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## Prevalence of caries and tooth Loss among study participants of the Hispanic Community Health/Study of Latinos

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### Abstract

**Background**—The Hispanic/Latino population is projected to increase from 16.7% to 30% by 2050. Previous US national surveys had minimal representation of Hispanic/Latino participants other than Mexican-Americans despite evidence suggesting -Hispanic/Latino country of origin and degree of acculturation influence their health outcomes. This study described prevalence and mean number of cavitated (D<sub>3</sub>) decayed and filled surfaces, missing teeth and edentulism for Hispanics/Latinos of different national origins.

**Methods**—The Hispanic Community Health Study/Study of Latinos (HCHS/SOL) conducted in-person examinations and interviews from over 16,000 participants aged 18–74 in four US cities between March 2008 and June 2011. Missing, filled and carious teeth were identified using modified methods of the National Health and Nutrition Examination Survey. Prevalence estimates (weighted percentages), weighted means, and standard errors were computed for measures.

**Results**—Prevalence of decayed surfaces (DS) ranged from 20.2% to 35.5%, depending on Hispanic/Latino background, while the prevalence of decayed and filled surfaces (DFS) ranged from 82.7% to 87.0%, indicating substantial dental treatment. The prevalence of missing teeth (MT) ranged from 49.8% to 63.8% and differed by Hispanic/Latino background. Significant differences in mean number of DS, DFS, and MT according Hispanic/Latino background group existed within each of the age groups and for females and males.

**Conclusions**—Oral health status does differ by Hispanic/Latino background even with adjustment for age, sex and other characteristics.

**Practical Implications**—These data indicate that Hispanic/Latinos in the US do receive restorative dental treatment and practitioners should consider that Hispanic/Latino origin is associated with oral health status.

### Keywords

Hispanic/Latino; Latino; caries; tooth loss

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### Introduction

Significant, persistent disparities in oral health have been noted in many health surveys conducted in the United States.<sup>1-6</sup> Disparities at all ages are most pronounced in selected minority groups with low education and income. In the most recent adult surveys, non-Hispanic/Latino white participants had a lower prevalence of untreated tooth decay compared with non-Hispanic/Latino black and Mexican-Americans who participated in the survey.<sup>6</sup> However, some measures of oral health are better in Hispanic/Latino groups than other groups. Mexican-Americans have lower rates of complete tooth loss (edentulism) compared with White and Black non-Hispanic/Latinos.<sup>5</sup> The reasons for this difference, which is most pronounced in those over the age of 60 years who did not experience community water fluoridation as children, have not been explained. It does, however, suggest that early life factors such as country of origin can influence a US immigrant's adult oral health status and that risk factors impacting oral health of Hispanic/Latino subgroups are likely multi-faceted.

One large limitation of several previous health surveys is the minimal representation by Hispanic/Latino participants not identifying as Mexican-Americans. The Hispanic/Latino population is the most rapidly growing segment of the United States population, projected to increase from 16.7% to 30% of the US population by 2050<sup>7-9</sup> Evidence suggests that Hispanic/Latino country of origin and degree of acculturation influence their health outcomes. For example, individual cardiovascular risk factors vary considerably according to country of origin and the number of years an individual lives in the US.<sup>10</sup> After recognizing the complexities of the health status in US Hispanic/Latino/Latino communities, the National Heart, Lung and Blood Institute, in partnership with National Center on Minority Health and Health Disparities, the National Institute of Deafness and Other Communications Disorders, the National Institute of Dental and Craniofacial Research, the National Institute of Diabetes and Digestive and Kidney Diseases, the National Institute of Neurological Disorders and Stroke, and the Office of Dietary Supplements, initiated the Hispanic/Latino Community Health Study/Study of Latinos (HCHS/SOL) in 2006. This prospective study was designed to interview and examine 16,000 individuals, ages 18 to 74 years who self-identified as Hispanic/Latino or Latino, from four communities in the United States (approximately 4,000 participants per center). It investigated several facets of health such as cardiovascular disease, stroke, asthma, chronic obstructive lung disease, sleep disorders, hearing impairment and tinnitus, diabetes, kidney and liver disease, cognitive impairment, dental caries and periodontal disease. The communities were selected because they had a strong community structure and stable Hispanic/Latino/Latino populations with residents of Mexican, Cuban, Puerto Rican and Dominican, and Central and South American origin<sup>1</sup>.

Since all Americans, including minority populations, are retaining teeth throughout their lives, it is important to examine a much larger, older, more diverse segment of the US Hispanic/Latino/Latino population. Many previous surveys have focused on the oral health status of US Hispanic/Latino/Latino children. In addition to describing the oral health status of adult Hispanic/Latino/Latino subgroups with greater accuracy, the data from this study provides a better assessment of the oral health needs of Hispanic/Latino/Latino individuals living in the US. This information should help communities target their dental public health programs to those with greatest need.

This paper provides results of the caries portion of the dental examination. Specifically, it describes the prevalence and mean number of cavitated (D3) carious and filled surfaces, missing teeth and dentate status for evaluated Hispanic/Latino subgroups by age group and sex. Indices of periodontal health of this cohort will be described in other papers.

## METHODS

### Study Population and Recruitment

The Hispanic/Latino Community Health Study/Study of Latinos (HCHS/SOL) conducted comprehensive in-person examinations, interviews, and collected biological samples from 16,000 participants ages 18–74 in four US cities (Bronx New York; Chicago; Miami; and San Diego). Each field center was chosen according to the place of origin of the Hispanic/Latino residents and geographic distribution based on the 2005–07 American Community Survey.<sup>12</sup>

The study sample is a two-stage area household probability design composed of three waves of recruitment corresponding to a random probability sample of the target areas in each city. Older adults (45–74 years) were over-sampled at a higher rate than younger adults (18–44 years) at a ratio of approximately 0.625: 0.375, which is the reverse of the age distribution in the US population. The sample weights were non-response adjusted (both at the household and person level), trimmed to truncate extreme outliers so that a few individuals would not have undue influence, and calibrated by a proportional standardized adjustment to the US 2010 Census overall areas from which the four HCHS/SOL centers screened household participants. The methods used to create the sample weights for the study make the collective group of randomly selected participants at a center resemble more closely the composition of the census tracts in which they live. The probability sample for HCHS/SOL enables inferences to census tracts in the four communities chosen for a diversity of Hispanic/Latino backgrounds not to the entire U.S. Hispanic/Latino population since it was intentionally not a nationwide survey.<sup>12</sup>

### Statistical Analyses

Prevalence estimates (weighted percentages), weighted means, and standard errors were computed using SAS version 9.3 © (Cary, NC) and SAS callable SUDAAN version 11 © (RTI Inc.) which is a statistical program that can be used as an adjunct to SAS so that the appropriate variance estimates and statistical tests can be computed using the survey design. The sample weight used is the overall normalized sample weight that is trimmed and

calibrated to the 2010 Census estimates for the census tracts sampled in HCHS/SOL. Age groups (18–34, 35–44, 45–64, 64–74) were constructed to sub-stratify outcome risk groups within the study design cut-point for age (18–44 vs. 45+). Age standardized estimates were produced with SUDAAN. Age and gender stratified estimates by background for the outcome measures were produced using either survey linear (continuous) or logistic (categorical) regression techniques. P-values from Wald chi-square tests were not adjusted for multiple comparisons. Reviewer 1 suggested we add: When a large number of statistical tests are conducted, at any P-value, an expected and unknown (in specific instances) percentage of statistical tests may indicate a true difference when, in fact, no difference between to two groups being compared exists. The various multiple comparison techniques attempt to adjust for these false positives by taking the number of tests into consideration. When no adjustments are made for multiple comparisons, the reader is left to choose if the P-value is significant, given the number of tests conducted. Some explanation may be helpful for the readership.)

**Questionnaire Information**—Study questionnaires administered either prior to or following the dental exam captured information on demographics; measures of socioeconomic status, such as employment status, income, and the SES Ladder Score (The SES economic ladder score was a rating scale of 1 to 10 where the lowest score rung is one and the top rung of the ladder is 10. Participants would mark where they feel they stand on the social ladder. (Test-retest reliability of the SES ladder score in HCHS/SOL was 0.67 which was acceptable for this measure). Last dental visit. and anthropometric measurements also were available.

### Dental Examiners and Calibration

Each of the four study sites had dedicated dental examiners (n=13) who completed training prior to data collection. Examiners were calibrated by an experienced standard examiner with overall inter-rater reliability measures of agreement discussed under Results.

### Dental Exam

After subject consent for participation in the study was obtained and medical history and oral health information reviewed, the examiner performed a screening exam for oral lesions. Once data collection began, all data were entered directly into a web-based data entry system.

**Dental Indices**—The procedures used in this study to determine missing, filled and carious teeth were based on the methods of the National Health and Nutrition Examination Survey ([http://www.cdc.gov/nchs/data/series/sr\\_11/sr11\\_248.pdf](http://www.cdc.gov/nchs/data/series/sr_11/sr11_248.pdf)). Tooth status, caries and restorations were determined by visual examination of all teeth present except third molars only using a #23 explorer and mouth mirror. Tooth status was determined by absence or presence of each tooth. If missing, then the examiner made a determination, after discussion with the participant, the reason for the missing tooth (i.e. trauma, caries, orthodontics, etc). Coronal caries and restorations were assessed by tooth surface on each tooth. Surfaces that had both caries and a restoration were scored as caries. Anterior teeth had four surfaces scored per tooth (lingual, labial, mesial, distal) and posterior teeth had five surfaces per tooth

(lingual, occlusal, buccal, mesial, distal). Root caries was scored as positive or negative for the entire mouth. A positive score indicated the presence of root caries on at least one tooth in the mouth.

### Statement of Ethics

This study was approved by the Institutional Review Board of all participating institutions and all procedures followed were in accordance with respective institutional guidelines. Participants provided informed consent to participate.

### Results

The examiner percent agreement for each of the measured indices for decayed surfaces and missing teeth was 99% and 98% respectively, and 86% for decayed/filled surfaces. Examiner concordance measured by Kappa statistics for decayed surfaces, decayed/filled, and missing teeth was 0.77, 0.80, and 0.92. Corresponding intra-class correlations were 0.51, 0.94, and 0.92.

A total of 15,848 study participants (9492 females, mean age 46, interquartile range (IQR) 19; 6356 males, mean age 45, IQR 22) who completed the dental caries portion of the exam were included in the analyses in this study. The number of study participants by age group was 18-34 (6474), 35-44 (4737), 45-64 (3340), and 65-74 (1277).

The characteristics of this population are presented in Table 1 by Hispanic/Latino subgroup. The subgroups differed by age, sex and by education level. Cuban participants were older. Male participation was highest in the Cuban and Puerto Rican subgroups, and individuals from Cuba, South America, and the other category (data for other category not shown) reported having more education. The pattern differed for income level, with Cubans, Dominicans, and individuals from Central American reporting lower incomes. The groups differed by household size in that Mexican households were larger. Cubans and Dominicans appeared to have lower SES Ladder Scores, yet Dominicans along with Puerto Ricans were more likely to indicate they could afford dental care. Overall, about 33% of the population was employed full time, with individuals of Mexican and South American heritage being more likely to have full time employment. Almost 49% of the group reported having a dental visit within the last year, with Dominicans and Puerto Ricans reporting slightly higher visit rates. About 40% of the group was classified as obese, with Puerto Ricans having a higher prevalence and South Americans less likely to be obese.

Figure 1. presents the age-standardized, weighted prevalence of dental conditions according to subgroups of the HCHS/SOL participants. The prevalence of each condition was age-standardized to the 2010 Census and weighted according to the sampling design. The overall prevalence of one or more decayed surfaces was 29.9 % of participants, with subgroup prevalence ranging from 20.2% among Dominicans to 35.5% among participants from Central America. The overall prevalence of participants with one or more decayed or filled surfaces was 85%, and the prevalence by Hispanic/Latino background, although significantly different, only varied by about three surfaces across all groups. The overall prevalence of participants with at least one decayed root surface was 11.9 %, with

participants of Cuban and Central American backgrounds having a higher prevalence of root surface decay (17% and 15%, respectively). Over half of the participants (57%) had at least one missing tooth, with participants of Cuban, Dominican, Central and South American backgrounds having higher rates. Participants of Mexican background had the lowest prevalence, 49.8%. The overall prevalence of edentulous participants was 4.1 %, with Cubans having the highest prevalence rate at 6.6%. Prevalence rates adjusted for examination center, income, education SES score, and dental visits can be found in the Appendix (Table 1a).

The mean numbers of decayed surfaces according to age, sex, and Hispanic/Latino background are presented in Table 2. Statistical testing found that, overall, one or more of the Hispanic/Latino background groups were significantly different from the others. Background group differences persisted across all age groups, but male – female differences only occurred in the 18–44 year-old and the 55–64 year-old groups. More specifically, it appears that in the 18 – 44 age group, on average, males had significantly more unrestored decayed surfaces. This pattern was most pronounced in those of Cuban, Mexican, and Central American backgrounds. In a subpopulation analysis done to match NHANES, the 55–64 year-old age group, all males regardless of background had more untreated decayed surfaces. Participants with Mexican, Central American, and Puerto Rican backgrounds had higher mean numbers of unfilled carious surfaces, while Dominicans and South Americans had fewer unfilled carious lesions. The mean numbers of decayed carious surfaces adjusted for examination center, income, education, SES score, and dental visits are presented in the Appendix (Table 2a).

The mean number of decayed and filled surfaces according to age, sex, and Hispanic/Latino background is presented in Table 3. Statistical testing indicates that overall and across age and sex groups mean decayed and filled caries surfaces in one or more of the Hispanic/Latino background groups was significantly different from the others. Further, mean decayed and filled surfaces in one or more Hispanic/Latino background groups differed from the others within each of the age groups. Finally, mean decayed and filled caries scores according to gender differed across all of the age groups. In general, those of South American or Mexican background consistently had the highest scores across the age groups. The mean number of decayed and filled surfaces adjusted for examination center, income, education, SES score, and dental visits can be found in the Appendix (Table 3a).

The mean numbers of missing teeth according to age, sex, and Hispanic/Latino background are presented in Table 4. Significant differences in mean number of missing teeth for one or more of the Hispanic/Latino background groups were detected overall and across age and sex groups. Similarly, the mean number of missing teeth in one or more Hispanic/Latino background groups differs from the others within each of the age groups. The mean number of missing teeth according to sex differed for all ages, except the 55–64 age group. On average, Cubans had the highest number of missing teeth (mean = 5.0) and Mexicans the lowest (mean=1.6). The mean number of missing teeth for males and females increased according to age group, with the 18–44 group having an average of 1.14 missing teeth and the 65–74 group having an average of 9.0. In the 18–44 age group, females tend to have a higher mean number of missing teeth across all Hispanic/Latino background groups except

South Americans. In the 45–54 age group, females tend to have a higher mean number of missing teeth across all Hispanic/Latino background groups, although the differences are not large. Females also tended to have a higher number of missing teeth across all Hispanic/Latino background groups, except Central Americans in the 65–74 age group.

## DISCUSSION

The overall purpose of the dental examination of HCHS/SOL was to describe dental disease in a population-based cohort of Hispanic/Latino/Latino persons. The study population had representation from at least five subgroups of Hispanic/Latino origin, making this the largest, most diverse study of the dental health of US Hispanic/Latino/Latinos. This paper provides the findings for decayed surfaces, decayed and filled surfaces, missing teeth due to caries or periodontal disease, dentate status, and root caries presence in five subgroups of Hispanic/Latino origin by age and sex. While the study participants were selected to be representative of Latinos in these four communities, the communities are not necessarily representative of Latinos in the U.S. and patterns of oral health presented in this study may differ for the whole United States.

For all participants, multiple differences of dental health were detected when evaluated across Hispanic/Latino backgrounds. For example, Mexicans and Central Americans had the highest prevalence and mean number of decayed surfaces, while Dominicans had the lowest prevalence of both measures. The differences in the mean number of decayed surfaces was consistent in the different age groups and when analyzed by sex (Table 2). Although Mexicans had the highest mean score of decayed surfaces, they had the least number of teeth missing due to caries or periodontal disease, while participants with Cuban and Dominican backgrounds had much higher numbers, especially in those over the age of 55 years. This is consistent with the edentulism data represented in Figures 2 and 3. Cuban and Dominican subgroups had a higher prevalence than the Mexican subgroup. These differences could reflect, in part, the treatment patterns for dental disease in these subgroups.

Background differences in the prevalence and mean number of teeth of decayed surfaces and decayed and filled surfaces also were apparent within age groups and for both males and females. Background differences were also apparent for the prevalence of edentulism within age groups for both females and males. Many significant differences were detected also by sex in the dental indices reported in this manuscript. This is consistent with past NHANES surveys of all participants, regardless of racial or ethnic background. Adult females aged 20 years and older had a higher number of filled surfaces and lower number of decayed surfaces in the 1999 – 2002 NHANES. In both NHANES I and NHANES III, mean DMFS was higher among women than among men.<sup>13</sup> Reasons for the difference in dental indices of males and females may relate to differences in health seeking behaviors, but the differences warrant further study. When the data from HCHS/SOL are compared to the most recent NHANES data (2005–2008) that provided edentulism data on adults, somewhat consistent patterns are detectable.<sup>14</sup> The prevalence of edentulism in NHANES participants aged 65 years and older that identified as Mexican-Americans was 15.7%; the prevalence in this study was 11.7%. Approximately the same percentage (48%) of adults aged 20–64 who identified as Mexican Americans in NHANES reported losing a tooth to dental disease as all

participants identifying as Mexican in this cohort reported (49%). Twenty to twenty-two percent of Mexican-American adults aged 45 to over 75 years examined in NHANES 2005 – 2008 had at least one untreated surface of dental decay, while 29% of the Mexican HCHS/SOL participants had untreated dental decay.

In conclusion, the large number of participants in this study permits the first useful estimates of oral health among Hispanic/Latinos in the United States according to their country or region of origin. The results show that as far as oral health status is concerned, Hispanic/Latinos in the US are not a homogenous group. There are differences according to Hispanic/Latino background and the causes of these differences need additional exploration. For example, a greater proportion of Cubans reported having education levels above high school, but was less likely to report income levels of \$30,000 per year or more (Table 1). This apparent inconsistency may be due to a much higher proportion of Cubans being age 65 or older and being retired. This complex issue as well as other differences identified through these initial analyses will be studied in the future. The breadth and depth of the data collected during this study will be an important resource in delineating potential social, behavioral, cultural, nutritional, and biological characteristic among study participants of different Hispanic/Latino origins.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgments

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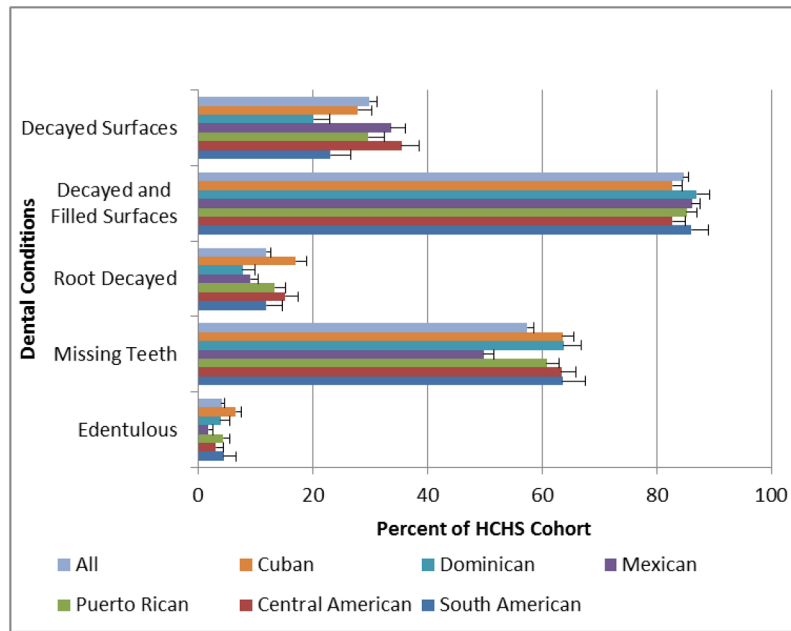
Hispanic/Latino Community Health Study/Study of Latinos thanks study participants for their invaluable participation. The content of this publication is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## References

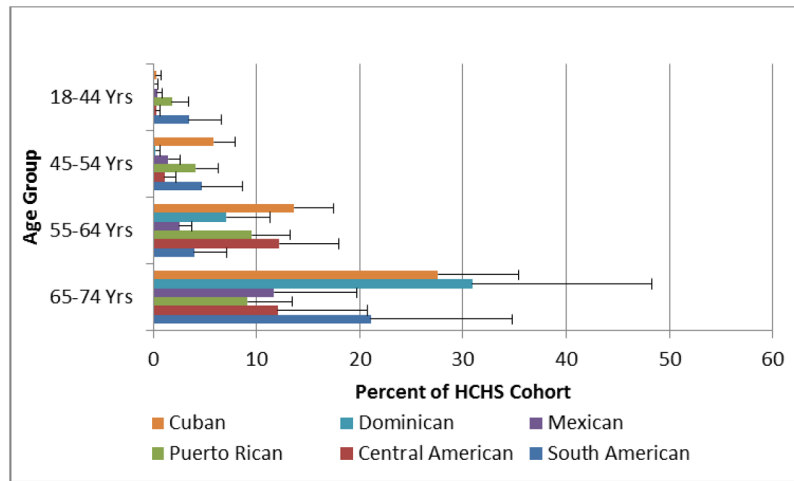
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**Figure 1.** US Census 2010 age standardized weighted prevalence of dental conditions by Hispanic/Latino/Latino background



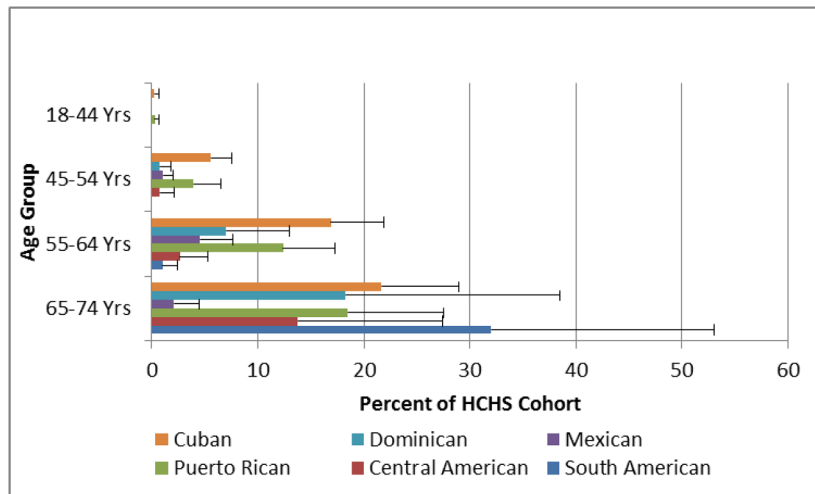
**Figure 2.**  
Prevalence of edentulous females in HCHS/SOL cohort

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**Figure 3.**  
Prevalence of edentulous males in HCHS/SOL cohort

**Table 1**  
**Descriptive characteristics of HCHS/SOL participants by Hispanic/Latino background, weighted percentages and standard errors (SE)**

All values are weighted for study design and nonresponse and are age standardized to the 2010 US Census population

| Characteristic           | <u>Cuban</u> |             | <u>Dominican</u> |             | <u>Mexican</u> |             | <u>Puerto Rican</u> |           | <u>Central American</u> |           | <u>South American</u> |  |
|--------------------------|--------------|-------------|------------------|-------------|----------------|-------------|---------------------|-----------|-------------------------|-----------|-----------------------|--|
|                          | Wt.% (SE)    | Wt.% (SE)   | Wt.% (SE)        | Wt.% (SE)   | Wt.% (SE)      | Wt.% (SE)   | Wt.% (SE)           | Wt.% (SE) | Wt.% (SE)               | Wt.% (SE) | Wt.% (SE)             |  |
| <b>Sex</b>               |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| Male                     | 52.1 (1.01)  | 40.2 (1.93) | 46.8 (0.97)      | 50.7 (1.37) | 47.3 (1.64)    | 44.9 (2.00) |                     |           |                         |           |                       |  |
| Female                   | 47.9 (1.01)  | 59.8 (1.93) | 53.2 (0.97)      | 49.3 (1.37) | 52.7 (1.64)    | 55.2 (2.00) |                     |           |                         |           |                       |  |
| <b>Age Group</b>         |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| 18-44                    | 45.6 (1.52)  | 61.5 (2.15) | 67.2 (1.15)      | 53.3 (1.68) | 64.4 (1.76)    | 55.8 (2.42) |                     |           |                         |           |                       |  |
| 45-54                    | 21.3 (0.92)  | 19.9 (1.41) | 17.2 (0.72)      | 21.3 (1.14) | 17.7 (1.23)    | 22.3 (1.67) |                     |           |                         |           |                       |  |
| 55-64                    | 16.4 (0.87)  | 12.0 (0.93) | 10.7 (0.66)      | 15.5 (1.01) | 11.9 (0.92)    | 13.3 (1.18) |                     |           |                         |           |                       |  |
| 65-74                    | 16.7 (1.21)  | 6.7 (1.02)  | 5.0 (0.44)       | 9.9 (0.97)  | 6.0 (0.82)     | 8.6 (1.29)  |                     |           |                         |           |                       |  |
| <b>Education</b>         |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| No H.S. diploma/GED      | 22.6 (1.06)  | 36.8 (1.86) | 36.3 (1.33)      | 36.0 (1.66) | 38.2 (1.62)    | 22.0 (1.96) |                     |           |                         |           |                       |  |
| H.S. diploma/GED         | 29.9 (1.39)  | 23.4 (1.88) | 30.2 (1.01)      | 28.6 (1.23) | 25.8 (1.43)    | 27.3 (1.86) |                     |           |                         |           |                       |  |
| Greater than H.S./ED     | 47.5 (1.49)  | 39.8 (1.82) | 33.5 (1.56)      | 35.4 (1.64) | 36.0 (1.65)    | 50.7 (2.15) |                     |           |                         |           |                       |  |
| <b>Income</b>            |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| \$15,000<                | 38.9 (1.60)  | 41.5 (2.19) | 26.2 (1.18)      | 35.6 (1.68) | 38.0 (1.92)    | 29.5 (2.01) |                     |           |                         |           |                       |  |
| \$15,000 to \$29,000     | 33.0 (1.40)  | 30.5 (1.64) | 33.5 (1.34)      | 29.1 (1.54) | 35.3 (1.78)    | 34.2 (1.84) |                     |           |                         |           |                       |  |
| \$30,000 and above       | 28.2 (1.65)  | 28.0 (1.84) | 40.3 (1.86)      | 35.3 (1.66) | 26.7 (1.95)    | 36.3 (2.18) |                     |           |                         |           |                       |  |
| <b>Household Size</b>    |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| Below median score       | 50.3 (2.01)  | 33.4 (2.03) | 22.2 (1.04)      | 51.4 (1.55) | 33.4 (1.55)    | 41.0 (2.16) |                     |           |                         |           |                       |  |
| At or above median score | 49.7 (2.01)  | 66.6 (2.03) | 77.8 (1.04)      | 48.6 (1.55) | 66.6 (1.55)    | 59.0 (2.16) |                     |           |                         |           |                       |  |
| <b>SES Ladder Score</b>  |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| Below median score       | 36.7 (1.25)  | 41.6 (2.04) | 27.1 (1.22)      | 31.4 (1.35) | 34.0 (1.48)    | 23.8 (1.84) |                     |           |                         |           |                       |  |
| At or above median score | 63.3 (1.25)  | 58.4 (2.04) | 72.9 (1.22)      | 68.6 (1.35) | 66.0 (1.48)    | 76.2 (1.84) |                     |           |                         |           |                       |  |
| <b>Employment Status</b> |              |             |                  |             |                |             |                     |           |                         |           |                       |  |
| Employed part-time       | 11.1 (0.70)  | 17.4 (1.50) | 19.8 (0.82)      | 11.8 (1.02) | 23.4 (1.36)    | 23.9 (1.58) |                     |           |                         |           |                       |  |
| Employed full-time       | 30.6 (1.23)  | 31.0 (1.88) | 37.1 (1.05)      | 28.3 (1.45) | 35.4 (1.45)    | 39.1 (1.91) |                     |           |                         |           |                       |  |
| Not currently employed   | 58.2 (1.35)  | 51.7 (2.22) | 43.1 (1.06)      | 59.9 (1.47) | 41.2 (1.56)    | 37.0 (2.04) |                     |           |                         |           |                       |  |

| Characteristic           | Cuban       |             | Dominican   |             | Mexican     |             | Puerto Rican |             | Central American |             | South American |             |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|------------------|-------------|----------------|-------------|
|                          | Wt.% (SE)   | Wt.% (SE)   | Wt.% (SE)   | Wt.% (SE)   | Wt.% (SE)   | Wt.% (SE)   | Wt.% (SE)    | Wt.% (SE)   | Wt.% (SE)        | Wt.% (SE)   | Wt.% (SE)      | Wt.% (SE)   |
| <b>Last Dental Visit</b> |             |             |             |             |             |             |              |             |                  |             |                |             |
| < 1 year ago             | 46.9 (1.35) | 63.5 (1.92) | 44.8 (1.26) | 54.1 (1.58) | 42.4 (1.80) | 51.9 (2.36) | 31.6 (1.14)  | 28.4 (1.88) | 39.4 (1.08)      | 32.1 (1.44) | 36.2 (1.70)    | 33.3 (2.02) |
| 1 to <4 years ago        | 31.6 (1.14) | 28.4 (1.88) | 39.4 (1.08) | 32.1 (1.44) | 36.2 (1.70) | 33.3 (2.02) | 21.5 (1.14)  | 8.1 (1.05)  | 15.8 (0.78)      | 13.8 (0.98) | 21.4 (1.43)    | 14.9 (1.68) |
| 4+ years ago             | 21.5 (1.14) | 8.1 (1.05)  | 15.8 (0.78) | 13.8 (0.98) | 21.4 (1.43) | 14.9 (1.68) |              |             |                  |             |                |             |
| <b>BMI</b>               |             |             |             |             |             |             |              |             |                  |             |                |             |
| Normal                   | 23.9 (1.15) | 20.5 (1.44) | 21.4 (0.80) | 20.0 (1.36) | 23.3 (1.58) | 27.5 (2.24) | 37.8 (1.25)  | 37.7 (1.92) | 39.5 (1.23)      | 33.3 (1.39) | 39.1 (1.77)    | 42.6 (2.21) |
| Overweight               | 37.8 (1.25) | 37.7 (1.92) | 39.5 (1.23) | 33.3 (1.39) | 39.1 (1.77) | 42.6 (2.21) | 38.4 (1.22)  | 41.7 (1.98) | 39.1 (1.28)      | 46.7 (1.55) | 37.6 (1.42)    | 29.9 (1.97) |
| Obese                    | 38.4 (1.22) | 41.7 (1.98) | 39.1 (1.28) | 46.7 (1.55) | 37.6 (1.42) | 29.9 (1.97) |              |             |                  |             |                |             |

Household median size is 2.72, SES ladder median score is 4

**Table 2**  
**Weighted mean (standard error) and 95% confidence interval of the mean for decayed surfaces for age group and gender by Hispanic/Latino participant subgroups**

All values are weighted for study design and nonresponse and are age standardized to the 2010 US Census population

| Age                      | Gender | Cuban      |         | Dominican  |          | Mexican    |          | Puerto Rican |          | Central American |          | South American |          |
|--------------------------|--------|------------|---------|------------|----------|------------|----------|--------------|----------|------------------|----------|----------------|----------|
|                          |        | Mean(SE)   | C.I.    | Mean(SE)   | C.I.     | Mean(SE)   | C.I.     | Mean(SE)     | C.I.     | Mean(SE)         | C.I.     | Mean(SE)       | C.I.     |
| 18-44                    | Male   | 1.2 (0.15) | 0.9,1.5 | 0.6 (0.15) | 0.3, 0.9 | 1.8 (0.15) | 1.5, 2.1 | 1.2 (0.14)   | 0.9, 1.5 | 1.8 (0.20)       | 1.4, 2.2 | 0.8 (0.15)     | 0.5, 1.1 |
|                          | Female | 0.8 (0.11) | 0.6,1.0 | 0.7 (0.11) | 0.4, 0.9 | 1.3 (0.09) | 1.1, 1.5 | 1.2 (0.22)   | 0.8, 1.7 | 1.6 (0.18)       | 1.2, 1.9 | 1.0 (0.19)     | 0.6, 1.4 |
| 45-54                    | Male   | 1.0 (0.15) | 0.8,1.4 | 0.7 (0.19) | 0.3, 1.0 | 1.0 (0.11) | 0.8, 1.2 | 1.0 (0.14)   | 0.8, 1.3 | 1.2 (0.23)       | 0.7, 1.6 | 0.7 (0.17)     | 0.3, 1.0 |
|                          | Female | 0.8 (0.10) | 0.6,1.0 | 0.2 (0.06) | 0.1, 0.2 | 1.2 (0.11) | 1.0, 1.4 | 1.0 (0.23)   | 0.6, 1.5 | 0.9 (0.12)       | 0.6, 1.1 | 0.5 (0.10)     | 0.3, 0.7 |
| 55-64                    | Male   | 1.0 (0.13) | 0.7,1.2 | 0.5 (0.11) | 0.2, 0.7 | 1.7 (0.33) | 1.1, 2.4 | 0.7 (0.13)   | 0.4, 1.0 | 1.6 (0.46)       | 0.7, 2.5 | 0.7 (0.16)     | 0.4, 1.0 |
|                          | Female | 0.4 (0.06) | 0.3,0.6 | 0.3 (0.08) | 0.2, 0.5 | 0.9 (0.14) | 0.7, 1.2 | 0.6 (0.12)   | 0.4, 0.8 | 0.5 (0.08)       | 0.3, 0.7 | 0.5 (0.11)     | 0.3, 0.7 |
| 65-74                    | Male   | 0.8 (0.48) | 0.0,1.8 | 0.2 (0.13) | 0.0, 0.5 | 1.0 (0.25) | 0.5, 1.5 | 0.7 (0.15)   | 0.4, 1.0 | 0.7 (0.38)       | 0.0, 1.5 | 0.7 (0.37)     | 0.0, 1.4 |
|                          | Female | 0.4 (0.08) | 0.1,0.2 | 0.1 (0.03) | 0.0, 0.2 | 0.6 (0.13) | 0.3, 0.9 | 0.4 (0.12)   | 0.2, 0.7 | 1.0 (0.20)       | 0.6, 1.3 | 1.1 (0.60)     | 0.0, 2.3 |
| <b>Total<sup>1</sup></b> |        | 0.9 (0.07) | 0.8,1.0 | 0.5 (0.06) | 0.4, 0.7 | 1.4 (0.07) | 1.3, 1.5 | 1.0 (0.08)   | 0.9, 1.2 | 1.4 (0.09)       | 1.3, 1.6 | 0.8 (0.09)     | 0.6, 1.0 |

<sup>1</sup> P-value from overall Wald test for differences between background groups is <0.0001

<sup>2</sup> P-value from overall Wald test for differences by background groups across the age and sex classes is <0.0001

<sup>3</sup> P-values for differences by Background groups within each age group, 18-44 yrs (<0.0001), 45-54 yrs (<0.0001), 55-64 yrs (<0.0001), 65-74 (<0.0001)

<sup>4</sup> P-values for differences by Gender within each age group, 18-44 yrs (0.0015), 45-54 yrs (0.4054), 55-64 yrs (0.0002), 65-74 (0.1869)

**Table 3**  
**Weighted mean (standard error) for decayed and filled surfaces for age group and gender by Hispanic/Latino participant subgroups**  
 All values are weighted for study design and nonresponse and are age standardized to the 2010 US Census population

| Hispanic Background <sup>3</sup> | Age    | Sex <sup>4</sup> | Cuban       |            | Dominican   |            | Mexican     |            | Puerto Rican |            | Central American |            | South American |            |
|----------------------------------|--------|------------------|-------------|------------|-------------|------------|-------------|------------|--------------|------------|------------------|------------|----------------|------------|
|                                  |        |                  | Mean(SE)    | C.I.       | Mean(SE)    | C.I.       | Mean(SE)    | C.I.       | Mean(SE)     | C.I.       | Mean(SE)         | C.I.       | Mean(SE)       | C.I.       |
| 18-44                            | Male   |                  | 9.6 (0.54)  | 8.5, 10.7  | 8.3 (0.58)  | 7.1, 9.4   | 9.1 (0.37)  | 8.4, 9.8   | 8.9 (0.51)   | 7.9, 9.9   | 7.7 (0.57)       | 6.5, 8.8   | 9.9 (0.92)     | 8.1, 11.7  |
|                                  | Female |                  | 11.8 (0.54) | 10.8, 12.9 | 13.1 (1.67) | 9.8, 16.4  | 13.0 (0.40) | 12.2, 13.8 | 11.3 (0.51)  | 10.3, 12.3 | 10.5 (0.53)      | 9.4, 11.5  | 15.4 (1.05)    | 13.3, 17.4 |
| 45-54                            | Male   |                  | 13.5 (0.57) | 12.4, 14.6 | 13.9 (0.95) | 12.0, 15.8 | 14.8 (0.85) | 13.1, 16.5 | 12.4 (1.21)  | 10, 14.7   | 14.6 (2.33)      | 10.1, 19.2 | 16.7 (1.35)    | 14.0, 19.3 |
|                                  | Female |                  | 15.5 (0.65) | 14.2, 16.8 | 17.9 (1.09) | 15.8, 20.1 | 21.0 (0.79) | 19.4, 22.5 | 15.8 (0.67)  | 14.5, 17.1 | 15.8 (0.95)      | 13.9, 17.7 | 21.6 (1.09)    | 19.5, 23.7 |
| 55-64                            | Male   |                  | 11.7 (0.82) | 10.1, 13.3 | 11.2 (1.02) | 9.2, 13.2  | 14.9 (0.77) | 13.3, 16.4 | 12.0 (1.09)  | 9.8, 14.1  | 14.0 (1.34)      | 11.4, 16.6 | 14.4 (1.75)    | 11.0, 17.9 |
|                                  | Female |                  | 15.9 (0.96) | 14.0, 17.8 | 14.5 (1.18) | 12.2, 16.8 | 21.3 (0.84) | 19.7, 23   | 17.8 (1.01)  | 15.9, 19.8 | 18.1 (1.09)      | 15.9, 20.2 | 20.8 (1.67)    | 17.6, 24.1 |
| 65-74                            | Male   |                  | 12.9 (1.99) | 9.0, 16.8  | 8.9 (1.55)  | 5.8, 11.9  | 20.6 (2.37) | 15.9, 25.2 | 13.3 (1.89)  | 9.6, 17    | 12.0 (2.32)      | 7.5, 16.6  | 17.0 (3.53)    | 10.1, 24.0 |
|                                  | Female |                  | 15.7 (2.18) | 11.4, 20.0 | 11.0 (2.27) | 6.6, 15.5  | 23.5 (2.22) | 19.1, 27.8 | 14.2 (1.32)  | 11.6, 16.8 | 17.6 (2.41)      | 12.8, 22.3 | 16.3 (3.39)    | 9.6, 22.9  |
| Total/                           |        |                  | 12.4 (0.38) | 11.7, 13.2 | 12.4 (0.67) | 11.1, 13.7 | 13.6 (0.31) | 13, 14.2   | 12.0 (0.33)  | 11.3, 12.6 | 11.3 (0.42)      | 10.5, 12.1 | 15.2 (0.60)    | 14.0, 16.4 |

<sup>1</sup> P-value from overall Wald test for differences between background groups is <0.0001

<sup>2</sup> P-value from overall Wald test for differences by background groups across the age and sex classes is <0.0001

<sup>3</sup> P-values for differences by Background groups within each age group, 18-44 yrs (<0.0001), 45-54 yrs (<0.0001), 55-64 yrs (<0.0001), 65-74 (<0.0001)

<sup>4</sup> P-values for differences by Gender within each age group, 18-44 yrs (<0.0001), 45-54 yrs (<0.0001), 55-64 yrs (<0.0001), 65-74 (0.0598)



**Table 4**  
**Weighted mean (standard error) for missing teeth due to caries or periodontal disease by Hispanic/Latino subgroups**

All values are weighted for study design and nonresponse and are age standardized to the 2010 US Census population

| Hispanic Background | Age                      | Sex <sup>4</sup> | Cuban       |           | Dominican   |            | Mexican    |          | Puerto Rican |           | Central American |           | South American |           |
|---------------------|--------------------------|------------------|-------------|-----------|-------------|------------|------------|----------|--------------|-----------|------------------|-----------|----------------|-----------|
|                     |                          |                  | Mean(SE)    | C.I.      | Mean(SE)    | C.I.       | Mean(SE)   | C.I.     | Mean(SE)     | C.I.      | Mean(SE)         | C.I.      | Mean(SE)       | C.I.      |
|                     | <b>18-44</b>             | Male             | 1.8 (0.13)  | 1.5, 2.0  | 1.1 (0.16)  | 0.8, 1.4   | 0.6 (0.06) | 0.5, 0.7 | 1.1 (0.12)   | 0.9, 1.4  | 1.1 (0.10)       | 0.9, 1.3  | 1.8 (0.27)     | 1.3, 2.3  |
|                     |                          | Female           | 2.0 (0.17)  | 1.6, 2.3  | 1.4 (0.14)  | 1.1, 1.6   | 0.9 (0.06) | 0.8, 1.0 | 1.5 (0.14)   | 1.3, 1.8  | 1.6 (0.14)       | 1.4, 1.9  | 1.8 (0.23)     | 1.3, 2.2  |
|                     | <b>45-54</b>             | Male             | 5.3 (0.31)  | 4.7, 5.9  | 4.8 (0.45)  | 3.9, 5.7   | 2.0 (0.17) | 1.7, 2.3 | 4.2 (0.32)   | 3.6, 4.8  | 4.5 (0.48)       | 3.6, 5.5  | 4.5 (0.44)     | 3.6, 5.3  |
|                     |                          | Female           | 6.8 (0.34)  | 6.1, 7.4  | 4.9 (0.35)  | 4.2, 5.6   | 2.9 (0.15) | 2.6, 3.2 | 5.0 (0.40)   | 4.2, 5.8  | 4.6 (0.30)       | 4.0, 5.2  | 4.8 (0.46)     | 3.9, 5.7  |
|                     | <b>55-64</b>             | Male             | 9.1 (0.48)  | 8.1, 10.0 | 7.9 (0.69)  | 6.5, 9.2   | 3.6 (0.37) | 2.9, 4.4 | 7.8 (0.44)   | 7.0, 8.7  | 4.9 (0.48)       | 3.9, 5.8  | 7.1 (0.57)     | 5.9, 8.2  |
|                     |                          | Female           | 9.3 (0.47)  | 8.3, 10.2 | 7.8 (0.49)  | 6.8, 8.8   | 4.0 (0.28) | 3.4, 4.5 | 7.4 (0.57)   | 6.3, 8.5  | 7.5 (0.48)       | 6.5, 8.4  | 8.7 (0.57)     | 7.6, 9.8  |
|                     | <b>65-74</b>             | Male             | 9.9 (0.71)  | 8.5, 11.3 | 10.9 (1.09) | 8.7, 13.0  | 4.3 (0.47) | 3.4, 5.2 | 9.6 (0.96)   | 7.7, 11.5 | 9.5 (2.00)       | 5.6, 13.4 | 7.8 (1.12)     | 5.6, 10.0 |
|                     |                          | Female           | 11.0 (0.78) | 9.5, 12.6 | 12.4 (1.09) | 10.2, 14.5 | 6.4 (0.58) | 5.2, 7.5 | 10.0 (0.59)  | 8.9, 11.2 | 9.5 (0.80)       | 7.9, 11.0 | 10.6 (1.41)    | 7.8, 13.4 |
|                     | <b>Total<sup>1</sup></b> |                  | 5.0 (0.16)  | 4.7, 5.3  | 3.3 (0.20)  | 2.9, 3.7   | 1.6 (0.05) | 1.5, 1.7 | 3.7 (0.14)   | 3.4, 4.0  | 2.9 (0.14)       | 2.6, 3.2  | 3.8 (0.22)     | 3.4, 4.3  |

<sup>1</sup> P-value from overall Wald test for differences between background groups is <0.0001

<sup>2</sup> P-value from overall Wald test for differences by background groups across the age and sex classes is <0.0001

<sup>3</sup> P-values for differences by Background groups within each age group, 18-44 yrs (<0.0001), 45-54 yrs (<0.0001), 55-64 yrs (<0.0001), 65-74 (<0.0001)

<sup>4</sup> P-values for differences by Sex within each age group, 18-44 yrs (<0.0001), 45-54 yrs (0.0009), 55-64 yrs (0.8787), 65-74 (0.0326)

Note: Full mouth tooth counts are based on the expectation of 32 adult teeth.