

ACCULTURATION AND CARDIOVASCULAR DISEASE SCREENING PRACTICES AMONG MEXICAN AMERICANS LIVING IN CHICAGO

Janine M. Jurkowski, PhD, MPH; Timothy P. Johnson, PhD

Objective: To examine acculturation as a correlate of cardiovascular disease screening practices among Mexican Americans.

Methods: A modified Behavioral Risk Factor Surveillance System (BRFSS) survey was administered to adults age 18 and older in four Chicago neighborhoods during the winter of 2000 (N=435).

Results: Regression analyses that accounted for complex sampling design found that Mexican Americans who were acculturated, were female, and had healthcare coverage were more likely to have been screened after controlling for age, healthcare coverage, education, and marital status. Acculturated Mexican Americans were 4.97 times more likely to have had blood cholesterol screening, 3.4 times more likely to have had blood pressure screening, and 7.99 times more likely to have had a routine check-up in the preceding two years when compared to unacculturated Mexican Americans. Mexican Americans with healthcare coverage were more likely to have had their blood pressure checked and to have obtained a routine check-up than did those without coverage. Women were more likely to have had a blood pressure screening and have obtained a routine check-up in the past two years.

Conclusions: The results suggest that more acculturated Mexican Americans, as well as those who are female and who have healthcare coverage, are more likely to obtain cardiovascular disease (CVD)-related screenings. The findings indicate a need for promoting CVD-related screenings among Mexican Americans and underscores the need for Spanish-speaking health professionals. (*Ethn Dis.* 2005;15:411-417)

Key Words: Access to Health Care, Acculturation, Cardiovascular Disease, Culture, Hispanics, Mexican Americans, Screening Practices

From the Department of Disability and Human Development (JM), and the Survey Research Laboratory (TPJ), University of Illinois at Chicago, Illinois.

Address correspondence and reprint requests to Janine M. Jurkowski, MPH, PhD; Assistant Professor, Department of Health Policy, Management, and Behavior; University at Albany School of Public Health; 1 University Place; Rensselaer, NY 12144; 518-402-0420; jjurkowski@albany.edu

INTRODUCTION

Among Latinos living in the United States, cardiovascular disease (CVD) causes more deaths than any other affliction.¹ In 2000, CVD was responsible for more than 27% of the deaths among Latino men and approximately 33% of deaths among Latino women living in the United States. Latinos also have high prevalence rates for many CVD risk factors and behaviors. For example, more than half of Mexican-American adults have high cholesterol.¹ In many cases, these risk factors are more prevalent among Latinos than among non-Hispanic Whites. In particular, Mexican Americans are more obese, have a greater prevalence of diabetes, and are less physically active than their non-Hispanic White counterparts.¹

Screening for CVD-related risk factors is important for the prevention and early detection of CVD. One in five adults in the United States has high blood pressure, but an estimated 31.6% are unaware of it.¹ High blood cholesterol is another major risk factor for CVD and, given the large proportion of adult Mexican Americans with this condition, screening is imperative. According to analyses of the 1999 national BRFSS data, Latinos were less likely to have been screened for blood cholesterol in the past five years than were non-Hispanic Whites, after controlling for demographic factors.² Analyses of the Medical Expenditure Panel Survey (MEPS) indicated racial/ethnic differences in CVD-related screening practices. The adjusted proportion of Latinos receiving blood pressure screening was lower than among non-Hispanic Whites (73% and 82%, respectively), but these differences were not significant.³ Another study examined persons in both fee-

for-service and health maintenance organizations and found that regardless of coverage type, Hispanics were less likely to report having had a blood pressure or cholesterol screening than were non-Hispanic Whites.⁴ Although some evidence suggests that Latinos are less likely to engage in CVD screening behaviors, information regarding specific correlates of screening behavior appears to be generally absent within this population.

Unlike the case with screening behaviors, several correlates of CVD risk factors are well known.^{3,10,11} With regard to Latino health behaviors, acculturation is perhaps the most relevant correlate to consider. We define acculturation as the process of adopting the values, beliefs, and behaviors of a dominant culture by a minority group or the modification of a person's culture due to contact with another culture.⁵⁻⁷ Studies of health-related conditions and behaviors among Latinos living in the United States have employed a variety of measures as proxies for the acculturation process.⁵⁻⁸ In particular, language abilities, language preferences, birthplace, and years of residence in the United States often are employed separately or as part of acculturation indices, with language the best predictor of acculturation.⁶

A few studies have explored the relationship between acculturation and several CVD-related preventive behaviors and risk factors among Latinos.⁹⁻¹³ A study of urban Mexican-American women who were interviewed at health fairs and community clinics in Chicago indicated no association between acculturation and physical activity levels,¹⁴ but other non-population-based research found mixed evidence among poor middle-aged and elderly Mexican Americans; acculturation increased physical activity

In 2000, CVD was responsible for more than 27% of the deaths among Latino men and approximately 33% of deaths among Latino women living in the United States.

as well as tobacco and alcohol consumption.¹¹ Research using data from the Third National Health and Nutrition Examination Survey (NHANES III) suggests that as adult Mexican Americans become more acculturated, leisure-time physical inactivity decreases.¹³ Spanish-speaking Mexican-American women born in the United States have higher non-HDL cholesterol and higher prevalence of type 2 diabetes compared to their English-speaking, Mexican-born counterparts.^{13,15} Spanish-speaking Mexican Americans are also twice as likely as their English-speaking counterparts to be physically inactive during leisure time, even after controlling for demographic factors.

Another factor that often is overlooked in the examination of ethnic differences in screening practices is the heterogeneity of the Latino population, which includes individuals representing many national origins and cultures. Research has found hypertension differences among different Latino groups,^{16,17} but to our knowledge no published studies have specifically examined the CVD-related screening practices of Mexican Americans. This absence is noteworthy, given that persons of Mexican origin represent the largest proportion of Hispanics currently residing in the United States.¹⁸

This paper investigates the effects of acculturation on CVD-related screening practices and general healthcare use among Mexican-American adults living

in Chicago. Having experienced a 38% growth in its Latino population between 1990 and 2000, Chicago offers a unique setting for conducting this research. Latinos—a large majority of whom are Mexican American—now represent 26% of the city's population.¹⁹ In addition, most research concerning the health of Mexican Americans in the United States has focused on residents of the “border states” (Arizona, California, New Mexico, and Texas). This study provides an important new setting in which to examine the health-related behaviors of this growing population.

METHOD

Data Collection

This study's data come from two separate telephone administrations of a modified version of the Behavioral Risk Factor Surveillance Survey. The University of Illinois at Chicago Survey Research Laboratory administered the surveys in the winter of 2000 in the Lawndale and Greater Lawn neighborhoods of Chicago. These neighborhoods have high concentrations of Latinos and non-Hispanic Blacks.

The sample was identified by using a dual sampling frame that employed both the Mitofsky-Waksberg and list-assisted approaches,²⁰ and the Trodahl-Carter method was used to randomly select one respondent age 18 years or older within a household.^{21,22} Surveys were administered in both Spanish and English. Data were weighted for selection probabilities; post-stratification weights also were included.

The response rates for the two surveys were computed as the ratio of completed interviews to the sum of the cases known to be eligible by using the standard response rate formula RR3, as defined by the American Association for Public Opinion Research.^{23,24} The response rate was 46.8% for the Lawndale survey and 30.2% for the Greater Lawn survey.^{24,25} These response rates are

within the range for telephone surveys conducted in the United States in the late 1990s and early 21st century²⁶ and reflect the practical difficulties of conducting survey research in urban environments.²⁷

Sample

Of the 819 respondents interviewed, 446 self-identified as Latinos. Of these, 423 reported that they were of Mexican origin. Because CVD-related risk factors are prevalent not just among older adults but throughout adulthood,¹ the entire adult Mexican-American sample of 423 was included in all analyses.

Measures

Three CVD-related screening variables were examined: 1) receipt of a routine physician visit during the past two years; 2) receipt of a blood pressure check by a physician during the past two years; and 3) receipt of a blood cholesterol check in the past two years. A two-year time frame for these measures was selected based on American Heart Association recommendations for at-risk persons.²⁸

A three-level acculturation index was constructed using two variables available in the data files: place of birth and interview language. Respondents who were interviewed in English and were born in the United States were considered acculturated. Mexican Americans who participated in Spanish and reported being born outside the United States were defined as unacculturated. Those born in the United States but responding Spanish and those born outside the United States but who were interviewed in English were classified as bicultural.

Sociodemographic variables examined in these analyses include age, sex, years of education, and marital status. Current healthcare coverage, defined as having “any kind of healthcare coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare,” was included as well.

Analyses

Bivariate cross tabulations, analysis of variance (ANOVA), and logistic regression were employed to examine associations between acculturation, other covariates, and the dependent variables.^{29,30} Because of the complex sampling design, a design-based analysis was conducted. Bivariate analyses were conducted using the svytab procedure, and logistic regression models were estimated using the STATA³¹ svylogit procedure.³²

RESULTS

Approximately 63% of the sample was male and 37% female. Slightly more than 79% were born outside the United States, and 72% preferred being interviewed in Spanish. The mean age of the sample was 35 years (standard deviation [SD]=11.0). Slightly more than 57% of the Mexican-American respondents reported having any healthcare coverage, and approximately 46% reported having at least a high school education. Approximately 68% indicated they were married or living with a partner. Most (69%) were defined as unacculturated, whereas 13% were classified as bicultural and 18% as acculturated.

The prevalence of blood pressure screening during the past two years was 86.1% in this population (Table 1), while 32.7% of those interviewed indicated they had had a blood cholesterol screening during the past two years. In addition, 70.1% of respondents reported having obtained a routine medical check-up during the previous two years. Acculturated Mexican Americans were most likely to have had a blood pressure check, a blood cholesterol screening, and a routine check-up in the past two years. Further, bicultural respondents were more likely than unacculturated respondents to have had a blood cholesterol screening and a routine check up in the preceding two years.

The bivariate analyses between lan-

Table 1. CVD screening practices in the past two years among Mexican Americans, by demographic characteristics

Characteristic	Blood Pressure Screening % (N) Yes	Blood Cholesterol Screening % (N) Yes	Routine Check-up % (N) Yes
Population total	86.1% (360)	32.7% (137)	70.1% (295)
	% (SE)	% (SE)	% (SE)
Acculturation index	N=418	N=423	N=421
Unacculturated	83.8 (2.2)	27.6 (2.6)	64.3 (2.8)
Bicultural	84.4 (4.8)	38.1 (6.7)	77.0 (5.6)
Acculturated	97.3 (1.9)	49.3 (5.9)	87.2 (4.0)
Chi-square <i>P</i> value	.009	.002	<.001
Birthplace	N=418	N=419	N=421
United States	96.6 (2.0)	47.1 (5.5)	85.4 (3.9)
Mexico or other	83.7 (2.0)	29.2 (2.5)	66.1 (2.6)
Chi-square <i>P</i> value	.002	.002	<.001
Language of interview	N=418	N=419	N=421
Spanish	84.2 (2.1)	27.8 (2.6)	64.7 (2.8)
English	91.8 (2.5)	45.9 (4.7)	83.6 (3.5)
Chi-square <i>P</i> value	.038	<.001	<.001
Gender	N=418	N=423	N=421
Male	82.1 (2.4)	28.3 (2.8)	61.8 (3.0)
Female	93.6 (2.0)	40.8 (4.0)	84.2 (3.0)
Chi-square <i>P</i> value	.008	.01	<.001
Age (in years)			
18–29	86.7 (2.8)	29.1 (3.9)	72.2 (3.8)
30–39	83.9 (3.2)	23.9 (3.8)	67.8 (4.2)
40+	87.7 (2.7)	44.4 (4.2)	70.7 (3.8)
Chi-square <i>P</i> value	NS	.001	NS
Education	N=415	N=419	N=417
High school diploma	89.3 (2.2)	33.8 (3.4)	74.9 (3.2)
Less than high school	83.7 (2.5)	31.7 (3.1)	65.9 (3.2)
Chi-square <i>P</i> value	NS	NS	.046
Marital status	N=418	N=423	N=421
Married/domestic partner	87.3 (2.0)	34.8 (2.8)	69.2 (2.8)
Not married/single	84.2 (3.2)	28.5 (3.9)	71.7 (3.9)
Chi-square <i>P</i> value	NS	NS	NS

This table presents the proportion of demographic characteristics of Mexican Americans who reported having been screened in the past two years. For example, 83.8% of unacculturated Mexican Americans, 84.4% of bicultural Mexican Americans, and 97.3% of acculturated Mexican Americans reported having had their blood pressure checked in the past two years.

SE=standard error; NS=not significant at the .05 level of significance.

guage and birthplace, the two components of the acculturation index, and screening practices found that Mexican Americans born in the United States and those who spoke English were each more likely to have their blood pressure and cholesterol checked and to have had a routine check-up in the past two years. Compared to their female counterparts, fewer Mexican-American men reported having had a routine check up and their

blood pressure and cholesterol checked. Education also was associated with the likelihood of having had a routine check-up, with the more educated (those with a high school diploma) more likely to have done so. Healthcare coverage was associated with screening practices as well: respondents without coverage were less likely to have had either type of screening or a routine check-up. Finally, those age 40 years or

Table 2. Acculturation level of Mexican Americans, by demographic characteristics

Characteristic Main Effects	Unacculturated % (SE)	Bicultural % (SE)	Acculturated % (SE)
Sex			
Female	36.6 (2.8)	31.9 (6.3)	41.3 (5.7)
Male	63.4 (2.8)	68.2 (6.3)	58.7 (5.7)
Education†			
High school diploma	33.3 (2.8)	67.1 (6.3)	77.6 (4.9)
Less than high school	66.7 (2.8)	32.9 (6.3)	22.5 (4.9)
Healthcare coverage*			
Have health coverage	52.8 (2.9)	67.7 (6.3)	68.9 (5.4)
No health coverage	47.2 (2.9)	32.3 (6.3)	31.1 (5.4)
Marital status†			
Married/domestic partner	76.2 (2.5)	68.3 (6.2)	36.5 (5.6)
Not married/single	23.9 (2.5)	31.7 (6.2)	63.5 (5.6)
Age (in years)†			
18–29	24.6 (2.6)	45.3 (6.8)	65.5 (5.5)
30–39	34.8 (2.8)	31.1 (6.3)	15.6 (4.2)
40+	40.6 (2.9)	23.6 (5.8)	18.9 (4.6)

* $P < .05$; † $P < .005$.

This table presents the proportion of demographic characteristics of Mexican Americans by acculturation level. For example, 36.6% of unacculturated Mexican Americans were female and 63.4% were male.

SE=standard error.

Table 3. CVD-related screening practices in the past two years among Mexican Americans

Characteristic Main Effects	Blood Cholesterol Checked		Blood Pressure Checked		Routine Check-Up	
	Odds Ratio	CI	Odds Ratio	CI	Odds Ratio	CI
Sex						
Female	1.54	(0.98, 2.42)	3.24†	(1.48, 7.09)	3.30‡	(1.94, 5.61)
Male	1.0	—	1.0	—	1.0	—
Education						
High school diploma	0.88	(0.53, 1.45)	1.21	(0.61, 2.42)	1.15	(0.70, 1.89)
Less than high school	1.0	—	1.0	—	1.0	—
Healthcare coverage						
Have health coverage	1.56	(0.97, 2.49)	5.37‡	(2.74, 10.51)	1.75*	(1.11, 2.76)
No health coverage	1.0	—	1.0	—	1.0	—
Acculturation index						
Acculturated	3.79‡	(1.94, 7.37)		(1.68, 38.0)	3.29†	(1.40, 7.73)
Bicultural	2.01	(1.00, 4.08)	6.92*	(0.33, 1.95)	1.77	(0.87, 3.62)
Unacculturated	1.0	—	0.80	—	1.0	—
Marital status						
Married/domestic partner	1.72*	(1.02, 2.91)	1.62	(0.84, 3.13)	0.96	(0.53, 1.69)
Not married/single	1.0	—	1.0	—	1.0	—
Age in years						
18–29	1.02	(0.55, 1.90)	1.31	(0.63, 2.75)	0.94	(0.53, 1.69)
30–39	1.0	—	1.0	—	1.0	—
40+	2.75‡	(1.59, 4.78)	1.51	(0.71, 3.24)	1.16	(0.66, 2.03)

* $P < .05$; † $P < .01$; ‡ $P < .005$, after controlling for all variables shown in table.

CI=confidence interval.

older were most likely to have had their blood cholesterol checked in the past two years (Table 1). Marital status was not significantly associated with check-ups and screening practices.

As Table 2 shows, acculturation level was associated with marital status, education level, age, and healthcare coverage: acculturated respondents were more likely to have a high school diploma and healthcare coverage, were younger, and were less likely to be married. Healthcare coverage, in particular, is known to be associated with acculturation and CVD screening, which suggests that healthcare coverage may be responsible for the relationship between acculturation and the CVD screening measures shown in Table 1.^{33–37} Further, education and sex are known to be associated with healthcare coverage, which calls into question the degree to which acculturation may directly influence CVD screening behaviors.^{36,38} To answer this question, we estimated logistic regression models designed to assess the effects of acculturation, net of other covariates, for each of the three screening practices.

The results of these analyses are shown in Table 3. Acculturation was significantly associated with all three screening behaviors, after controlling for all other variables. Acculturated Mexican Americans had approximately four times greater odds ($P < .005$) and bicultural Mexican Americans had about two times greater odds ($P = .05$) compared to their unacculturated counterparts to have had a blood cholesterol screening in the past two years. Compared to the unacculturated, acculturated Mexican Americans had approximately seven times greater odds of having a blood pressure check in the past two years ($P < .05$) and had 3.3 times greater odds of having had a routine check-up ($P < .001$).

A number of other variables were significantly associated with screening behaviors as well. Women were more than three times more likely than men

Acculturated Mexican Americans were more likely to engage in CVD-related screening practices . . .

to have had their blood pressure checked ($P < .01$) and a routine check-up ($P < .005$) and appear to be somewhat more likely to have had their blood cholesterol checked ($P < .06$) in the past two years. Healthcare coverage was positively associated with having had a blood pressure screening and a routine check-up in the past two years—respondents with healthcare coverage had 5.4 times greater odds of having had their blood pressure checked ($P < .005$) and 1.8 times greater odds of having had a routine check-up ($P < .05$). Finally, being age 40 or older also was independently associated with cholesterol screening ($P < .005$).

DISCUSSION

Findings of this study identify an important association between acculturation and CVD-related screening behaviors among Mexican Americans living in Chicago. Acculturated Mexican Americans were more likely to engage in CVD-related screening practices, and bicultural Mexican Americans also were more likely than their unacculturated peers to have obtained blood cholesterol screening in the two years before the survey.

This investigation is unique in that it examines acculturation as a correlate of CVD-related screening behaviors among Mexican Americans, a relationship that has not been reported previously. The findings from this study are consistent with existing research on CVD risk factors and preventive behaviors, which indicates that unacculturated Latinos are less likely to engage in

CVD-related preventive practices such as physical activity and tobacco abstinence.^{11,13} This study's findings also are consistent with cancer control research, which has found that among Mexican-American women, acculturation is correlated with cancer screening behaviors.^{39,40}

The present study also is distinctive in that it reports on Mexican Americans living in a northern US city. Many studies of Latino populations, such as those based on NHANES III and MEPS data, examine samples of Mexican Americans that are predominantly from southwestern areas of the United States, as the sampling designs for these studies oversampled the southwestern United States, the region with the highest concentrations of Mexican Americans.^{41,42} Evidence exists of state and regional differences in prevalence of CVD-related risk factors and CVD mortality in the United States.⁴³ These differences also may be relevant for screening practices among Mexican Americans. Those living in large cities in northern areas may be different from those living in the Southwest in respect to factors that may affect their CVD-related screening practices.

Although Latinos experience greater risk factors for CVD compared to other ethnic groups, mortality statistics suggest that Latinos have lower rates of CVD mortality. However, the National Death Index's method of matching social security numbers has been found to underestimate mortality rates among Latinos.⁴⁴ A study using a National Mortality Followback Survey found that 20% of individuals identified as Latino by family or other informants were not identified as such on their death certificates. Additionally, the lower mortality rates among Latinos have been postulated to be due partly to Mexican Americans, a large sub-population of Latinos, returning to Mexico to die.⁴⁴

Early detection through screening is an important method for the prevention and control of CVD. Therefore, the in-

creased risk of CVD and the underestimation of national mortality rates among Latinos, as well as the present findings of an association between acculturation and CVD screening practices, illustrate the need for further research to understand the differences in screening practices among Mexican-American populations. These findings also highlight the need for culturally appropriate promotion of CVD-related screenings among Mexican Americans living in Chicago. Further, healthcare professionals serving Chicago Mexican Americans need to be aware of cultural differences within this population that may influence screening practices. Health professionals should also strive to increase the number of bilingual and culturally similar healthcare providers serving Mexican-American neighborhoods in Chicago.

The current study also supports existing knowledge suggesting that lack of coverage can be deleterious to health,³³ given findings that healthcare coverage was independently correlated with blood pressure screening practices and routine check-ups. Lack of access among some Mexican Americans living in Chicago is a public health challenge that might be addressed through community-based free screening campaigns with adequate follow-up. Contrary to previously cited research on CVD-related risk factors and behaviors, socioeconomic status, measured by education, was not associated with the likelihood of having obtained CVD-related screenings in this sample of Mexican Americans. The current study also found that males were less likely to obtain CVD-related screenings. These differences are consistent with National BRFSS data.⁴⁵

This study has some limitations. Perhaps most importantly, this study cannot be generalized to all Chicago Latinos or to Mexican Americans living in other regions of the United States. This sample also is not representative of Latinos who have different national origins and cultures. Southwestern states report

higher age-adjusted rates of CVD and stroke mortality than Illinois.⁴³ Regional differences in CVD mortality rates also may reflect regional variations in acculturation patterns relevant to health behaviors.

Another potential limitation is the survey's response rate, in that nonresponse may be associated with the screening practices of interest. If, for example, screening practices are lower among undocumented Mexican Americans and undocumented persons are less likely to participate in telephone interviews, the estimates reported here may overestimate the CVD screening practices of Mexican Americans living in Chicago. It should be noted, however, that we have no direct evidence that this is in fact the case.

This study examined CVD-related screening practices in a cross-sectional manner. Consequently, measuring the temporal relationship of the effects of acculturation, healthcare coverage, or other variables on behaviors was not possible. Longitudinal research will be necessary to more fully understand why unacculturated Mexican Americans are less likely to be screened for CVD-related risk factors. Further, because these data were collected as part of a surveillance tool for program planning, multiple measures of some of the constructs examined here were not available. Although many of the BRFSS screening items employed in these analyses have been previously validated,⁴⁶⁻⁴⁹ the use of multiple indicators would have nonetheless improved the reliability and comprehensiveness of this study. Additionally, other indicators of acculturation, such as generation status, immigrant status, and language preference for specific circumstances, would have been useful. A validated acculturation scale, such as those created by Cuellar and colleagues or Marin and colleagues, would also have contributed to more precise assessments.^{5,7} Despite these limitations, this study presents new information about CVD-related screening practices

among Mexican Americans. Because Mexican Americans living in the United States are at increased risk, understanding the sociocultural processes that contribute to screening compliance will become increasingly imperative as this population ages.

ACKNOWLEDGMENTS

We thank Susan R. Levy, PhD, Professor Emeritus, Division of Community Health Sciences, University of Illinois at Chicago for providing the data used for the analyses. The data used were funded by the Centers for Disease Control and Prevention (Grant No. U48/CCU 509661-07).

REFERENCES

1. American Heart Association (AHA). *Heart Disease and Stroke Update—2003 Update*. Dallas, Tex: AHA; 2002.
2. Brown DW, Giles WH, Greenlund KJ, Croft JB. Disparities in cholesterol screening. *Prev Med*. 2001;33:517-522.
3. Corbie-Smith G, Flagg EW, Doyle JP, O'Brien MA. Influence of usual source of care on differences by race/ethnicity in receipt of preventive services. *J Gen Intern Med*. 2002; 17(6):458-464.
4. DeLaet DE, Shea S, Carrasquillo O. Receipt of preventive services among privately insured minorities in managed care versus fee-for-service insurance plans. *J Gen Intern Med*. 2002; 17(6):451-457.
5. Cuellar I, Arnold B, Maldonado R. Acculturation rating scale for Mexican Americans-II: a revision of the original ARMSA scale. *Hisp J Behav Sci*. 1995;17:275-304.
6. Cuellar I, Harris LC, Jasso R. An acculturation scale for Mexican-American normal and clinical populations. *Hisp J Behav Sci*. 1980; 2:199-217.
7. Marin G, Sabogal F, Marin B, Otero-Sabogal R, Perez-Stable E. Development of a short acculturation scale for Hispanics. *Hisp J Behav Sci*. 1987;9:183-205.
8. Zane N, Mak W. Major approaches to the measurement of acculturation among ethnic minority populations: a content analysis and an alternative empirical strategy. In: Chun KM, Organista PB, Marin G, eds. *Acculturation: Advances in Theory, Measurement, and Applied Research*. Washington, DC: American Psychological Association; 2003:39-60.
9. Vega WA, Sallis JF, Patterson T, Rupp J, Atkins C, Nader PR. Assessing knowledge of cardiovascular health-related diet and exercise behaviors in Anglo- and Mexican Americans. *Prev Med*. 1987;16:696-708.
10. Sundquist J, Winkleby MA, Pudarc S. Cardiovascular disease risk factors among older

- Black, Mexican-American, White women and men: an analysis of NHANES III, 1988-1994. *J Am Geriatr Soc*. 2001;49:109-116.
11. Cantero PJ, Richardson JL, Baezconde-Garbanati L, Marks, G. The association between acculturation and health practices among middle-aged and elderly Latinas. *Ethn Dis*. 1999;9:166-180.
12. Bermudez OI, Falcon LM, Tucker KL. Intake and food sources of macronutrients among older Hispanic adults: association with ethnicity, acculturation, and length of residence in the United States. *J Am Diet Assoc*. 2000; 100:665-673.
13. Crespo CJ, Smit E, Carter-Pokras O, Anderson R. Acculturation and leisure-time physical inactivity in Mexican-American adults: results from NHANES III, 1988-1994. *Am J Public Health*. 2001;91:1254-1257.
14. Wilbur J, Chandler PJ, Dancy B, Lee H. Correlates of physical activity in urban Midwestern Latinas. *Am J Prev Med*. 2003;25(3):S69-S76.
15. Sundquist, J, Winkleby MA. Cardiovascular risk factors in Mexican-American adults: a transcultural analysis of NHANES III, 1988-1994. *Am J Public Health*. 1999;89:723-730.
16. Lorenzo C, Serrano-Rios M, Martinez-Larrad MT, et al. Prevalence of hypertension in Hispanic and non-Hispanic White populations. *Hypertension*. 2002;39:203-208.
17. Pappas G, Gergen PJ, Carroll M. Hypertension prevalence and the status of awareness, treatment, and control in the Hispanic Health and Nutrition Examination Survey (HHANES), 1982-84. *Am J Public Health*. 1990;80:1431-1436.
18. United States Bureau of the Census. *Profiles of General Demographic Characteristics: 2000 Census of Population and Housing*. Washington, DC: United States Department of Commerce; 2001.
19. *Chicago Fact Book*. Chicago, Ill: City of Chicago Department of Commerce; 2000.
20. Waksberg, J. Sampling methods for random digit dialing. *J Am Stat Assoc*. 1978;73:40-46.
21. Trodahl V, Carter R. Random selection of respondents within households. *J Marketing Res*. 1964;1:71-76.
22. Bryant BE. Respondent selection in a time of changing household composition. *J Marketing Res*. 1975;12:129-135.
23. American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. Ann Arbor, Mich: American Association for Public Opinion Research; 2000.
24. Survey Research Laboratory. *Report on Health Behaviors in Greater Lawn*. Report No. 842. Chicago, Ill: Survey Research Laboratory, University of Illinois at Chicago; 2000.
25. Survey Research Laboratory. *Report on Health Behaviors in Lawndale*. Report No. 849. Chicago, Ill: Survey Research Laboratory, University of Illinois at Chicago; 2000.

26. Keeter S, Miller C, Kohut A. Consequences of reducing non-response in a national telephone survey. *Public Opin Q*. 2000;64:125-148.
27. Groves RM, Couper MP. *Non-Response in Household Interview Surveys*. New York, NY: Wiley Publishers; 1998.
28. Pearson TA, Brown VW, Donato K, et al. AHA prevention conference III: Behavior Change And Compliance: Keys to Improving Cardiovascular Health, January 15-17, 1993, Monterrey, California: Lipids: Workshop IV. *Circulation*. 1993;88:1397-1401.
29. Long JS. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, Calif: Sage; 1997.
30. Wright RE. Logistic regression. In: Grimm LG, Yarnold PR, eds. *Reading and Understanding Multivariate Statistics*. Washington, DC: American Psychological Association; 2000:217-244.
31. Gould W. *Interpreting Logistic Regression in All Its Forms*. STATA Technical Bulletin. College Station, Tex: Stata Corp; 2000;53:19-29.
32. Hamilton LC. *Statistics with STATA. Updated for Version 7*. Belmont, Calif: Duxbury; 2003.
33. Hagdrup NA, Simoes EJ, Brownson RC. Healthcare coverage: traditional and preventive measures and associations with chronic disease risk factors. *J Community Health*. 1997;22:387-399.
34. Franks P, Clancy CM, Gold MR. Health insurance and mortality: evidence from a national cohort. *JAMA*. 1993;270:737-741.
35. Winkleby MA, Kraemer HC, Ahn DK, Varady AN. Ethnic and socioeconomic differences in cardiovascular disease risk factors: findings for women from the third National Health and Nutrition Examination Survey, 1988-1994. *JAMA*. 1998;280:356-362.
36. de la Torre A, Friis R, Hunter HR, Garcia, L. The health insurance status of US Latino women: a profile from the 1982-1984 HHANES. *Am J Public Health*. 1996;86:533-537.
37. Larkey LK, Hecht ML, Miller K, de la Torre C. Hispanic cultural norms for health-seeking behaviors in the face of symptoms. *Health Educ Behav*. 2001;28:65-80.
38. Collins KS, Schoen C, Joseph S, Duchon L, Simantov E, Yellowitz M. *Health Concerns Across A Woman's Lifespan: The Commonwealth Fund 1998 Survey of Women's Health*. New York, NY: The Commonwealth Fund; 1999.
39. Suarez L. Pap smear and mammogram screening in Mexican-American women: the effects of acculturation. *Am J Public Health*. 1994; 84:742-746.
40. O'Malley AS, Kerner J, Johnson AE, Mandelblatt J. Acculturation and breast cancer screening among Hispanic women in New York City. *Am J Public Health*. 1999;89:219-227.
41. National Center for Health Statistics. Third National Health and Nutrition Examination Survey. *Vital Health Stat* 2. 1992.
42. Waksberg J, Levine D, Marker D. *Assessment of Major Federal Data Sets for Analyses of Hispanic and Asian or Pacific Islander Subgroups and Native Americans, Extending the Utility of Federal Data Bases*. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, Department of Health and Human Services; 2000.
43. Casper ML, Barnett E, Halverson JA, et al. *Women and Heart Disease: An Atlas of Racial and Ethnic Disparities in Mortality*. 2nd ed. Morgantown, WV: Office for Social Environment and Health Research; 2000.
44. Stern MP, Wei M. Do Mexican Americans really have low rates of cardiovascular disease? *Prev Med*. 1999;29:S90-S95.
45. Powell-Griner EE, Anderson JE, Murphy J. State and sex specific prevalence of selected characteristics—Behavioral Risk Factor Surveillance System, 1994 and 1995. *Morb Mortal Wkly Rep*. 1997;46:SS-03.
46. Jackson C, Jatulis DE, Fortmann SP. The Behavioral Risk Factor Survey and the Stanford Five-City Project Survey: a comparison of cardiovascular risk behavior estimates. *Am J Public Health*. 1992;82:412-416.
47. Bowlin SJ, Morrill BD, Nafziger AN, Lewis C, Pearson TA. Reliability and changes in validity of self-reported cardiovascular disease risk factors using dual response: The Behavioral Risk Factor Surveillance System. *J Clin Epidemiol*. 1996;49:511-517.
48. Shea S, Stein AD, Lantigua R, Basch CE. Reliability of the Behavioral Risk Factor Survey in a triethnic population. *Am J Epidemiol*. 1991;133:489-500.
49. Stein AD, Courval JM, Lederman RI, Shea S. Reproducibility of responses to telephone interviews: demographic predictors of discordance in risk factor status. *Am J Epidemiol*. 1995;141:1097-1105.

AUTHOR CONTRIBUTIONS

Design and concept of study: Jurkowski, Johnson
Data analysis and interpretation: Jurkowski, Johnson
Manuscript draft: Jurkowski, Johnson
Statistical expertise: Jurkowski
Administrative, technical, or material assistance: Jurkowski, Johnson
Supervision: Johnson