ORIGINAL ARTICLE

A national study of the association between language use and health insurance coverage in the United States

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Received: November 11, 2012 **Accepted:** December 2, 2012 **Online Published:** January 25, 2013
DOI: 10.5430/jha.v2n2p115 **URL:** http://dx.doi.org/10.5430/jha.v2n2p115

Abstract

Background: A significant proportion of individuals seen in US hospitals speak a language other than English. A number of reports have shown that individuals who speak a language other than English have diminished access to care, but few have examined specifically language barriers and its relationship to health insurance coverage.

Objectives: To estimate the impact of language use on prevalence of reported health insurance coverage across multiple racial and ethnic groups and among persons living in the U.S. for varying periods of time.

Design and participants: Cross sectional study using data from the 2010 National Health Interview Survey.

Main measures: The main outcome measure is health insurance status.

Key results: Persons who spoke Spanish or a language other than English were less likely to have insurance. Among Hispanics who speak Spanish or a language other than English, only 50.6% report having health insurance coverage compared to 76.7% of Hispanics who speak only or mostly English. For non-Hispanic whites who speak Spanish or a language other than English, 71.7% report having health insurance coverage compared to 83.4% of non-Hispanic whites who speak only or mostly English, this same pattern was observed across all racial/ethnic groups. Among those speaking only or mostly English living in the U.S. <15 years had significantly lower adjusted odds of reporting health insurance coverage compared to those born in the United States.

Conclusions: This was a large nationally representative study describing language differences in insurance access using a multi-ethnic population. This data suggest that individuals who speak a language other than English are less likely to have insurance across all racial and ethnic groups and nativity and years in the United States groups, underscoring the significant independent importance of language as a predictor for access to insurance.

Key words

Spoken language, Race and ethnicity, Health insurance, Access to care, Disparities

1 Background

There are an estimated 45 million people from all racial and ethnic groups as well as a variety of nationalities in the United States who report speaking a language other than English at home [1]. Racial and ethnic disparities in health insurance coverage have been well-documented- with racial and ethnic minorities less likely to have health insurance coverage than non-Hispanic whites. There is also a growing body of evidence to show that individuals who primarily speak a language other than English face significant barriers in access to care [2-5]. The importance of this issue is underscored by a recent analysis of likely enrollment in California's health insurance coverage expansion programs that found language barriers could deter more than 100,000 Californians from enrolling in the State's Health Benefit Exchange [6]. Language use may be associated with observed racial and ethnic healthcare disparities, but few studies document health insurance disparities by language use [7-18]. This paucity in the literature limits the ability to describe the complete picture of health insurance disparities and the potential influence of language on racial and ethnic disparities in health insurance in the United States.

Prior reports have shown that immigrants are less likely than persons born in the United States to have health insurance coverage [19, 20]. Acculturation has been shown to be associated with access to care, utilization of healthcare, and health behaviors; however the relationship may vary based upon acculturation measure used and population study with acculturation serving as a possible barrier or facilitator [18, 19]. Spoken language and the amount of time living in the United States among immigrants and foreign-born persons may be important acculturation factors related to access to care. Few national reports, however, have investigated the potential role of the three factors in obtaining health insurance coverage. Examining language use and nativity and length of time in the United States will help to further define factors related to health insurance disparities in the United States among various population subgroups.

In addition, the reports documenting language barriers have largely been based upon data collected at the point of care, and are often focused at the provider or facility level, or on a very specific patient population. Self-reported, population-based data on language are less common, and this has limited the ability to identify and track language disparities in health and health care at the national level. This study investigates the association between self-reported spoken language and insurance coverage for Hispanic, non-Hispanic white, non-Hispanic blacks and Asians using a nationally representative sample and for native born and foreign born persons living in the United States for varying periods of time. The data in this report provide one of the first comprehensive descriptions of the impact of language on health insurance coverage for multiple racial and ethnic and nativity groups in the United States.

2 Methods

2.1 Study design

We analyzed data from the 2010 National Health Interview Survey (NHIS) [21]. The NHIS is an in-person survey of the U.S. non-institutionalized population in which participants are queried about their health and health-care access and utilization. All data are self-reported or provided by a knowledgeable proxy. Participants in the NHIS are sampled using a complex multi-stage probability design, such that the sample is nationally representative. In 2010, one randomly selected adult $\geqslant$18 years of age per household also completed a more-detailed interview that collected additional data related to health care access and utilization as well as health status. The total sample of the 2010 NHIS was 89,976 persons and this included a total of 27,157 sample adults.

2.2 Participants

This analysis included 4,444 Hispanic, 11,535 non-Hispanic white, 3,557 non-Hispanic black and 1,409 Asian adults, with self-reported data on spoken language. Due to small sample size, we excluded other racial and ethnic groups. To better examine the interaction of language with health insurance coverage, this study focused on the non-Medicare population, thus this study only included adults aged 18-64 years of age.

 ISSN 1927-6990 E-ISSN 1927-7008

2.3 Measures

2.3.1 Health insurance coverage

Health insurance coverage was the main outcome measure for this study. Respondents self-reported health insurance coverage over the previous year. Respondents indicating they had any health insurance coverage over the previous year were classified as having health insurance and those indicating they did not have health insurance coverage over the previous year were classified as not having health insurance.

2.3.2 Language use

Respondents were asked about the language they used most often to speak from the question: "In general, what language do you speak?" Study participants selected from the following response categories: only English, only Spanish, Spanish and English about the same, mostly Spanish, mostly English or some other language. Respondents reporting speaking only English or mostly English for language use were categorized as speaking only or mostly English. Respondents reporting only Spanish, Spanish and English about the same, mostly Spanish, mostly English or some other language for language use were categorized as speaking Spanish or a language other than English.

2.3.3 Race and ethnicity

Respondents self-reported race and Hispanic ethnicity. The categories of race and ethnicity included in this study were: Hispanic, non-Hispanic white, non-Hispanic black, and Asian.

2.3.4 Nativity and years living in the United States

Respondents were asked if they were born in the United States (yes/no), and those reporting no were asked how many years they had been living in the United States (less than 5 years; 5-10 years; 10-15 years; greater than 15 years). The study variable nativity and years in United States was categorized as: less than 15 years; greater than 15 years; or entire lifetime for those born in the United States.

2.3.5 Covariates

This investigation also examined additional variables to identify their role in the association between health insurance coverage and language use, including age, sex, education level, working status, weight status and co-morbidities. Weight status was classified by body mass index (BMI), calculated from self-reported height and weight (kg/m^2). Respondents were also asked if they had ever been told by health care provider they had diabetes (yes/no), hypertension (yes/no), or heart disease (yes to any of the following: myocardial infarction, stroke, angina, coronary heart disease). A composite variable of comorbidities was created, with persons self-reporting diagnosis diabetes, hypertension or heart disease was considered to have comorbidity and those not reporting any of these conditions were considered not to have comorbidity. Education level was categorized as: less than high school education; high school education or General Education Development test (GED), which is a high school diploma equivalency; or some college education or greater. Respondents were asking about their employment during the previous week. Those reporting working for pay at a job or business, or with a job or business but not at work were classified as currently working. Those reporting looking for work, working but not for pay at a family owned business, or not working and not looking for work were classified as not currently working.

2.4 Statistical analysis

This investigation used SAS software (version 9.2, SAS Institute, Cary, NC) to perform data management and SUDAAN (version 10.0, Research Triangle Institute, Research Triangle Park, NC) to account for the complex survey design and perform statistical analysis. This analysis used sample weights to account for differential probabilities of sample selection, non-response and sample non-coverage. The sample weights also permit national estimates to be made from the data. The level of statistical significance for all analysis was a *p*-value less than 0.05. All analyses were stratified by race and ethnicity and nativity and years in the United States.

We calculated age-standardized prevalence estimates of demographic data and language use data which were standardized to the 2000 U.S. population using the following age-groups: 18-24 years, 25-44 years, and 45-64 years. This investigation also used chi-squared tests to test for differences between language use and demographic characteristics. Chi-squared tests were also used to test for differences in health insurance status by language use, for each race and ethnicity group and nativity and years in the United States group.

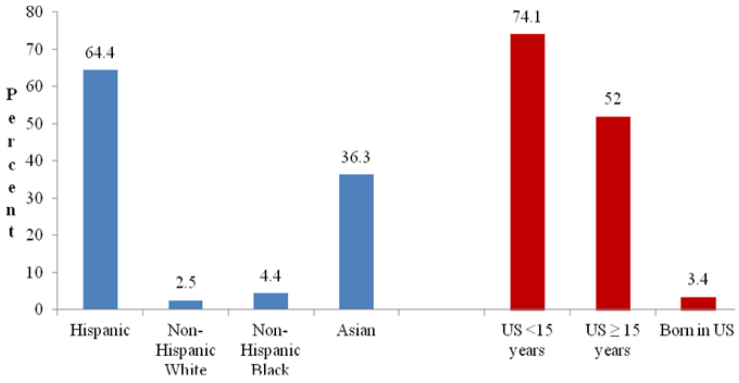

Figure 1. Age-adjusted Prevalence of speaking Spanish or Another Language for each for each Racial and Ethnic and Nativity and Years in the United States group among Adults Aged 18-64 Years, 2010 National Health Interview Survey

We used logistic regression analysis to model odds of health insurance status. We adjusted models for age, sex, education level, working status, BMI and comorbidities. We calculated adjusted odds ratios with corresponding 95% confidence intervals from logistic regression. Adjusted odds ratios with corresponding 95% confidence intervals not containing 1, were considered statistically significant. An interaction between race and ethnicity and language use and an interaction between nativity and years in the United States and language use were found. To investigate research questions of interest and for ease of interpretation, we used stratified models. Due to small sample sizes, estimates from regression analysis modeling odds of reporting health insurance coverage among non-Hispanic blacks speaking Spanish or a language other than English were statistically unreliable and therefore not presented.

We used models stratified by race and ethnicity and nativity and years in the United States to explore within group associations between language use and health insurance status for each racial and ethnic group and each nativity and years in the United States group. To examine differences in health insurance coverage status by language use for each racial and ethnic group, we stratified models by race and ethnicity with language use as the primary explanatory variable. To examine differences in health insurance coverage status for each nativity and years in the United States group, we stratified models by the study variable nativity and years in the United States with language use as the primary explanatory variable.

To examine racial and ethnic differences in health insurance coverage for each language group, we stratified models by language use and used race and ethnicity as the primary explanatory variable, with non-Hispanic white as the referent group. To examine nativity and years in the United States differences in health insurance coverage for each language group, we stratified models by language use and used nativity and years in the United States as the primary explanatory variable with born in the United States as the referent group. For models stratified by language use exploring the association between race and ethnicity and health insurance status, non-Hispanic white was the referent group. For models stratified by language use exploring the association between nativity and years in the United States and health insurance status, born in the United States was the referent group.

Income data sensitivity analysis

Income data (total earnings for the previous year) was missing for 45% of the study sample who reported speaking Spanish or another language and was missing for 36% who reported speaking only or mostly English. Respondents who reported

speaking Spanish or a language other than English were significantly more likely to have missing income data than respondents who reported speaking only or mostly English (p<.001). Due to the large amount of missing data and differential reporting of income between language groups, income was not included in the primary analyses. In a sensitivity analysis, logistic regression was conducted including income as a covariate in models, and was limited to study subjects who had reported income data. Adjusted odds ratios with models adjusted for income were comparable to adjusted odds ratios of the full sample that did not adjust for income (data not shown).

3 Results

Demographic information for the study sample is presented in Table 1. Health insurance coverage was less prevalent among persons who reported speaking Spanish or a language other than English, compared to those who reported speaking English (56.9% vs.81.7%, p<.001). Figure 1 shows the prevalence of reported language use by race and ethnic and nativity and years in the United States. The percentage of Spanish or a language other than English use was reported by Hispanics and by persons living in the United States less than 15years.

Table 1. Prevalence of Demographic Characteristics for Adults Aged 18-64 years, 2010 National Health Interview Survey

	Total Sample N=20,945	**Spanish or Language Other than English N=3,800**	**Only or Mostly English N=17,145**	***P***
Age (Mean, SE)	40.5 (0.14)	38.5 (0.3)	40.8 (0.2)	<.001
Sex				
Male	49.4 (48.6-50.3)	51.7 (49.7-53.7)	48.9 (48.0-49.9)	=.01
Education Level				<.001
Less than High School Education	12.9 (12.2-13.5)	37.8 (35.6-40.0)	8.8 (8.2-9.4)	
High School or GED	25.5 (24.7-26.3)	24.6 (22.9-26.4)	25.5 (24.6-26.4)	
Some College or Greater	61.7 (60.7-62.8)	37.6 (35.3-39-8)	65.7 (64.7-66.8)	
Race and Ethnicity				
Hispanic	15.9 (15.3-16.7)	71.0 (68.7-73.2)	6.8 (6.4-7.3)	<.001
Non-Hispanic White	66.2 (65.1-67.3)	11.6 (9.9-13.6)	75.2 (74.1-76.2)	
Non-Hispanic Black	12.7 (12.0-13.6)	4.1 (3.1-5.4)	14.3 (13.4-15.2)	
Asian	5.0 (4.7-5.5)	13.3 (11.8-14.9)	3.7 (3.4-4.1)	
Nativity and years in the United States				
In U.S. Less than 15 years	8.1 (7.6-8.6)	39.1 (37.2-41.0)	2.6 (2.4-3.0)	<.001
In U.S. 15 Years or Greater	10.0 (9.5-10.6)	40.5 (38.6-42.4)	5.4 (5.0-5.8)	
Born in U.S.	81.8 (81.0-82.6)	20.4 (18.8-22.1)	91.9 (91.4-92.4)	
U.S. Citizen				
Yes	90.0 (89.5-90.6)	49.0 (47.0-51.0)	97.1 (96.8-97.4)	<.001
Comorbidities				
Diabetes				=.48
Yes	6.0 (5.6-6.3)	7.1 (6.3-8.2)	5.8 (5.5-6.2)	
Hypertension				<.001
Yes	22.4 (21.7-23.0)	18.2 (16.8-19.8)	23.0 (22.3-23.7)	
Heart Disease				<.001
Yes	8.4 (7.9-8.8)	5.5 (4.7-6.5)	8.8 (8.4-9.3)	
At least one comorbidity				<.001
Yes	28.2 (27.5-58.9)	23.3 (21.7-24.9)	29.0 (28.2-29.7)	
BMI (Mean, SE)	27.7 (0.06)	27.4 (0.12)	27.7 (0.06)	=.05
Presently working-Yes	69.2 (68.4-70.0)	63.4 (61.7-65.6)	70.1 (69.3-71.0)	<.001
Health Insurance Coverage-Yes	78.1 (77.3-78.7)	56.9 (54.7-59.2)	81.7 (80.9-82.3)	<.001

The prevalence of health insurance coverage status for racial and ethnic groups and nativity and years in the United States group by language status is shown in Figure 2. Among Hispanics who speak Spanish or a language other than English, only 50.6% report having health insurance coverage, whereas 76.7% of Hispanics who speak only or mostly English report health insurance coverage. Among the other racial/ethnic groups and nativity and years in the United States groups, this same pattern in observed, with lower reported prevalence of health insurance coverage among those who report speaking Spanish or a language other than English compared to those who report speaking only or mostly English. Table 2 shows the adjusted odds of health insurance coverage for language groups, stratified by race and ethnicity and nativity and years in the United States group. For each racial and ethnic group, and each nativity and years in United States group, persons who reported speaking Spanish or a language other than English were less likely to report health insurance coverage compared to those who reported speaking only or mostly English.

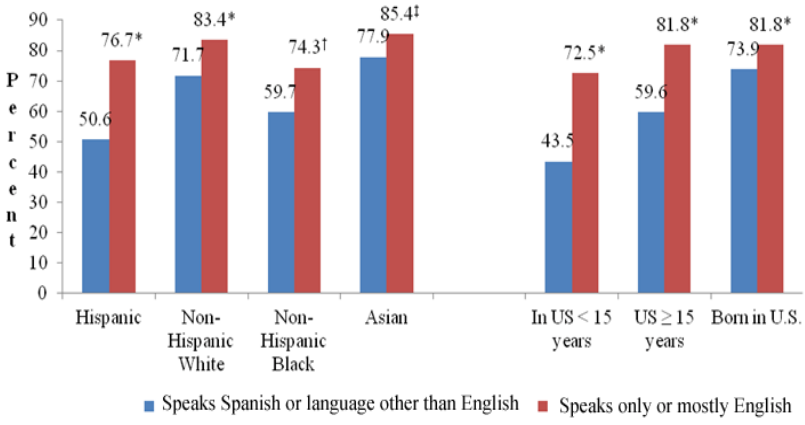

Figure 2. Age-adjusted Prevalence of Health Insurance Coverage by Race and Ethnicity and Nativity and years in the United States by Language Use among Adults Aged 18-64 Years, 2010 National Health Interview Survey.

* $p<.001$; † $p=.04$; ‡ $p=.01$

Table 2. Adjusted Odds of Health Insurance Coverage for Persons who Report speak Spanish or a Language Other than English Compared to those who Report Speaking Only or Mostly English, for each Racial and ethnic and nativity and years in the United States Group among Adults aged 18-64 Years, 2010 National Health Interview Survey

	Race and Ethnicity			**Nativity and years in the United States**		
	Hispanic*	**Non-Hispanic White***	**Asian***	**US <15 years***	**US Years ≥ 15 years***	**Born in the US***
Model Variable	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Language Use (Spanish or Another Language)	0.4 (0.4-0.5)	0.5 (0.4-0.8)	0.7 (0.5-0.9)	0.5 (0.4-0.7)	0.5 (0.4-0.7)	0.8 (0.6-1.1)
Sex (Male)	0.6 (0.5-0.7)	0.7 (0.6-0.8)	0.8 (0.5-1.2)	0.6 (0.5-0.8)	0.7 (0.5-0.9)	0.7 (0.7-0.8)
Co-morbidities (Yes)	1.3 (1.0-1.7)	1.2 (1.0-1.4)	1.2(0.8-2.0)	1.3 (0.9-1.9)	1.3 (0.9-1.8)	1.2 (1.0-1.3)
Body Mass Index	1.0 (1.0-1.1)	1.0 (1.0-1.1)	1.0 (0.9-1.1)	1.0 (0.9-1.0)	1.0 (0.9-1.0)	1.0 (1.0-1.1)
Education Level§						
Less than High School	0.3 (0.2-0.4)	0.3 (0.3-0.4)	0.4 (0.2-0.7)	0.3 (0.2-0.4)	0.5 (0.4-0.6)	0.4 (0.3-0.4)
High School or GED	0.5 (0.5-0.7)	0.5 (0.4-0.5)	0.4 (0.3-0.7)	0.4 (3-0.6)	0.5 (0.4-0.7)	0.5 (0.4-0.5)
Work status(Not working)	0.7 (0.6-0.9)	0.5 (0.4-0.5)	0.5 (0.3-0.7)	0.8 (0.6-1.1)	0.5 (0.4-0.7)	0.6 (0.5-0.6)

*Adjusted for age; §Referent group for education level is some college or greater

ISSN 1927-6990 E-ISSN 1927-7008

Table 3. Adjusted Odds of Health Insurance Coverage for Racial and Ethnic groups and Nativity and Years in the United States Group by Language Status Among Adults aged 18-64 years, 2010 National Health Interview Survey

	Speaks Spanish or a language other than English OR (95% CI)	**Speaks Only or Mostly English OR (95% CI)**
MODEL 1*§†		
Race/Ethnicity		
Hispanic	0.6 (0.4-0.8)	0.7 (0.6-0.8)
Non-Hispanic black	**	0.7 (0.6-0.8)
Asian	1.4 (0.9-2.1)	1.0 (0.8-1.3)
Sex	0.6 (0.5-0.8)	0.7 (0.7-0.8)
Comorbidities (Yes)	1.4 (1.1-1.8)	1.2 (1.1-1.4)
Body Mass Index	1.0 (1.0-1.1)	1.0 (1.0-1.1)
Education Level		
Less than High School	0.3 (0.3-0.4)	0.4 (0.3-0.5)
High School or GED	0.5 (0.4-0.6)	0.5 (0.5-0.6)
Work status-Not working	0.7 (0.6-0.8)	0.6 (0.5-0.6)
MODEL 2*‡†		
Nativity/Time in U.S.		
US < 15 years	0.3 (0.2-0.4)	0.6 (0.4-0.8)
US≥ 15 years	0.6 (0.5-0.8)	1.0 (0.8-1.2)
Sex	0.6 (0.5-0.8)	0.7 (0.7-0.8)
Comorbidities (Yes)	1.3 (1.0-1.7)	1.2 (1.0-1.4)
Body Mass Index	1.0 (0.9-1.0)	1.0 (1.0-1.1)
Education Level		
Less than High School	0.3 (0.2-0.4)	0.4 (0.3-0.4)
High School or GED	0.4 (0.3-0.5)	
Work status(Not working)	0.7 (0.5-0.8)	0.5 (0.5-0.6)

*Models adjusted for age; ** Due to small sample size, estimates not included

§Referent group for race/ethnicity is non-Hispanic white;

†Referent group for education level is some college or greater;

‡Referent group for nativity is born in the United States

Analysis stratified by language is presented in Table 3. Among those speaking Spanish or a language other than English, Hispanics had significantly lower adjusted odds of reporting health insurance coverage compared to non-Hispanic whites. Among those speaking only or mostly English, Hispanics and non-Hispanic blacks significantly lower adjusted odds of reporting health insurance coverage compared to non-Hispanic whites. Among those speaking Spanish or a language other than English, the U.S. <15 years and the U.S. ⩾ 15 years groups had lower adjusted odds of reporting health insurance coverage compared those born in the United States

4 Discussion

This is one of the most comprehensive recent studies examining language use and insurance coverage in a nationally representative sample of non-Hispanic white, non-Hispanic black, Asian and Hispanic adults. Insurance coverage has been explicitly linked to access to care and improved health outcomes in US hospitals. Prior analysis has focused largely on language barriers faced by Hispanic and Asian populations, but this study also included non-Hispanic whites and non-Hispanic blacks [7, 22-25]. In addition, few national studies have examined the potential role of language as an independent barrier for health insurance coverage by nativity and years in the United States. In this study, persons who spoke Spanish or a language other than English were less likely to report health insurance coverage, compared to those

who reported speaking only or mostly English Though this finding is not entirely new, what is new is the reporting of language differences in the prevalence of insurance coverage across racial and ethnic groups and nativity and years in the United States groups, with those who reported speaking a language other than English reporting less insurance coverage across all groups.

To our knowledge, the influence of language on within racial and ethnic group differences in health insurance coverage has not been explained at the national level. The data from this report suggest that persons in all racial and ethnic groups who speak a language other than English may face barriers in insurance coverage. Prior analysis of the impact of language on insurance coverage within groups has predominantly been limited to more local level data or smaller groups of populations as well as children. Many of the findings of those studies are similar to the results we see here [26-28]. Huang and others looked at the impact of language on various sub-segments of the Asian population and showed that up to 29.8 % of primarily Korean speaking Asian Americans as well as 21.5% Vietnamese and 16.8% primarily Chinese speaking were uninsured [29]. These numbers were significantly higher than Asian American who spoke primarily English and similar to the overall numbers found in our study. Thus, while distinct associations have been shown between race and ethnicity and health insurance coverage and other areas of health care access, studies suggest restricting analysis to race and ethnicity may mask language disparities, especially for non-Hispanic white populations, which is also supported by the findings from this study [30].

As mentioned earlier appreciating the impact of language use could have significant impact on insurance expansion efforts at the state level, the analysis in California noted that more than 1 million limited–English proficient (LEP) adults will be eligible to receive tax credits to purchase affordable coverage in the Health Benefit Exchange. However, only 42 percent of eligible LEP adults are expected to enroll in the program due in part to language barriers [8]. The national importance of language access for all populations is emphasized by Title VI of the Civil Rights Act, which underscores that all entities that receive federal funding, including hospitals, primary care clinics, managed care organizations, and physicians should ensure access to care for individuals who speak a language other than English.

Within each nativity and years in the United States group, persons who spoke Spanish or a language other than English were less likely to report health insurance coverage, with the lowest prevalence of health insurance reported among persons who emigrated to the U.S. and reported living in the U.S less than 15 years. Immigrants who have lived in the United States longer or speak only or mostly English may assimilate better into the U.S. health care system compared to those who have lived in the U.S. for a shorter time or speak Spanish or a language other than English. Prior studies looking at the impact of acculturation on insurance have shown an increasing rate of un-insurance and underinsurance in the Hispanic and certain subgroups of the Asian American population which is a growing national challenge in the US [31]. In particular this data has shown that both US-born and immigrant Hispanics have fallen significantly behind non-Hispanic nonelderly adults in insurance coverage although the increase in uninsured rate is largest for Hispanic noncitizens. A nine state analysis limited to children in states with Latino populations over 500,000 also showed similar findings pointing to financial, nonfinancial, and social policy barriers in eligibility and enrollment into Medicaid and State Children's Health Insurance Program (SCHIP) [32]. While the effect of acculturation on health care access and health status varies by a number our factors, our analysis suggest that spoken language and nativity and time living in the U.S. may also be related to health insurance coverage and important elements to consider when developing interventions, policies and programs to improve access to care.

This study has a few limitations. Study variables were all self-reported; thus, recall bias is possible. Additionally, this study did not include language variables outside of spoken language. A more comprehensive review of language, such as English proficiency, written language, or linguistic isolation may have strengthened this study. The NHIS is an interviewer survey administered in English and Spanish, with translators used for persons who speak languages outside of English and Spanish, whenever possible. Finally, NHIS is limited to civilian, non-institutionalized persons and does not include people

living in nursing homes or other institutions. The sample of non-Hispanic blacks who speak Spanish a language outside of English was small, which limits inferences that can be made about this population.

Language appears to be an important variable and acculturation proxy to include when examining disparities and differences in health insurance coverage. In this study we provide one of the first comprehensive descriptions of the impact of language on access to care for non-Hispanic white, non-Hispanic black, Asian and Hispanic populations and for immigrants living in the United States for various periods of time. Continuing to investigate and identify language differences in health insurance coverage status and to further define the influence of language, race and ethnicity, nativity and the amount of time living in the United States on health insurance coverage is important to improve access to care for these groups.

Conflict of interests

The findings and conclusions in this report are those of the authors and not necessarily of the U.S. Department of Health and Human Services or the Office of the Assistant Secretary for Planning and Evaluation.

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