex		Ethnic Group			Family Unit		Age		Reg. MD		Visit		N
	Male	Female	Black	White	Hispanic	Single	Intact	13	17	yes	no	<1 yr	>1 yr	
Any condition	66.3%	64.7%	73.0%	64.1%	70.2%	65.5%	66.6%	63.0%	69.2%					193
	<i>z</i> = .28		<i>z</i> = .95		<i>z</i> = .50	<i>z</i> = -.36		<i>z</i> = .77						
	<i>P</i> = .78		<i>P</i> = .34		<i>P</i> = .61	<i>P</i> = .72		<i>P</i> = .44						
Significant condition	38.2%	31.6%	36.1%	34.1%	50.0%	39.3%	33.9%	34.9%	35.7%					193
	<i>z</i> = -.93		<i>z</i> = .10		<i>z</i> = 1.60	<i>z</i> = -.64		<i>z</i> = -.10						
	<i>P</i> = .35		<i>P</i> = .92		<i>P</i> = .11	<i>P</i> = .52		<i>P</i> = .92						
Significant condition and health care	33.6%	31.4%	39.0%	33.7%	52.1%	41.9%	33.1%	35.4%	35.1%	34.7%	35.5%	37.0%	23.9%	186
	<i>z</i> = .98		<i>z</i> = .43		<i>z</i> = 1.72	<i>z</i> = .99		<i>z</i> = -.04		<i>z</i> = -.09		<i>z</i> = 1.17		
	<i>P</i> = .33		<i>P</i> = .66		<i>P</i> = .08	<i>P</i> = .32		<i>P</i> = .97		<i>P</i> = .92		<i>P</i> = .24		

*P* less than .05.

behavior is less than optimal. Almost one-third of those surveyed had not seen a physician in the year prior to assessment and about one-quarter had not seen a dentist. With regard to the latter group, differences were evident between ethnic groups, with black populations showing less frequent dental care utilization.

The providers which adolescents sought for medical care showed consistent differences by age and ethnic group. Adolescents increasingly took responsibility for their own medical and dental care with age. While younger adolescents made use of the private pediatrician, the older adolescents tended to use clinics and hospitals. Health care utilization for adolescent populations, both nationally and within our sample, shows important variation among ethnic groups. Dental care as well as the use of private physicians was more frequent among white adolescents. This difference can reasonably be presumed to reflect economic advantages of White adolescents. The economic differences that characterize ethnic groups in America, apparently extend to the realm of health care during adolescence.

Worries about the future were the most frequent of the personal and family concerns and this was highest among females and older adolescents. No comparative evidence is available but one might speculate that these concerns about the future are part of the "diminished expectations" of the 1980s and the uncertainty our society faces. Parcel et al. (8) in a similar but larger study reported on the dominant worries of 3255 high school students in a triethnic study. Forty-two percent reported worries about school, and 36% problems with parents or family. Both are higher than the Alameda County sample. In our sample the percentage of adolescents who had ever wanted to hurt themselves badly was

17.4%. This type of response covers a great range of possible behaviors, but the high level of an affirmative response appears to be noteworthy.

The findings regarding drug abuse are of note. Not only are prevalence rates generally high, but a strong age gradient is evident. Both the prevalence rates and age gradient are consistent with the study of Johnston and Bachman (10). These problems are significant because alcohol and cigarette abuse, probably the major risk factors for adult mortality, start in adolescence. The significance of age in adolescent substance abuse has been shown by McAlister et al. (23). They found that most young adults who smoke adopted the habit during or before the ninth grade. Preventive efforts not only for the use of cigarettes but for other types of substance abuse should take into consideration the age-gradient phenomena. The significance of adolescence as a "critical period" where these behavior patterns can become established for life needs to be stressed in prevention programs.

Morbidity levels for most diseases were relatively low in our study. By and large, adolescence is probably the healthiest period of life in which morbidity is even less than during childhood (16). However, the sex differences with regard to blood pressure in our study are of note. In our study, the systolic blood pressure was higher in females than males, while the National Health Survey (18) as well as others (24) have found the opposite. At present we have no explanation available of this difference. The finding of no significant differences between independent variables with respect to diastolic blood pressure is consistent with several studies (25,26). No reports of differences due to either Hispanic origin or family unit are available in the literature. The higher reported systolic blood pressure and lower diastolic

pressure for Hispanics in our study are of interest and merit further investigation.

The area of dental health is also significant. The findings regarding ethnic differences in the area of tooth decay and their relationship to dental care utilization are of note. Dental health in adolescents represents a significant area for preventive efforts, and the encouragement of wider utilization might show significant improvement.

### Conclusion

To our knowledge, this is first time that the Hispanic group has been compared to the other two major ethnic categories in the United States on health utilization behavior as well as on health status concerns. This breakdown brings a new and important parameter in the study of adolescent health given the rapidly growing Hispanic population in the United States. It also points to the importance of considering ethnic groups separately in the analysis of health problems and health services utilization behavior.

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