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Reversal of Associations between Spanish Language Use and Mammography and Pap Smear Testing

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INTRODUCTION

In the United States, mortality from breast cancer is decreasing and cervical cancer deaths have rapidly declined over the past several decades.(1) However, these declines in mortality are not distributed equally among women of different ethnicities. Latina women are less likely to be diagnosed with early stage breast cancer than non-Latina Whites(2) and to subsequently die of breast cancer than non-Latina White women.(3) Additionally, cervical cancer incidence rates among Latina women are approximately 70% higher and death rates nearly 50% higher than among non-Latina Whites.(4, 5) Despite evidence-based guidelines recommending routine breast and cervical cancer screening(6–8), Latina women are less likely to utilize cancer screening services(3), and have lower breast and cervical cancer screening rates compared to non-Latinas.(9) Approximately 50.5 million Americans, or 16% of the total U.S. population, identify themselves as Hispanic or Latino.(10) Therefore, it is critical to identify and investigate potential causes of the outcomes disparity in breast and cervical cancer among Latina women in the United States.

Prior studies have examined screening disparities and highlight the importance of health care accessibility, distinct cultural attitudes, provider bias, and language barriers between providers and patients.(11–13) Racial and ethnic disparities have been shown to result in part from differences in socioeconomic status, insurance status, type and availability of health care services, patient preferences, and acculturation(14), but these only partially explain screening disparities.(15) Several studies have found that English-proficient women are more likely to receive and follow screening recommendations and that speaking a language other than English is negatively associated with receipt of cancer screening services.(16)

In a prior analysis of the BRFSS, we found a negative association between Spanish language use and colorectal cancer (CRC) screening. Even after controlling for potential confounding variables, compared to Latinos who responded to the BRFSS in English, Latinos who answered the BRFSS in Spanish had 0.64 times the odds of reporting having received CRC testing within recommended guidelines.(17) The purpose of this study was to examine the relationship between preferred language use (English versus Spanish) and self-reported receipt of mammography and Pap smear testing among U.S. Latinas and non-Latinas.

METHODS

Data Source and Population

We conducted a cross-sectional analysis of the Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) 2008 and 2010 surveys.⁽¹⁵⁾ The study sample for this analysis included adult women who completed the 2008 or 2010 BRFSS in a state that administered and recorded data from English and Spanish-speaking respondents. Women aged 21–64 years who had not had a hysterectomy and were not pregnant were included in the study sample for Pap smear testing, while responses from non-pregnant women aged 40–64 years were included to assess receipt of mammography. Although the CDC provided states with English and Spanish versions of the BRFSS surveys, not all states administered the surveys in Spanish. States that had data on fewer than 50 surveys completed in Spanish were excluded. Given differences in health care delivery between the U.S. territories and the states, the territories were excluded.

Study Variables

Our dependent variables were the reported receipt of tests for breast and cervical cancer screening which we analyzed separately. We operationalized these variables using BRFSS questions regarding mammography and Pap smear testing. Respondents aged 40–64 years were considered screened for breast cancer if they reported receipt of a mammogram within the last two years. Respondents were considered to have been screened for cervical cancer if they reported receipt of a Pap smear within the past one year for women aged 21–29 years and within the last three years for women aged 30–64 yrs.

Our main independent variable was the preferred language of survey respondent, English vs. Spanish. We classified participants as “responding-in-English” if the corresponding survey was coded in the BRFSS data set as being conducted in English or “responding-in-Spanish” if the survey was coded as being conducted in Spanish. The BRFSS provides no information about the level of English proficiency or the respondents' preferred language. Respondent language was further stratified by self-reported Hispanic/Latino race/ethnicity. The main independent variable was thus divided into three categories of exposure: non-Latinas responding-in-English (non-Latinas), Latinas responding-in-English, and Latinas responding-in-Spanish. Respondents that did not have an identified language of response or did not report Latina/Non-Latina status were excluded from the analysis.

Demographic characteristics for the study sample included age, marital status, employment status, geographic region as defined by the U.S. Census (i.e. Northeast, Midwest, South, and West)⁽¹⁸⁾, and urban vs. suburban/rural status. Race and ethnicity were incorporated into the main independent variable. Education and income were combined to define an indicator variable for low socioeconomic status (SES). Low SES was defined as less than a 12th grade education and/or annual income of less than \$20,000^(19, 20). In addition to these factors, we included as potential covariates the presence of an identified health care provider, health insurance, smoking status, respondent's body mass index and perceived general health (Table 1). Given a potential interaction between the independent variable and health insurance status, we also conducted separate analysis for respondents with and without medical insurance.

Statistical Analysis

Respondent characteristics were calculated using standard means for continuous variables and proportions/frequencies for categorical variables. Chi-squared tests were used to examine the relationships between the dependent variables, receipt of mammography and Pap smear, and the ethnicity/language independent variable, as well as each potential

confounder. Covariates included age, marital status, geographic region, urban vs. suburban/rural status, socioeconomic status, employment status, identified health care provider, smoking status, body mass index, and perceived general health. Logistic regression was used to estimate crude odds ratios (OR) between the three ethnicity/language categories and the receipt of screening tests, as well as between the covariates and receipt of screening tests. If the OR for the ethnicity/language variable adjusted for each potential covariate resulted in at least a 10% difference from the unadjusted OR, the variable was considered to be a confounder and was included in a final multivariable logistic model. Interactions between preferred language and other covariates included in the model were examined and tested in order to rule out differential effects of the covariates by language. The data were analyzed using SUDAAN version 10 (Research Triangle Institute). Sampling weights were included in all analysis. These sampling weights take into account the disproportionate stratified sampling design of the BRFSS. Additionally, the weights are adjusted post-stratification to accommodate non-response and non-coverage within the sample(20).

RESULTS

The final analysis sample for receipt of mammography included 162,256 BRFSS respondents representing 36.8 million women aged 40–64 years old in 30 states. The majority (84.9%) of the mammography study sample was composed of non-Latinas who responded to the survey in English. The remainder of this sample consisted of Latinas who responded in English (8.4%) and Latinas who responded in Spanish (6.8%). The final analysis sample for receipt of Pap smear testing included 167,551 BRFSS respondents representing 51.9 million women aged 21–64 years old in 30 states. As in the mammography sample, the majority (80.0%) in this sample were non-Latinas who responded to the survey in English. The remainder of the Pap smear testing sample consisted of Latinas who responded to the survey in English (10.9%) and Latinas who responded in Spanish (9.1%). In both the mammography and Pap smear testing samples, a greater percentage of non-Latinas had health insurance, a health care provider, and higher education and income levels compared with Latinas responding-in-English, who in turn had greater percentages of these characteristics compared with Latinas responding-in-Spanish. (Table 1.)

Breast Cancer Screening

Table 2 represents the unadjusted and adjusted mammography results for non-Latinas, Latinas responding-in-English, and Latinas responding-in-Spanish. The unadjusted odds ratios (ORs) for mammography screening for both Latinas responding-in-English and Latinas responding-in-Spanish were lower than for non-Latinas. However, for both Latina groups the adjusted ORs were higher than for non-Latinas. Compared to non-Latinas, Latinas responding-in-English had 1.16 times the odds (95% CI= 1.05–1.29) and Latinas responding-in-Spanish had 2.20 times the odds (95% CI=1.90–2.55) of reporting receipt of mammography.

When stratified by health insurance status, in the adjusted analysis for those *with* health insurance, Latinas responding-in-Spanish continued to have higher ORs for mammography compared to non-Latinas (OR=1.92, 95% CI=1.57–2.35). However, Latinas responding-in-English had ORs similar to non-Latinas (OR=1.06, 95%CI=0.95–1.19). In the sample *without* health insurance, in crude analysis both the Latinas responding-in-English and Latinas responding-in-Spanish groups had higher odds of receiving mammography compared to non-Latinas. These ORs increased for both groups of Latinas in the adjusted analysis. (Table 2).

Cervical Cancer Screening

Table 3 represents the unadjusted and adjusted Pap smear testing results for non-Latinas, Latinas responding-in-English, and Latinas responding-in-Spanish. The unadjusted ORs for Pap smear testing for both Latinas responding-in-English and Latinas responding-in-Spanish were lower than for non-Latinas. However, for both groups of Latinas, the adjusted analysis again indicated higher odds of cervical cancer screening compared to non-Latinas although the ORs for Latinas responding-in-English compared to non-Latinas did not reach statistical significance. Compared to non-Latinas, Latinas responding-in-English had 1.10 times the odds (95% CI= 0.98–1.23) while Latinas responding-in-Spanish had 2.37 times the odds (95% CI=2.04–2.75) of reporting receipt of Pap smear testing compared to non-Latinas

When stratified by health insurance status, in the adjusted analysis for those *with* health insurance, Latinas responding-in-Spanish continued to have higher ORs for cervical cancer screening compared to non-Latinas (OR=1.73, 95%CI=1.40–2.14). However, there was no difference between Latinas responding-in-English and non-Latinas (OR=1.02, 95% CI=0.90–1.16). For the sample *without* health insurance, in the crude analysis Latinas responding-in-Spanish had higher ORs (OR=2.21, 95% CI=1.92–2.54) compared to non-Latinas while Latinas responding-in-English had ORs that were similar to non-Latinas (OR=1.07, 95% CI=0.90–1.26). However, in the adjusted analysis, both Latinas responding-in-English (OR=1.28, 95% CI=1.05–1.55) and Latinas responding-in-Spanish (OR=2.94, 95% CI=2.41–3.58) had ORs that were significantly higher than for non-Latinas. (See table 3.)

DISCUSSION AND CONCLUSION

The purpose of this study was to examine the association between BRFSS language preference, English versus Spanish, and reported receipt of mammography and Pap smear screening tests among Latina and non-Latina women. Our previous analyses of the 2006 BRFSS revealed that compared to non-Latinos and Latinos responding-in-English, Latinos responding to the BRFSS in Spanish had lower adjusted odds of reporting receipt of colorectal cancer screening tests. Thus, we hypothesized that Spanish language use among Latinas would have a similar negative association with reported mammography and Pap smear testing. The results of these analyses, however, suggested “reversed associations” in that although the unadjusted odds for mammography and Pap smear testing are lower among Latinas, the adjusted odds were actually greater for Latinas responding-in-Spanish than they were for non-Latinas. Similarly, but to a lesser extent, the adjusted odds were greater for Latinas responding-in-English compared to non-Latinas although there was no statistically significant difference between Latinas responding-in-English and non-Latinas in the Pap smear analysis.

Reversed associations such as those found in this study have been seen in a series of analyses of population level datasets. Rakowski et al.(21, 22) explored the phenomenon of reversed association in mammography screening for non-White racial/ethnic groups. Using several years of BRFSS and National Health Interview Survey (NHIS) data to assess the association of race and ethnicity with receipt of mammography, Rakowski et al. found that across all years of the BRFSS surveys analyzed, the unadjusted odds ratios for Latina women were less than 1.00 and significantly lower than for non-Latina White women, however the adjusted odds ratios were greater than 1.00 and statistically significant. This reversal phenomenon was particularly large for Latina women.

Our results are similar to those found in Rakowski’s analysis of the BRFSS data in that both Latinas responding-in-English and Latinas responding-in-Spanish had crude odds ratios less than 1.00 for receipt of mammography and Pap smear. On adjusted analysis, reversals of

association were particularly striking for Latinas responding-in-Spanish as this group had significantly higher adjusted odds ratios for both mammography and Pap smear testing when also stratified to those with and without health insurance. Our results suggest that language and insurance status may be major contributors to the reversed associations among Latinas described by Rakowski et al. Of note, we also considered the role of socioeconomic status (SES) and examined SES within insurance strata but observed no differential effect across SES levels on the exposure variable.

Several possible explanations exist for the results we have shown. Perhaps the advent of programs increasing availability of screening studies previously not available may account for higher adjusted screening rates. Indeed, in the last two decades many programs targeting ethnic minorities and the medically underserved have sought to educate women about the importance of screening and to make mammography and Pap smear testing accessible and available free-of-charge. For example, the CDC and state-sponsored National Breast and Cervical Cancer Early Detection Program (NBCCEDP) helps low-income, uninsured, and underinsured women gain access to screening and diagnostic services including mammography and Pap smear testing(23). Since 1991, the NBCCEDP has served more than 3.9 million women, provided more than 9.8 million screening examinations, and diagnosed 52,694 breast cancers, and 2,856 invasive cervical cancers(24). Some authors have suggested that the success of the NBCCEDP may contribute to the adjusted reversals observed in their studies.

The success of programs such as the NBCCEDP in targeting underserved women may also help explain the differences in the direction of associations observed in the present study and in our previous BRFSS analysis showing a negative association between Spanish language use and CRC screening. Only recently did the CDC start a colorectal screening program similar, but on a smaller scale, to NBCCEDP programs for women's cancers. Thus, the everyday barriers that the NBCCEDP circumvents were likely present for the population identified for CRC screening, but with no or limited availability of such a public program at the time of survey. It is also possible that prior research pointing to language as a barrier to cancer screening, as well as subsequent efforts to train physicians and community outreach workers may have resulted in increased utilization of health care services by Latina women.

Several limitations of this study are noteworthy. First, we categorized respondents as responding-in-English versus responding-in-Spanish based on respondents' language in the BRFSS. Although this may represent respondents' language preference, respondents who answered in Spanish may also be proficient in English and vice versa. This may under-represent the number of English speakers and over-represent Spanish speakers, and furthermore may account for higher adjusted screening rates seen in Spanish-speaking Latinas if part of this population is actually proficient in English. In addition, as a telephone survey of non-institutionalized adults, the BRFSS may not be representative of those of lower SES who may not have telephones and of those who primarily use cellular phones. This may have also falsely elevated the adjusted odds ratio for Spanish-speaking Latinas. Of particular concern with the BRFSS is the finding by Link et al. who used race, ethnicity, and language variables from the 2000 U.S. Census data with 2003 BRFSS data and estimated that counties with larger percentages of Spanish-only speakers had lower BRFSS participation rates compared with counties in which all respondents spoke English. Finally, the definitions of the screening outcome variables are a potential limitation as we relied on self-report and individuals may not accurately remember when their last screening exams were conducted and whether they were exams done for screening or for the evaluation of symptoms. Self-reported answers can also be affected by social desirability bias in which respondents provide the perceived correct answer instead of accurate reporting of screening practices.

The results of the present study further confirm that there is a relationship between Spanish language use and receipt of screening mammography and Pap smear for screening. Unlike other studies of language use and cancer screening services, the data suggests that Spanish-speaking Latinas have higher adjusted odds of receiving mammography and Pap smear as compared to their English-speaking peers.

Furthermore, this study contributes to the investigation of reversals by identifying language, particularly in those without insurance, as a potentially key variable contributing to the reversal phenomenon observed among Latinas. Future analyses of large population based datasets such as the BRFSS should consider including language as a standard covariate, as not doing so may lead to missed opportunities to identify and target at-risk groups.

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References

1. ACS. Cancer Facts & Figures 2012. 2012 Available from: <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-031941.pdf>.
2. Jemal A, Clegg LX, Ward E, Ries LA, Wu X, Jamison PM, et al. Annual report to the nation on the status of cancer, 1975–2001, with a special feature regarding survival. *Cancer*. 2004; 101(1):3–27. [PubMed: 15221985]
3. ACS. Cancer Facts & Figures for Hispanics/Latinos 2009–2011. 2009 Available from: <http://www.cancer.org/acs/groups/content/@nho/documents/document/ffhispanicslatinos20092011.pdf>.
4. USPSTF. Screening for breast cancer. 2009 Available from: <http://www.uspreventiveservicestaskforce.org/uspstf/uspbrca.htm>.
5. USPSTF. Screening for cervical cancer. 2003 Available from: <http://www.uspreventiveservicestaskforce.org/uspstf/uspscerv.htm>.
6. Coughlin SS, Uhler RJ. Breast and cervical cancer screening practices among Hispanic women in the United States and Puerto Rico, 1998–1999. *Prev Med*. 2002; 34(2):242–251. [PubMed: 11817921]
7. Rodriguez MA, Ward LM, Perez-Stable EJ. Breast and cervical cancer screening: impact of health insurance status, ethnicity, and nativity of Latinas. *Ann Fam Med*. 2005; 3(3):235–241. [PubMed: 15928227]
8. Wells KJ, Roetzheim RG. Health disparities in receipt of screening mammography in Latinas: a critical review of recent literature. *Cancer Control*. 2007; 14(4):369–379. [PubMed: 17914337]
9. U. S, Census, Bureau. [cited 2012 February 21] Overview of Race and Hispanic Origin, 2010. 2010. Available from: <http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>
10. Smedley, B.; Stith, A.; Nelson, A. Washington, DC: Academy Press; 2002. Unequal treatment: Confronting racial and ethnic disparities in health care.
11. Jacobs EA, Karavolos K, Rathouz PJ, Ferris TG, Powell LH. Limited English proficiency and breast and cervical cancer screening in a multiethnic population. *Am J Public Health*. 2005; 95(8): 1410–1416. [PubMed: 16043670]
12. Hiatt RA, Pasick RJ, Stewart S, Bloom J, Davis P, Gardiner P, et al. Community-based cancer screening for underserved women: design and baseline findings from the Breast and Cervical Cancer Intervention Study. *Prev Med*. 2001; 33(3):190–203. [PubMed: 11522160]
13. Woloshin S, Schwartz LM, Katz SJ, Welch HG. Is language a barrier to the use of preventive services? *J Gen Intern Med*. 1997; 12(8):472–477. [PubMed: 9276652]
14. Diaz JA, Roberts MB, Goldman RE, Weitzen S, Eaton CB. Effect of language on colorectal cancer screening among Latinos and non-Latinos. *Cancer Epidemiol Biomarkers Prev*. 2008; 17(8):2169–2173. [PubMed: 18708410]

15. CDC. [cited 2012 February 21] Behavioral Risk Factor Surveillance System 2010 technical information and data. 2010. Available from: http://www.cdc.gov/brfss/technical_infodata/surveydata/2008.htm
16. U. S, Census, Bureau. [cited 2012 February 21] 2007 Economic Census: Regions and Divisions. 2007. Available from: http://www.census.gov/econ/census07/www/geography/regions_and_divisions.html
17. Gwynn RC. Risk factors for asthma in US adults: results from the 2000 Behavioral Risk Factor Surveillance System. *J Asthma*. 2004; 41(1):91–98. [PubMed: 15046383]
18. Rakowski W, Clark MA, Rogers ML, Weitzen S. Investigating reversals of association for utilization of recent mammography among Hispanic and Non-Hispanic Black women. *Cancer Causes Control*. 2009
19. Adams EK, Breen N, Joski PJ. Impact of the national breast and cervical cancer early detection program on mammography and pap test utilization among white, Hispanic, and African American Women: 1996–2000. *Cancer Supplement*. 2007; 109(2):348–358.
20. CDC. [cited 2012 February 21] National Breast and Cervical Cancer Early Detection Program (NBCCEDP). 2009. Available from: <http://www.cdc.gov/cancer/NBCCEDP/about.htm>
21. Adams EK, Florence CS, Thorpe KE, Becker ER, Joski PJ. Preventive care: female cancer screening, 1996–2000. *Am J Prev Med*. 2003; 25(4):301–307. [PubMed: 14580631]
22. Breen N, Wagener DK, Brown ML, Davis WW, Ballard-Barbash R. Progress in cancer screening over a decade: results of cancer screening from the 1987, 1992, and 1998 National Health Interview Surveys. *J Natl Cancer Inst*. 2001; 93(22):1704–1713. [PubMed: 11717331]
23. Beach ML, Flood AB, Robinson CM, Cassells AN, Tobin JN, Greene MA, et al. Can language-concordant prevention care managers improve cancer screening rates? *Cancer Epidemiol Biomarkers Prev*. 2007; 16(10):2058–2064. [PubMed: 17932353]
24. Link MW, Mokdad AH, Stackhouse HF, Flowers NT. Race, ethnicity, and linguistic isolation as determinants of participation in public health surveillance surveys. *Prev Chronic Dis*. 2006; 3(1):A09. [PubMed: 16356362]

Table 1

Demographic Characteristics of 2008 & 2010 BRFSS Sample

	Mammography: Female participants 40–64 years old			PAP: Female participants 21–64 years old		
	Non-Latina English Respondents	Latina - English Respondents	Latina - Spanish Respondents	Non-Latina English Respondents	Latina - English Respondents	Latina - Spanish Respondents
N (%)	148,631 (91.6)	8,384 (5.2)	5,241 (3.2)	148,192 (88.4)	11,169 (6.7)	8,190 (4.9)
Weighted N (%)	31,208,933 (84.9)	3,105,552 (8.4)	2,487,507 (6.8)	41,512,947 (80.0)	5,677,627 (10.9)	4,726,347 (9.1)
Age						
<i>mean</i>	51.2	49.8	49.1	41.7	37.9	38.3
<i>se</i>	0.03	0.13	0.17	0.06	0.21	0.22
Body Mass Index (BMI)						
<i>mean</i>	27.4	28.7	29.4	26.7	27.8	28.2
<i>se</i>	0.03	0.14	0.18	0.03	0.12	0.14
Metropolitan Status (%)						
<i>urban</i>	38.6	51.9	54.8	39.9	51.3	55.3
<i>suburban</i>	46.4	41.1	40.3	46.2	41.8	38.6
<i>rural</i>	15.0	7.0	5.0	14.0	7.0	6.1
Education (%)						
< High School	4.4	16.5	59.1	4.0	15.4	56.2
High School/GED	24.1	27.2	21.3	21.0	26.3	24.9
> High School	71.6	56.3	19.6	75.0	58.3	18.9
Marital (%)						
<i>Partnered</i>	71.2	65.4	72.1	68.2	62.2	75.5
<i>Not Partnered</i>	28.8	34.6	27.9	31.8	37.8	24.5
Income (%)						
< \$20,000	10.7	20.1	45.0	11.0	21.4	47.3
\$20,000 – \$34,999	12.4	17.8	28.7	13.1	20.5	28.4
\$35,000 – \$74,999	28.5	28.6	11.9	28.6	26.2	10.0
\$75,000+	38.7	23.9	2.6	37.9	22.1	1.7
<i>Refused</i>	9.7	9.7	11.8	9.5	9.9	12.6
Low SES (%)	13.3	28.8	74.2	13.4	29.3	73.4
Medical Insurance (%)	89.3	81.3	50.1	86.9	76.0	44.9
Identified Health Care Provider (%)	90.3	85.2	61.2	85.1	76.1	48.5
Smoking (%)						
<i>Never</i>	57.7	67.9	84.2	62.6	73.2	88.0
<i>Past</i>	25.1	19.0	8.8	20.2	13.5	6.3
<i>Current</i>	17.2	13.1	7.0	17.3	13.2	5.7

	Mammography: Female participants 40–64 years old			PAP: Female participants 21–64 years old		
	Non-Latina English Respondents	Latina - English Respondents	Latina - Spanish Respondents	Non-Latina English Respondents	Latina - English Respondents	Latina - Spanish Respondents
Good Health (%)	84.9	75.4	49.1	89.7	83.3	64.8
Exercise in last 30 days (%)	75.8	68.2	60.5	78.8	72.3	61.3
Consumed alcohol in last 30 days (%)	52.9	40.8	17.4	57.3	46.1	17.0
Employment (%)	78.0	76.9	79.2	84.7	83.5	85.7
	<i>Employed/Student</i>					
	6.6	8.5	10.5	7.3	9.7	9.6
<i>Out of Work</i>						
	15.4	14.6	10.3	8.0	6.8	4.7
Screening (%)	73.3	70.1	67.6	83.1	77.7	79.0

BRFSS, Behavioral Risk Factor Surveillance System;
GED, General Education Degree

Table 2

Multivariate Analysis - Determinants of Breast Cancer Screening

	Crude			Adjusted (*)			Sample N	Weighted N
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI		
<i>Non-Latina English Respondents</i>	73.3	1.00	(n/a)	72.7	1.00	(n/a)	148,540	31,186,502
<i>Latina Responding in English</i>	70.1	0.85	(0.78–.93)	75.4	1.16	(1.05–1.29)	8,372	3,102,004
<i>Latina Responding in Spanish</i>	67.6	0.76	(0.69–0.85)	87.4	2.20	(1.90–2.55)	5,238	2,486,563
<i>With Insurance</i>	Crude			Adjusted (*)			Sample N	Weighted N
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI		
<i>Non-Latina English Respondents</i>	77.0	1.00	(n/a)	77.5	1.00	(n/a)	132,137	27,849,460
<i>Latina Responding in English</i>	74.6	0.88	(0.79–0.97)	78.6	1.06	(0.95–1.19)	6,811	2,523,155
<i>Latina Responding in Spanish</i>	76.7	0.98	(0.84–1.15)	88.5	1.92	(1.57–2.35)	2,609	1,245,257
<i>Without Insurance</i>	Crude			Adjusted (*)			Sample N	Weighted N
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI		
<i>Non-Latina English Respondents</i>	42.1	1.00	(n/a)	41.7	1.00	(n/a)	16,403	3,337,042
<i>Latina Responding in English</i>	50.3	1.39	(1.15–1.69)	53.1	1.88	(1.34–2.64)	1,561	578,850
<i>Latina Responding in Spanish</i>	58.5	1.94	(1.67–2.26)	62.3	2.77	(2.00–3.82)	2,629	1,241,307

(*) - adjusted for age, body mass index, regular source of medical care, marital status, smoking status, perceived health, alcohol use, physical activity level, low SES, metropolitan status, and region of country

Table 3

Multivariate Analysis - Determinants of Cervical Cancer Screening

	Crude			Adjusted (*)			Sample N	Weighted N
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI		
<i>Non-Latina English Respondents</i>	83.1	1.00	(n/a)	81.9	1.00	(n/a)	148,540	31,186,502
<i>Latina Responding in English</i>	77.7	0.71	(0.65–0.78)	83.2	1.11	(0.98–1.23)	8,372	3,102,004
<i>Latina Responding in Spanish</i>	79.0	0.77	(0.69–0.85)	95.7	2.37	(2.04–2.75)	5,238	2,486,563
<i>With Insurance</i>								
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI	Sample N	Weighted N
<i>Non-Latina English Respondents</i>	86.8	1.00	(n/a)	86.7	1.00	(n/a)	130,247	36,031,175
<i>Latina Responding in English</i>	83.1	0.75	(0.67–0.84)	87.1	1.02	(0.90–1.16)	8,703	4,312,024
<i>Latina Responding in Spanish</i>	82.7	0.73	(0.63–0.85)	93.9	1.73	(1.40–2.14)	3,466	2,121,520
<i>Without Insurance</i>								
	Screening Rates (%)	OR	95% CI	Screening Rates (%)	OR	95% CI	Sample N	Weighted N
<i>Non-Latina English Respondents</i>	58.9	1.00	(n/a)	58.1	1.00	(n/a)	17,868	5,457,612
<i>Latina Responding in English</i>	60.4	1.07	(0.90–1.26)	63.6	1.28	(1.05–1.55)	2,455	1,362,215
<i>Latina Responding in Spanish</i>	76.0	2.21	(1.92–2.54)	80.3	2.94	(2.41–3.58)	4,722	2,604,883

(*) - adjusted for age, body mass index, regular source of medical care, marital status, smoking status, perceived health, alcohol use, physical activity level, low SES, metropolitan status, and region of country