Language Spoken and Differences in Health Status, Access to Care, and Receipt of Preventive Services Among US Hispanics

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More than 1 in 10 US residents now speak Spanish at home, and approximately half of these persons report an ability to speak English less than "very well."[1] Language preference and English language proficiency have previously been associated with health-related behaviors, disease prevalence, and receipt of health care services among Hispanics,[2–6] but lack of sufficient individual-level population-based data on ethnicity, socioeconomic position, acculturation, and language has limited our ability to document the extent of language-associated disparities or to understand their component causes.[7]

The utility of national surveys in monitoring health disparities and informing public health interventions relies upon methodologic adaptation to the increasing diversity of the US population.[8] One of the most important sources of national data for identifying emerging health problems, developing public health policies and targeted prevention programs, and tracking progress toward meeting the *Healthy People 2010* objectives is the Behavioral Risk Factor Surveillance System (BRFSS) sponsored by the Centers for Disease Control and Prevention.[9] The BRFSS has included an optional Spanish-language survey instrument since 1987, but until recently, few states conducted Spanish-language interviews. Spanish-language survey data are now available from 23 states, which together represent approximately 90% of the total US Hispanic population. Thus, it is newly possible to describe rates of common population health indicators for a nationally representative sample of Spanish-speaking adults and to broadly examine language-associated disparities within the US Hispanic population.

We sought to (1) provide a broad, national overview of the current US Spanish-speaking population, examining chronic disease prevalence, risk factors, self-reported health status, access to care, and receipt of preventive health services; (2) assess the extent to which language is associated with these health indicators

among US Hispanics; and (3) examine regional variation in these health indicators among Spanish-speaking Hispanics. Comparative indicators for English-speaking Hispanic respondents are given to provide a context for evaluating and responding to the health risks and health care needs of the Spanish-speaking population.

METHODS

Survey and Sample

The BRFSS is an ongoing, state-based random-digit-dialed telephone survey of the US civilian, noninstitutionalized population 18 years or older with household (land-line) telephones. We examined health indicators that were measured in the core sections of the BRFSS questionnaire in the period of 2003 to 2005 by using data from states that conducted the survey in both English and Spanish. These included 20 states in 2003 (Arizona,

California, Colorado, Connecticut, Florida, Illinois, Indiana, Kansas, Massachusetts, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Rhode Island, Texas, Utah, and Washington), 2 additional states in 2004 (Oregon and Virginia), and 1 additional state in 2005 (Arkansas). Together, these states account for approximately 90% of the total US Hispanic population according to 2000 census estimates.[10]

We limited the analyses to respondents who identified themselves as Hispanic or Latino (n=45076), which we refer to hereafter as Hispanic. Those who chose to complete the survey in Spanish made up the Spanish-speaking Hispanic group for this study, and those who completed the survey in English made up the English-speaking Hispanic group.

Measures

We selected 25 indicators from the BRFSS survey to assess chronic disease prevalence,

Objectives. We examined self-reported health status, health behaviors, access to care, and use of preventive services of the US Hispanic adult population to identify language-associated disparities.

Methods. We analyzed 2003 to 2005 Behavioral Risk Factor Surveillance System data from 45076 Hispanic adults in 23 states, who represented 90% of the US Hispanic population, and compared 25 health indicators between Spanish-speaking Hispanics and English-speaking Hispanics.

Results. Physical activity and rates of chronic disease, obesity, and smoking were significantly lower among Spanish-speaking Hispanics than among English-speaking Hispanics. Spanish-speaking Hispanics reported far worse health status and access to care than did English-speaking Hispanics (39% vs 17% in fair or poor health, 55% vs 23% uninsured, and 58% vs 29% without a personal doctor) and received less preventive care. Adjustment for demographic and socioeconomic factors did not mitigate the influence of language on these health indicators.

Conclusions. Spanish-language preference marks a particularly vulnerable subpopulation of US Hispanics who have less access to care and use of preventive services. Priority areas for Spanish-speaking adults include maintenance of healthy behaviors, promotion of physical activity and preventive health care, and increased access to care. (*Am J Public Health.* 2008;98:2021–2028. doi:10.2105/AJPH.2007.119008)

health behaviors and risk factors, access to care, quality of life, and receipt of preventive services.

The presence of 4 chronic conditions was assessed by respondent self-report of having ever had a diagnosis of the following: arthritis, asthma, diabetes, or high blood pressure. Health behaviors and risk factors were assessed with 6 items: current smoking status (yes or no), binge drinking (≥5 drinks on 1 occasion during the past month), recommended physical activity (moderate physical activity for ≥30 minutes per day, ≥5 days per week, or vigorous physical activity for ≥20 minutes per day, ≥3 days per week), any leisure-time physical activity (yes or no), recommended fruit and vegetable intake (dichotomized at ≥5 servings per day), and obesity (body mass index >30 kg/m^2, calculated from self-report of height and weight).

Health status and quality of life items addressed current perceived health (dichotomized as poor or fair, or good, very good, or excellent), poor mental health days (dichotomized at ≥14 days and <14 days in the past month of poor mental health), poor physical health days (dichotomized at ≥14 days and <14 days in the past month), and activity limitation (number of days activity was limited by poor health, dichotomized at ≥14 days and <14 days in the past month). Access to care was assessed with 4 items: health insurance status (dichotomized as insured or uninsured), lack of a personal physician (yes or no), inability to see a doctor because of cost in the past year (yes or no), and no routine medical checkup in the past year (yes or no).

Receipt of preventive services was assessed with 7 items. All respondents were asked whether they had had a dental visit in the past year, a flu shot in the past year, and a pneumonia shot ever. Respondents 50 years and older were asked whether they had had a sigmoidoscopy or colonoscopy in the past 10 years. Men 50 years and older were asked whether they had ever had a prostate-specific antigen test for prostate cancer screening. Women 40 years and older were asked whether they had had a clinical breast examination and a mammogram in the past 2 years. Women 18 years and older with an intact cervix were asked if they had had a pap smear within the past 3 years. Cancer screening questions were asked only in the 2004

BRFSS survey, which resulted in fewer respondents in our study population for these indicators.

Independent variables

Language of interview was the primary independent variable of interest. Covariables in the multivariate analysis included age as a continuous variable, gender, and educational level in 4 categories. Income was not included in the models because data were missing for a large percentage of respondents, and having missing data was associated with language. Income was highly correlated with education, an alternative indicator of socioeconomic position.

Analysis

We compared the unadjusted prevalence of each of the 25 health indicators among Spanish-speaking and English-speaking respondents by using the χ^2 test. To further examine the influence of Spanish language preference on health, we developed multivariate logistic regression models for each indicator. Adjusted odds ratios with 95% confidence intervals were generated to compare Spanish-speaking Hispanics with English-speaking Hispanics, with adjustment for age, gender, and education.

States were divided into 3 regions on the basis of US Census estimates of Hispanic population growth and geographic distribution.[10] States that experienced less than a doubling in the size of their Hispanic populations between 1990 and 2000 were labeled region 1 or region 2. Region 1 included southwestern states with historically large Hispanic populations, primarily of Mexican origin (Arizona, California, Colorado, New Mexico, and Texas). Region 2 included other states with slow Hispanic population growth and with greater representation of Hispanics of Puerto Rican, Cuban, and other Latin American descent (Connecticut, Florida, Illinois, Massachusetts, New Jersey, New York, and Rhode Island). Region 3 included states experiencing rapid new growth, with a greater than doubling in size of their Hispanic populations between 1990 and 2000 (Arkansas, Indiana, Kansas, Nebraska, Nevada, North Carolina, Oklahoma, Oregon, Utah, Virginia, and Washington). All analyses were performed with weighted data analyzed with SUDAAN version 8.0 (Research Triangle

Institute, Research Triangle Park, NC) to account for the complex sampling design of the BRFSS.

RESULTS

Demographic Characteristics

During the 3-year study period, 17 827 of 45 076 (40%) of the Hispanic respondents to the BRFSS were interviewed with the Spanish-language survey instrument. Demographic characteristics are shown in Table 1. More than two thirds of both Spanish- and English-speaking Hispanics were younger than 45 years, and Spanish-speaking Hispanics were slightly less likely to be represented in older age groups (28% of Spanish-speaking Hispanics were 45 years or older compared with 31% of English-speaking Hispanics).

Approximately 59% of Spanish-speaking Hispanics had less than a high school education, compared with 18% of English-speaking Hispanics, and only 6% of Spanish-speaking Hispanics had completed college, compared with 21% of English-speaking Hispanics. Spanish-speaking Hispanics were far more likely than were English-speaking Hispanics to report household incomes of less than $15 000 (36% vs 15%, respectively) and of $15 000 to $24 999 (38% vs 21%, respectively). More than 60% of respondents in both groups were employed for wages (i.e., paid work; 61% and 64% of the Spanish- and English-speaking groups, respectively). A greater percentage of Spanish-speaking Hispanics were homemakers (19% vs 7% of English-speaking Hispanics), and a smaller percentage were students or retired. Only 6% of Spanish-speaking and 5% of English-speaking Hispanics reported being unable to work.

Selected Health Indicators

The prevalences of 25 selected health indicators among Spanish- and English-speaking Hispanics are shown in Table 2. Odds ratios (ORs) for Spanish-speaking relative to English-speaking Hispanics are also shown, with adjustment for age, gender, and level of education. An OR greater than 1.0 indicates less favorable results among Spanish-speaking Hispanics.

Chronic conditions and risk factors. The prevalences of arthritis and asthma were significantly lower among Spanish-speaking than

TABLE 1—Demographic Characteristics of Hispanic Respondents: Behavioral Risk Factor Surveillance System, 2003–2005

Demographics	Spanish-Speaking Hispanics (n = 17 827), Weighted % (95% CI)	English-Speaking Hispanics (n = 27 249), Weighted % (95% CI)
Gender		
Men	51.6 (50.2, 52.9)	48.7 (47.5, 49.9)
Women	48.4 (47.1, 49.8)	51.3 (50.1, 52.5)
Age groups, y		
18–24	17.2 (16.0, 18.4)	21.3 (20.2, 22.4)
25–34	30.5 (29.2, 31.7)	25.7 (24.7, 26.7)
35–44	24.2 (23.1, 25.3)	21.7 (20.8, 22.6)
45–64	21.7 (20.6, 22.9)	23.1 (22.2, 24.1)
≥ 65	6.4 (5.8, 7.1)	8.3 (7.6, 9.0)
Education level		
Less than high school diploma	59.0 (57.7, 60.4)	18.4 (17.5, 19.4)
High school diploma	24.3 (23.1, 25.5)	32.8 (31.7, 34.0)
Some college	10.3 (9.5, 11.2)	28.0 (27.0, 29.1)
College degree or more	6.3 (5.7, 7.0)	20.7 (19.9, 21.7)
Household income, $		
< 15 000	36.2 (34.7, 37.7)	15.3 (14.3, 16.3)
15 000–24 999	38.2 (36.7, 39.7)	21.3 (20.3, 22.3)
25 000–34 999	14.7 (13.6, 15.8)	15.2 (14.3, 16.1)
35 000–49 999	7.1 (6.3, 8.0)	16.5 (15.6, 17.5)
50 000–74 999	2.5 (2.0, 3.1)	14.8 (13.9, 15.7)
≥ 75 000	1.3 (1.0, 1.7)	17.0 (16.1, 18.0)
Employment status		
Employed for wages	61.4 (60.1, 62.7)	64.3 (63.1, 65.5)
Out of work	7.2 (6.5, 7.9)	8.3 (7.7, 9.1)
Homemaker	19.0 (18.1, 20.0)	7.4 (6.9, 8.0)
Student	2.4 (1.9, 2.9)	7.0 (6.3, 7.8)
Retired	4.3 (3.8, 4.9)	7.7 (7.1, 8.4)
Unable to work	5.7 (5.0, 6.4)	5.2 (4.7, 5.7)

among English-speaking Hispanics (11% vs 18% for arthritis, and 5% vs 14% for ever being diagnosed with asthma). Spanish- and English-speaking Hispanics reported similar rates of diabetes (7% vs 8%) and high blood pressure (17% vs 19%), although Spanish-speaking Hispanics had significantly lower odds of high blood pressure after adjustment for age, gender, and education.

Spanish-speaking Hispanics reported favorable health behaviors related to smoking (15% vs 19% of English-speaking Hispanics) and binge drinking (15% vs 19% of English-speaking Hispanics). Spanish-speaking Hispanics were more likely to report less than the recommended level of physical activity (65% vs 53% of English-speaking Hispanics) and no leisure-time physical activity at all (46% vs 27% of English-speaking Hispanics). Obesity was slightly less prevalent among Spanish-speaking Hispanics (25%) than among English-speaking Hispanics (27%). Language remained significantly associated with each of these indicators after adjustment for age, gender, and educational level. A large percentage of both groups reported eating less than 5 daily servings of fruit and vegetables (77% of Spanish-speaking Hispanics and 78% of English-speaking Hispanics), with no significant difference between the 2.

Access to care. Access to health care was far worse for Spanish-speaking than for English-speaking Hispanics by all measures of access. More than half (55%) of Spanish-speaking Hispanics lacked health insurance, compared with 23% of English-speaking Hispanics, and 58% did not have a personal doctor compared with 29% of English-speaking Hispanics. Spanish-speaking Hispanics were less likely to have had a checkup in the past year (45% vs 36% of English-speaking Hispanics) and were more likely to have been unable to see a doctor for needed care in the past year because of cost (27% vs 19% of English-speaking Hispanics). All differences remained significant in the adjusted models.

Quality of life. Spanish-speaking Hispanics were substantially more likely to report poor or fair health status (39%) than were English-speaking Hispanics (17%), a difference that remained significant after adjustment for age, gender, and education. Rates of poor physical health days, poor mental health days, and days of activity limitation because of poor health, however, were similar between Spanish- and English-speaking Hispanics.

Receipt of preventive services. With the exception of cervical cancer screening, preventive health indicators showed low utilization of preventive services among all Hispanics. Sixty-five percent of Spanish-speaking Hispanics and 61% of English-speaking Hispanics 50 years and older reported not having undergone colon cancer screening with sigmoidoscopy or colonoscopy in the past 10 years. Among women 40 years and over, 54% of Spanish-speaking Hispanics and 49% of English-speaking Hispanics had not had a mammogram and clinical breast examination in the prior 2 years. Among men 40 years and over, 62% of Spanish-speaking Hispanics and 50% of English-speaking Hispanics had never had prostate cancer screening with a prostate-specific antigen test. Cervical cancer screening rates were comparatively high, with approximately 17% of women in both groups not having had a pap smear in the prior 3 years. No statistically significant differences between Spanish- and English-speaking Hispanics were detected for these cancer-screening measures, which were collected from a smaller subset of the total study population.

Spanish-speaking Hispanics were significantly more likely than were English-speaking

TABLE 2—Prevalence of Selected Health Indicators Among US Hispanics, with Adjusted Odds Ratios (AORs) for Spanish-Speaking Hispanics Relative to English-Speaking Hispanics: Behavioral Risk Factor Surveillance System, 2003–2005

Health Indicator	Years Asked	No.	Spanish Speakers, % (95% CI)	English Speakers, % (95% CI)	P^a	AOR for Spanish Speakers[b] (95% CI)
Chronic conditions						
Arthritis	2003, 2005	28 688	10.6 (9.6, 11.6)	17.7 (16.4, 18.5)	<.001	0.54 (0.47, 0.63)
Asthma, ever	2003, 2004, 2005	45 009	5.1 (4.6, 5.8)	13.9 (13.1, 14.8)	<.001	0.35 (0.30, 0.41)
Diabetes	2003, 2004, 2005	44 963	6.7 (6.0, 7.4)	7.6 (7.0, 8.2)	.082	0.90 (0.77, 1.06)
High blood pressure	2003, 2005	29 484	17.0 (15.7, 18.4)	19.4 (18.3, 20.5)	.012	0.81 (0.71, 0.93)
Risk factors						
Current smoking	2003, 2004, 2005	44 875	15.2 (14.2, 16.3)	19.2 (18.3, 20.2)	<.001	0.63 (0.57, 0.71)
Less than recommended physical activity	2003, 2005	27 348	65.2 (63.5, 66.9)	52.8 (51.3, 54.3)	<.001	1.55 (1.39, 1.71)
No leisure-time physical activity	2003, 2004, 2005	44 979	46.0 (44.6, 47.4)	26.7 (25.6, 27.7)	<.001	2.02 (1.85, 2.19)
Less than 5 daily servings of fruit and vegetables	2003, 2005	28 771	77.2 (75.7, 78.6)	78.0 (76.7, 79.2)	.477	1.13 (1.00, 1.27)
Obesity	2003, 2004, 2005	40 132	25.2 (23.9, 26.6)	27.4 (26.4, 28.5)	<.001	0.82 (0.75, 0.90)
Binge drinking	2003, 2004, 2005	44 477	15.3 (14.2, 16.4)	19.0 (18.0, 20.0)	<.001	0.71 (0.63, 0.80)
Access to health care						
No current health insurance	2003, 2004, 2005	44 880	55.4 (54.0, 56.7)	23.3 (22.3, 24.3)	<.001	3.58 (3.27, 3.91)
Could not see a doctor because of cost	2003, 2004, 2005	44 945	26.7 (25.5, 27.9)	19.1 (18.2, 20.0)	<.001	1.40 (1.28, 1.53)
No personal doctor	2003, 2004, 2005	44 676	58.0 (56.7, 59.4)	28.7 (27.6, 29.9)	<.001	3.26 (2.98, 3.56)
No checkup in past year	20005	17 292	45.2 (43.0, 47.5)	36.4 (34.5, 38.4)	<.001	1.27 (1.11, 1.46)
Quality of life						
Fair or poor health	2003, 2004, 2005	44 867	38.6 (37.3, 40.0)	17.2 (16.3, 18.1)	<.001	2.63 (2.40, 2.89)
Poor mental health days ≥14 days/mo	2003, 2004, 2005	45 076	11.7 (10.8, 12.6)	13.0 (12.3, 13.8)	.038	0.78 (0.69, 0.88)
Poor physical health days ≥14 days/mo	2003, 2004, 2005	45 076	13.6 (12.7, 14.6)	11.6 (10.9, 12.3)	.003	1.10 (0.97, 1.24)
Activity limitation ≥14 days/mo	2003, 2004, 2005	45 076	7.1 (6.4, 7.8)	7.9 (7.3, 8.6)	.093	0.76 (0.65, 0.89)
Receipt of preventive services						
No flu shot in past year	2003, 2004, 2005	44 915	81.4 (80.3, 82.4)	75.8 (74.8, 76.8)	<.001	1.37 (1.24, 1.50)
No pneumonia vaccine ever	2003, 2004, 2005	41 169	84.8 (83.8, 85.9)	82.2 (81.1, 83.1)	<.001	1.23 (1.10, 1.38)
No dental visit in past year	2004	15 368	50.3 (47.9, 52.7)	35.4 (33.4, 37.4)	<.001	1.64 (1.43, 1.88)
No sigmoidoscopy or colonoscopy in past 10 y (ages ≥50 y)	2004	4 117	64.6 (59.4, 69.5)	60.8 (56.7, 64.8)	.301	1.00 (0.73, 1.35)
No mammogram and CBE in past 2 y (ages ≥40 y)	2004	4 512	54.3 (49.8, 58.8)	49.1 (44.2, 52.9)	.109	1.16 (0.90, 1.50)
No pap smear in past 3 y	2004	7 755	15.9 (13.5, 18.6)	16.3 (14.1, 18.7)	.828	0.89 (0.67, 1.19)
No PSA test ever (ages ≥40 y)	2004	2 690	61.6 (55.6, 67.3)	49.8 (44.9, 54.6)	.005	1.38 (0.95, 2.00)

Note. CI = confidence interval; CBE = clinical breast exam; PSA = prostate-specific antigen.
[a]Based on χ^2 comparison of crude prevalence.
[b]Compared with English speakers, adjusted for age, gender, and educational level.

Hispanics to report not having gotten a flu shot in the past year (81% vs 76%) and no history of pneumonia vaccination (85% vs 82%). Half of Spanish-speaking Hispanics and 35% of English-speaking Hispanics had not visited a dentist in the past year.

Regional differences among Spanish-speaking Hispanics. Regional differences among Spanish-speaking Hispanics for the 25 health indicators are shown in Table 3. In states experiencing rapid new growth of their Hispanic populations (region 3), Spanish-speaking Hispanics had particularly low rates of arthritis, asthma, diabetes, and hypertension, and had favorable quality-of-life indicators, compared with Spanish-speaking Hispanics in states with historically larger but slower-growing Hispanic populations (regions 1 and 2). Spanish-speaking Hispanics in region 3 states reported considerably worse access to health care, however: 70% lacked health insurance, 71% lacked a personal physician, and 53% had not had a checkup in the past year. Percentages shown are unadjusted to reflect true population prevalence. Age adjustment of these percentages, however, did not greatly alter these patterns. Differences among English-speaking Hispanics across these regions were not apparent (data not shown). Thus, disparities between English- and Spanish-speaking Hispanics in access to care were most marked in new-growth states.

TABLE 3—Prevalence of Selected Health Indicators Among Spanish-Speaking Hispanics, by Region: Behavioral Risk Factor Surveillance System, 2003–2005

	Region 1[a,b] (n = 19 440), % (95% CI)	Region 2[b,c] (n = 12 933), % (95% CI)	Region 3[d] (n = 12 703), % (95% CI)
Chronic conditions			
Arthritis	9.8 (8.4, 11.3)	14.4 (12.7, 16.3)	4.9 (3.9, 6.2)
Asthma ever	4.9 (4.0, 5.8)	6.3 (5.4, 7.2)	3.7 (3.0, 4.5)
Diabetes	6.8 (5.8, 7.9)	7.7 (6.7, 8.8)	3.4 (2.9, 4.1)
High blood pressure	17.3 (15.5, 19.3)	19.1 (17.2, 21.2)	8.7 (7.5, 10.0)
Risk factors			
Current smoking	14.5 (13.1, 16.1)	16.3 (14.6, 18.0)	16.3 (14.8, 17.9)
Less than recommended physical activity	61.8 (59.3, 64.2)	70.2 (67.7, 72.7)	71.1 (68.8, 73.3)
No leisure-time physical activity	43.8 (41.8, 45.7)	50.2 (48.0, 52.4)	47.5 (45.4, 49.6)
Less than 5 daily servings of fruits and vegetables	75.1 (72.9, 77.1)	79.8 (77.6, 81.8)	83.0 (81.0, 84.8)
Obesity	26.5 (24.6, 28.5)	23.6 (21.6, 25.7)	21.6 (19.7, 23.7)
Binge drinking	15.8 (14.3, 17.5)	14.2 (12.5, 16.1)	15.0 (13.6, 16.6)
Access to health care			
No current health insurance	53.7 (51.8, 55.7)	54.0 (51.8, 56.2)	69.4 (67.4, 71.2)
Could not see a doctor due to cost	25.3 (23.7, 27.0)	29.0 (27.0, 31.1)	28.7 (26.8, 30.6)
No personal doctor	58.0 (56.0, 59.9)	53.5 (51.3, 55.7)	70.9 (69.1, 72.6)
No checkup in last year	46.7 (43.4, 49.9)	38.8 (35.3, 42.4)	52.9 (49.9, 55.8)
Quality of life			
Fair or poor health	38.1 (36.2, 40.0)	41.3 (39.1, 43.5)	34.4 (32.5, 36.3)
Poor mental health days ≥14 d/mo	12.2 (10.9, 13.6)	11.9 (10.7, 13.3)	7.8 (6.7, 9.0)
Poor physical health days ≥14 d/mo	14.4 (13.1, 15.9)	13.6 (12.2, 15.0)	8.5 (7.5, 9.7)
Activity limitation ≥14 d/mo	7.2 (6.3, 8.3)	7.8 (6.7, 9.0)	4.1 (3.3, 4.9)
Receipt of preventive services			
No flu shot in the last year	82.3 (80.7, 83.7)	79.5 (77.8, 81.2)	81.1 (79.3, 82.8)
No pneumonia vaccine ever	85.5 (84.0, 86.9)	82.8 (81.1, 84.5)	86.6 (85.1, 88.1)
No dental visit in past year	50.2 (46.8, 53.6)	48.6 (44.7, 52.5)	55.3 (51.5, 59.0)
No pap smear in past 3 y	17.0 (13.7, 20.9)	14.2 (10.7, 18.7)	13.4 (10.7, 16.7)
No mammogram and CBE in past 2 y (ages ≥40 y)	57.5 (50.9, 63.9)	48.9 (42.7, 55.2)	56.8 (42.4, 70.1)
No sigmoidoscopy or colonoscopy in past 10 y (ages ≥50 y)	67.7 (59.9, 74.6)	56.8 (49.9, 63.4)	86.0 (77.8, 91.5)
No PSA test ever (ages ≥40 y)	61.9 (53.3, 69.8)	55.1 (46.5, 63.4)	81.6 (74.5, 87.1)

Note. CI = confidence interval; CBE = clinical breast exam ; PSA = prostate-specific antigen.

[a]Region 1 was made up of southwestern states with large, stable Hispanic populations: Arizona, California, Colorado, New Mexico, and Texas.

[b]The region experienced a less than doubling of the Hispanic population between 1990 and 2000, according to US Census estimates.

[c]Region 2 was made up of states with slow growth of Hispanic populations, less than doubling between 1990 and 2000 according to US Census estimates: Connecticut, Florida, Illinois, Massachusetts, New Jersey, New York, and Rhode Island.

[d]Region 3 was made up of states experiencing rapid new growth of Hispanic populations, greater than doubling between 1990 and 2000 according to US Census estimates: Arkansas, Indiana, Kansas, Nebraska, Nevada, North Carolina, Oklahoma, Oregon, Utah, Virginia, and Washington. This region experienced a greater than doubling of the Hispanic population between 1990 and 2000, according to US Census estimates.

DISCUSSION

To our knowledge, this is the first national, population-based, comprehensive assessment of the association between language preference and common measures of health status and health care access among US Hispanics. Many of the measures we studied are critical to monitoring state and national progress toward the *Healthy People 2010* objectives. Although previous studies with BRFSS data uncovered disparities between Hispanics and non-Hispanic Whites in access to care and receipt of preventive services,[11] categorization of US Hispanics according to preferred language reveals important, marked differences between English-speaking and Spanish-speaking subpopulations across several indicators of socioeconomic status, health status, health behaviors, and health care access and utilization. These findings add to a growing body of research illustrating the heterogeneity of the US Hispanic population and examining the relation between acculturation and immigrant health. Our findings are unique, however, in providing nationally representative population estimates.

These analyses indicate significantly lower rates of tobacco use, physical activity, and binge drinking in the US Spanish-speaking population than among English-speaking Hispanics, as well as lower prevalences of arthritis, asthma, high blood pressure, and obesity. These differences were not explained by differences in age, gender, and educational attainment. Language may be operating as a marker of differences within the US Hispanic population in a variety of ways. Low chronic disease prevalence among Spanish speakers may be attributable to a "healthy migrant" effect, in that the Spanish-speaking population includes those who have most recently immigrated to the United States, a subgroup generally recognized to be in more robust health than the general population. Chronic disease prevalence was lowest among Spanish speakers in states experiencing rapid new immigration (region 3). Epidemiologically, this regional variation illustrates the demographic transition toward increasing chronic disease burden as populations move from developing toward developed countries. A characteristic rise in obesity and chronic disease associated with assimilation to Westernized dietary and exercise patterns has been previously recognized[12] and signals an important opportunity for preventive public health interventions in areas of new Hispanic population growth.

Language preference and English language proficiency have commonly been used as measures of immigrant acculturation, a term that refers to immigrant adoption of the behaviors and attitudes of the mainstream culture. More-complex acculturation scales have been developed over the past several years, although it is increasingly recognized that no single scale or construct can fully capture the complex contextual nuances of cultural influences on health.[13,14] Our findings that Spanish-speaking Hispanics were significantly less likely than were English-speaking Hispanics to use tobacco and to binge drink are consistent with prior reports of the negative impact of acculturation on tobacco and alcohol use among Hispanic immigrants.[15–26] A lesser likelihood of recommended physical activity among Spanish speakers has also been recognized in several prior studies.[12,14,27–31] Our finding that almost half of Spanish-speaking Hispanics did not engage in any leisure-time physical activity

indicates a critically important opportunity for more-healthful lifestyle promotion in this population.

It should be recognized, however, that this common measure of population health behaviors does not take into account job-related physical activity. Interestingly, 63% of Spanish-speaking Hispanics in this study described either heavy labor or "mostly walking" as part of their job, compared with 42% of English-speaking Hispanics (data not shown). Our study did not confirm prior reports of higher diabetes prevalence related to lesser acculturation among Hispanics,[32] perhaps because of the opposing influence of healthy migrant effect within the Spanish-speaking population, as previously discussed. The low rate of self-reported diabetes among Spanish-speaking Hispanics may also partially reflect a lesser likelihood of screening and diagnosis in this group, rather than true absence of disease.

A major finding of our study was the stark difference between Spanish-speaking and English-speaking Hispanic populations in access to health care. Whereas employment among Spanish- and English-speaking Hispanics was similar, half of Spanish-speaking Hispanics lacked health insurance, compared with 20% of English-speaking Hispanics. Less than half of Spanish-speaking Hispanics had a personal physician, and 1 in 4 were unable to seek needed care in the past year because of cost. Access barriers were particularly evident among Spanish-speaking Hispanics in new-growth states. Previous studies reported low rates of health insurance coverage among immigrants despite high rates of workforce participation. Most of the difference in rates of health coverage between the foreign-born and native-born US adults is attributable to restrictions on access to public insurance programs (such as Medicaid), from which immigrants are generally barred if undocumented or within their first 5 years of legal residence.[33] It is probable that immigration-based restrictions on publicly funded programs are more common in the Spanish-speaking population, which would compound additional nonfinancial linguistic and cultural barriers to care.

Not surprisingly, poor access to care among Spanish-speaking Hispanics is mirrored by a lower likelihood of receiving preventive health services. Spanish-speaking Hispanics were

significantly less likely than were English-speaking Hispanics to receive pneumonia and influenza immunizations, dental care, and breast and prostate cancer screening. The notable exception to this was cervical cancer screening. Contrary to prior studies that observed a favorable association between English language proficiency and cervical cancer screening,[4,34–37] we found no significant difference in self-reported pap smear rates between English- and Spanish-speaking Hispanics in this national sample. More than 80% of eligible Spanish- and English-speaking Hispanic women had received a pap smear within 3 years; this rate is similar to national BRFSS estimates of cervical cancer screening rates for non-Hispanic women. Interestingly, Spanish-speaking Hispanics in new-growth states had better rates of cervical cancer screening than did English-speaking Hispanics and Spanish-speaking Hispanics living in states with larger, longer-developed Hispanic populations. The absence of language- and ethnicity-associated disparity in cervical cancer screening indicates an area of relative success in reaching public health objectives for the immigrant population, which may be attributable to a greater interaction with the health care system by younger Hispanic women for family planning and pregnancy-related services.

In light of lower rates of chronic conditions, a striking finding was the poor perceived health status of Spanish-speaking Hispanics, with 39% reporting fair or poor health compared with 17% of English-speaking Hispanics. Previous studies have similarly observed that Hispanic immigrants rate themselves in poorer health than do native-born Hispanics,[38–41] and that fair or poor self-reported health among recent immigrants does not predict mortality as it does among native-born and long-term immigrants.[42] This finding has previously been attributed to a tendency of Latino immigrants to express emotional or mental health problems through physical health constructs[42,43] or was thought to possibly reflect undetected disease burden among recent immigrants. Our study suggests an alternative explanation for this observation. We found that the self-report of fair or poor health status was particularly likely among Spanish-language respondents, whereas Spanish-speaking Hispanics were no more likely than were English-speaking

Hispanics to report activity limitation because of poor physical or mental health. This discrepancy suggests a cultural or linguistic influence on how the question is responded to (i.e., does a Spanish-speaking respondent's "fair" differ from an English-speaking respondent's "good"?). Further research is needed to better understand how cultural differences in perception of health, as well as cultural and linguistic differences in norms of self-presentation, may affect the validity of self-reported health status measures in diverse populations.

Study Limitations

The utility of BRFSS data in examining the influence of acculturation on health risks and health care utilization is limited by its cross-sectional nature, and the findings from this study would be strengthened considerably by the availability of more-refined measures of diversity and acculturation, such as formal ascertainment of English language proficiency, country of origin, and age or generation of immigration. We were not able to control for income in our models because of low response rates to this survey item; thus, we relied on education alone as an indicator of socioeconomic status. Observed regional differences among Spanish-speaking Hispanics may reflect differences in characteristics of the Spanish-speaking populations themselves (such as countries of origin and time since immigration), as well as characteristics of the states in which they live (such as state policies or community infrastructure that may facilitate or impede healthy behaviors and access to care). These complex interrelations could not be fully explored with the available data.

Another important limitation of the BRFSS is that only adults living in households with land-line telephones are surveyed. As a result, Hispanics and other groups characterized by low socioeconomic status or residency transience are known to be underrepresented. It may be reasonably assumed that Spanish-speaking Hispanics would be even more underrepresented than English-speaking Hispanics. If the least acculturated among Spanish speakers are hardest to reach, our findings may underestimate the extent of true differences between English- and Spanish-speaking Hispanics. In addition, BRFSS data are derived exclusively from self-report, and the extent to which ethnicity, education,

and language influence the accuracy of self-reported health behaviors and preventive care is not fully understood.[44] The major strength of the BRFSS, however, is the ability to generate population-wide estimates. Our findings demonstrate convincingly that Spanish-language preference marks a subpopulation of Hispanics with less education and income and poorer self-reported health, access to health care, and receipt of preventive services.

Implications

The associations observed in this study do not imply a direct causal pathway between language preference or proficiency and any of the health indicators examined but undoubtedly reflect a multitude of contributing factors, including socioeconomic, educational, environmental, legal, and cultural differences between Spanish-speaking and English-speaking Hispanic populations. The combined ecologic effect of these factors, encoded within the language variable, is protective for certain health outcomes and behaviors, but also conveys future risk related to poor access to health care and low utilization of preventive services. Ongoing research is needed to more fully explore the protective mechanisms of low acculturation and to identify ways to preserve protective cultural influences within the immigrant population over time. Although the language variable is a blunt indicator of complex heterogeneity among US Hispanics, language itself should be recognized as a critical component of public health assessment and intervention for a growing proportion of the US population. This will necessitate greater use of Spanish-language media to promote public health messages, local infrastructure that enables healthy behaviors in Hispanic communities, the removal of cultural and linguistic barriers in our health care institutions, and policies that promote rather than impede access to health care for immigrants.

A final, important conclusion to be drawn from this study is that accurate surveillance of the health status of the US population necessitates methodologic adaptation to demographic, cultural, and linguistics shifts in our society. Most states using a Spanish-language survey instrument for the BRFSS have started doing so only within the past 5 years, and it remains common for Spanish-speaking individuals to be excluded

from participation in other published population-based surveys and clinical studies. It is clear that such exclusion would create significant bias in the representation of Hispanics as a whole and would limit our ability to detect disparities that fall along ethnic and cultural lines. Further dissection of such disparities, to better elucidate contributing factors and provide guidance for future interventions, will require ongoing refinement of how we ask the questions.

Conclusions

The US Spanish-speaking population represents a particularly vulnerable subset of US Hispanics who have far lower income and educational attainment, poor perceived health status, and far worse access to the health care system. Priority areas for improving the health status of Spanish speakers in the United States include maintenance of healthy behaviors related to tobacco and alcohol use, promotion of physical activity and healthy weight, improvement in immunization and cancer screening rates, and increasing access to affordable, timely, and linguistically appropriate care. ∎

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