

## Revisiting the Latino Health Paradox

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### EXECUTIVE SUMMARY

The Tomás Rivera Policy Institute (TRPI) study described in this report revisits the unexpected but currently widely accepted belief that Latinos<sup>1</sup> in the United States tend to be healthier than the average population despite their generally low socioeconomic status (SES). This finding is referred to in the literature as the Latino health paradox.

This study investigated whether or not such a paradox exists for the following health outcomes:

- Mental health
- Obesity/overweight
- Diabetes
- High blood pressure
- Heart disease
- Asthma
- Overall health

Latinos were studied and compared with different groups as follows:

- Latinos versus non-Latinos
- Immigrant Latinos versus non-immigrant non-Latino whites, and
- Latinos across generations

The Latino health paradox refers to the contradictory finding that indicates Latinos in the United States tend to have significantly better health and mortality outcomes than the average population despite generally low socioeconomic status.

Data used in this study were taken from the 2005 Adult Survey Public Use Files (PUFs) of the California Health Interview Survey (CHIS), a state representative database of interviews with more than 45,000 households.

This TRPI analysis is unique because, unlike other studies on the Latino health paradox, it takes into account SES, insurance status, lifestyle habits, different comparison groups and the effects of acculturation. Acculturation refers to the adjustments and changes experienced by immigrants in response to their contact with the society in their new country.

The TRPI findings strongly suggest that of the seven health outcomes, the Latino health paradox exists only for mental health issues, asthma, and high blood pressure. Our results indicate that immigrant Latinos are healthier in terms of these three outcomes when they first arrive in the United States; however, they become less healthy after acculturation. Health policy should focus on interventions that take into account factors associated with improved health for Latinos.

### ACKNOWLEDGEMENTS

TRPI gratefully acknowledges the support of the WellPoint Foundation, whose generous grant made this policy brief possible.

<sup>1</sup> The California Health Interview Survey (CHIS) dataset used in this study includes the following in its definition of Latinos: Mexican, Salvadorian, Guatemalan, Central American, Puerto Rican, Latino European, South American, Other Latino, and two or more Latino types.

The opposite is true for overall health: Acculturated Latinos report better self-perceived physical health. As far as being overweight or obese, however, Latinos consistently fare worse than non-Latinos, regardless of acculturation.

## I. WHY REVISIT THE PARADOX?

The Latino health paradox, also known as the Latino epidemiological paradox, Hispanic paradox, and Hispanic epidemiological paradox, refers to the contradictory epidemiological finding that indicates Latinos in the United States tend to have significantly better health and mortality outcomes than the average population despite generally low socioeconomic status.

### THERE ARE FOUR MAIN THEMES IN THIS REPORT:

- 1 We revisit the Latino health paradox by looking at Latinos and comparing them with different ethnic groups. There are limited studies exploring these comparisons. For example, some studies compare Latinos with non-Latinos, citing that Latinos are the healthier of the two groups. Others compare immigrant Latinos with U.S.-born non-Hispanic whites, noting the former are healthier than the latter. Still others compare immigrant Latinos to their U.S.-born Latino counterparts, again noting that the former group is the healthier of the two. There is also a gap in the research in determining whether or not the Latino immigrant, referred to as “first-generation,” is different from the non-Latino immigrant.
- 2 We analyze the health paradox by looking at specific health outcomes (mental health, overall health, being overweight or obese, diabetes, high blood pressure, heart disease and asthma). There is no common definition of health indicators across different studies. For example, it is unclear whether the health indicators reflect mortality, specific chronic diseases, or other measures of health. This study uses the same health outcomes across different groups for comparability.
- 3 We consider socioeconomic status (SES) and lifestyle characteristics to determine if these account for a health paradox. Studies on the Latino paradox usually consider only race, age, and gender. Unlike many of the previous studies about the health paradox, this study considers insurance status, SES, diet, drinking, and exercise habits, thereby allowing the researcher to rule out some of the usual explanations and

determine if a health paradox remains as a result of specific groupings which cannot be otherwise explained.

- 4 There is a need to reassess claims that acculturation explains the paradox. In a comprehensive review of literature, Lara et al. (2005) show that acculturation may have both positive and negative effects on various Latino health outcomes. Since the studies reviewed by Lara et al. show conflicting results for many of the health outcomes and behaviors, however, there is a need to return to the data to re-analyze the effects of acculturation.

## II. STUDY QUESTIONS

This research revisited the Latino paradox by attempting to answer two main questions:

### 1 Does the Latino Health Paradox exist for the chosen health outcomes<sup>2</sup> of this study?

To answer this question, this study investigated the following:

- Are Latinos healthier than non-Latinos?
- Are Latino immigrants healthier than non-immigrant whites in the U.S.?
- Are all Latinos alike in their health conditions across generations?

### 2 If the Latino paradox does exist, does acculturation affect Latinos differently than non-Latinos?

To answer this question, the study sought answers to the following:

- Do Latinos acculturate better than non-Latinos in terms of health status across generations?
- How do health outcomes vary between first-generation Latino immigrants and first-generation non-Latino immigrants?

## III. PREVIOUS STUDIES ABOUT THE LATINO HEALTH PARADOX

### LATINOS VS. NON-LATINO WHITES

Kyriakos Markides originally coined the now famous term, “Hispanic epidemiologic paradox” (Markides and Coreil, 1986). An early review of literature conducted by Markides and Coreil on Latino infant mortality, general mortality, cardiovascular diseases, cancer, physical health, and mental

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2 Mental health issues, being overweight or obese, diabetes, high blood pressure, heart disease, asthma, and overall health

health showed that the health status of Hispanics in the Southwest was “much more similar to the health status of other whites than that of blacks, although socioeconomically, the status of Hispanics is closer to that of blacks.” For diabetes, however, their review showed that Hispanics appeared to be disadvantaged relative to other whites.

The Latino health paradox exists only for mental health issues, asthma, and high blood pressure . . . immigrant Latinos are healthier in terms of these three outcomes when they first arrive in the United States; however, they become less healthy after acculturation.

Hayes-Bautista et al. (1994) found a strong Latino health profile for the 7.7 million Latinos in California in 1985-90. Latinos have low rates of low birth-weight babies and low infant mortality, about equal to the rate among non-Hispanic whites and Asians. Latinos also have lower age-adjusted death rates due to heart disease, strokes, and cancers, again, about equal to Asians. They found, however, that Latinos have higher death rates due to motor vehicle accidents and cirrhosis than non-Hispanic whites, blacks, or Asians, and a diabetes death rate higher than non-Hispanic whites or Asians.

Many studies on the paradox focus on mortality, such as a recent study by Hayes-Bautista et al. (2002) and Markides and Eschback (2005) that reviewed recent evidence that supports the apparent Latino mortality paradox by comparing Latinos with non-Hispanic whites. Markides and Eschback found that all Latinos combined have the greater mortality advantage compared with non-Latino whites, and the advantage is greatest among older people. However, the results could potentially be biased because some less-healthy Latinos may have returned to their native countries. Aside from this potential bias, it bears noting that the study only controls for age, gender, and race/ethnicity. Socioeconomic characteristics and health behaviors, which are included in this TRPI study, were not included in the Markides and Eschback study.

#### **ACCULTURATION TO AMERICA AND THE LATINO HEALTH PARADOX**

Acculturation refers to the adjustments and changes experienced by immigrants in response to their contact with the society in their new country. Elements of acculturation may include behavior, language, and religion. Cho, Frisbie, Hummer, and Rogers (2004) found that for self-reported health, immigrant Latinos have better outcomes than U.S.-

born Latinos. Frisbie et al. (2001) found similar patterns when comparing U.S.-born with foreign-born Asians and Pacific Islanders. Similar results also were found when comparing African-born with U.S.-born blacks (David and Collins, 2002). Specifically, David and Collins found that the birth-weight patterns of infants of African-born black women and U.S.-born white women were more closely related to one another than birth weights of infants of African-born black women to those of U.S.-born black women.

Lara et al. (2005) conducted a literature review of acculturation and Latino health in the United States. This study found that the “strongest evidence points toward a negative effect of acculturation on health behaviors overall (substance abuse, diet, and birth outcomes)” among Latinos in the United States. Acculturation had a positive effect, however, on self-reported health assessment. Results were mixed for mental health, asthma, diabetes, hypertension, and obesity.

#### **GAPS IN THE LITERATURE**

Much of the Latino paradox literature assumes that acculturation has a strong correlation with health outcomes. To test this assumption, there is a need to compare health outcomes for Latino and non-Latino immigrants—two groups who have essentially the same level of low acculturation. Comparing the two groups would show whether or not Latinos are more or less healthy than other groups outside the phenomenon of acculturation.

Many studies do not control for SES and general lifestyle characteristics. Instead, they often assume that the Latino immigrant population is socioeconomically disadvantaged as a group. Therefore, the findings that they do better in certain health measures must indicate a paradox. Yet these studies likely would have had different outcomes if SES and lifestyle characteristics had been taken into account.

#### **IV. DATA**

The California-representative data used in this study are from the 2005 Adult Survey Public Use Files (PUFs) of the California Health Interview Survey (CHIS). This dataset consists of individual records from the adult component of the survey, which includes interviews with 45,649 households containing 43,020 adults. Moreover, the set includes sizeable samples of non-Hispanic whites (28,979), Latinos (6,369), Asians (3,941), African Americans (1,954), American Indians, and others. The data were gathered from computer-assisted telephone interview surveys using a geographically stratified random-digit-dial sample. The CHIS data provide statistically reliable estimates for local areas as well as for different racial and ethnic populations in the state of California.

In California, Latinos are healthier than non-Latinos in general in terms of mental health and asthma.

Meanwhile, Latinos fare worse than non-Latinos in terms of overall health, being overweight or obese, and having diabetes.

## V. FINDINGS

As mentioned above, this study looked at the effect of being Latino on several key outcome variables: mental health, being overweight or obese, diabetes, high blood pressure, heart disease, asthma, and overall health. Overall, socioeconomic factors (poverty and education levels), lifestyle characteristics (as measured by physical activity, drinking, and eating habits), and other characteristics (such as gender and age) yielded the expected incremental effects on health outcomes. Specifically, being younger, having higher education levels, being married, having good income, doing regular exercise, and having a healthy diet led to improved health.

### ARE LATINOS HEALTHIER THAN NON-LATINOS?

Findings show that in California, Latinos are healthier than non-Latinos in general in terms of mental health and asthma (Figures 1 and 5). The mental health of Latinos is better across all other races/ethnicities (Figure 2). For asthma, Latinos share the same advantage over whites as Asians (Figures 5 and 6).

Meanwhile, Latinos fare worse than non-Latinos in terms of overall health (Figure 1), being overweight or obese, and having diabetes (Figure 3). As for being overweight or obese, blacks fare worse than Latinos when compared with whites. Asians have the least propensity to have weight problems across the races/ethnicities (Figure 4).

There is no statistically significant difference between Latinos and non-Latinos for high blood pressure and heart disease.

### ARE LATINO IMMIGRANTS HEALTHIER THAN NON-IMMIGRANT WHITES IN THE U.S.?

A more dramatic result emerges when comparing health outcomes between first-generation Latinos and non-immigrant non-Hispanic whites (Figures 7-9). Interestingly, the paradox holds for mental health and asthma. Results also suggest that immigrant Latinos are healthier in terms of high blood pressure problems and heart disease than non-immigrant non-Hispanic whites.

Significantly, results were also consistent in suggesting that Latino immigrants fare worse when it comes to overall health, being overweight or obese, and having diabetes.

### ARE LATINOS ALIKE ACROSS GENERATIONS?

Latinos are not alike across generations. Results suggest that first-generation Latinos are healthier than second and third generations (and beyond) for mental health (Fig.10), diabetes, high blood pressure (Fig.11) and asthma (Fig.12).

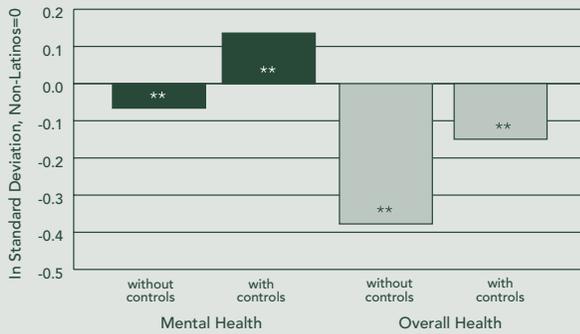
First-generation Latinos appear to have worse overall health, compared with non-immigrant Latinos. When it

**TABLE 1**  
**SUMMARY OF FINDINGS: IS THERE A PARADOX?**

OUTCOMES	WHICH GROUP IS HEALTHIER?		
	LATINOS VS. NON-LATINOS	LATINO IMMIGRANTS VS. NON-IMMIGRANT NON-HISPANIC WHITES	LATINOS ACROSS GENERATIONS (GEN 1 & 2 VS. GEN 3 & UP)
<b>Mental Health</b>	Latinos	Latinos	Gen 1 & 2
<b>Overall Health</b>	Non-Latinos	Non-immigrant non-Hispanic whites	Gen 2 and up
<b>Overweight or Obese</b>	Non-Latinos	Non-immigrant non-Hispanic whites	No difference
<b>Diabetes</b>	Non-Latinos	Non-immigrant non-Hispanic whites	Gen 1
<b>High Blood Pressure</b>	No difference	Latinos	Gen 1
<b>Heart Disease</b>	No difference	Latinos	No difference
<b>Asthma</b>	Latinos	Latinos	Gen 1 & 2

**FIGURE 1**

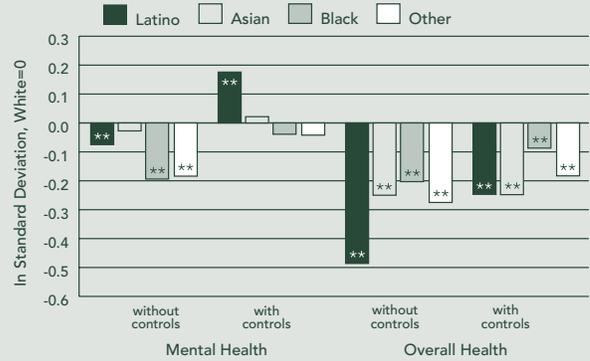
**LATINOS VS. NON-LATINOS IN GENERAL FOR MENTAL HEALTH AND OVERALL HEALTH**



NOTES:  
 1. The higher the score, the healthier the person.  
 2. Comparison group = non-Latinos  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 2**

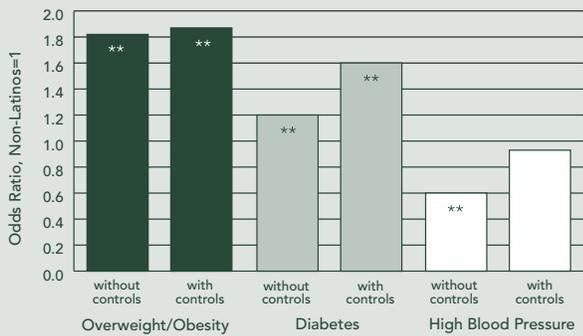
**LATINOS VS. OTHER NON-LATINO RACES/ ETHNICITIES FOR MENTAL HEALTH AND OVERALL HEALTH**



NOTES:  
 1. The higher the score, the healthier the person.  
 2. Comparison group = Whites  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 3**

**LATINOS VS. NON-LATINOS IN GENERAL FOR OVERWEIGHT/OBESITY, DIABETES, AND HIGH BLOOD PRESSURE**



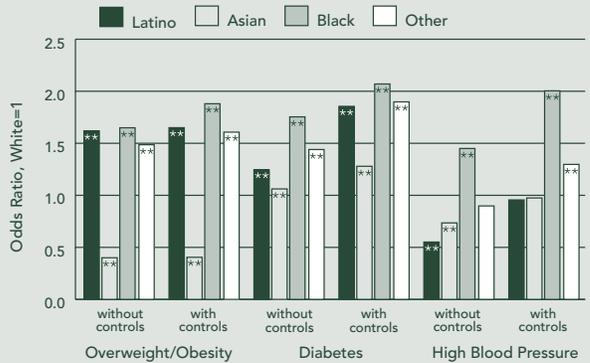
NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = Non-Latinos  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

comes to being overweight or obese as well as having heart disease, there are no significant differences across Latino generations.

Conducting the study without accounting for socioeconomic and lifestyle characteristics shows that a paradox exists for high blood pressure, heart disease, and asthma. Results for mental health are mixed. However, once SES and lifestyle characteristics are accounted for in the model, overall findings strongly show that a paradox exists for mental health and asthma. There is also some evidence that suggests a paradox exists for high blood pressure. Results

**FIGURE 4**

**LATINOS VS. OTHER NON-LATINO RACES/ ETHNICITIES FOR OVERWEIGHT/OBESITY, DIABETES, AND HIGH BLOOD PRESSURE**



NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = Whites  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

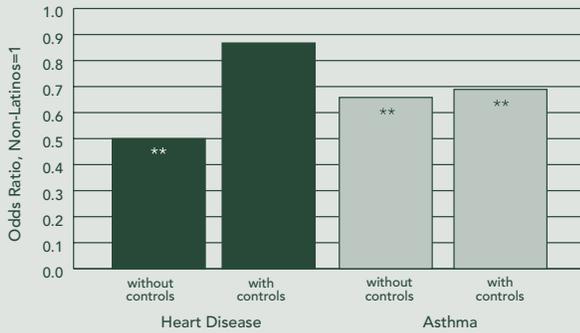
suggest, however, that no paradox exists for overall health, being overweight or obese, or diabetes.

**DO LATINOS ACCULTURATE BETTER THAN NON-LATINOS IN TERMS OF HEALTH STATUS ACROSS GENERATIONS?**

The next step tests whether or not acculturation has anything to do with the existence or non-existence of a paradox. To test this, the analysis on page 9 (Table 2) compares Latinos

**FIGURE 5**

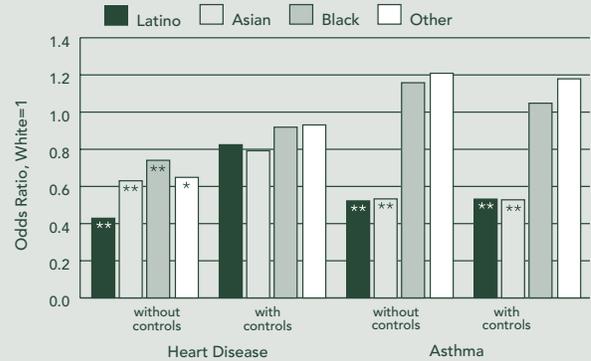
**LATINOS VS. NON-LATINOS IN GENERAL FOR HEART DISEASE AND ASTHMA**



NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = non-Latinos  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 6**

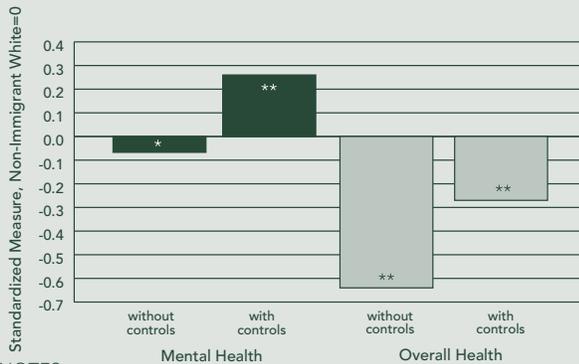
**LATINOS VS. OTHER NON-LATINO RACES/ ETHNICITIES FOR HEART DISEASE AND ASTHMA**



NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = Whites  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 7**

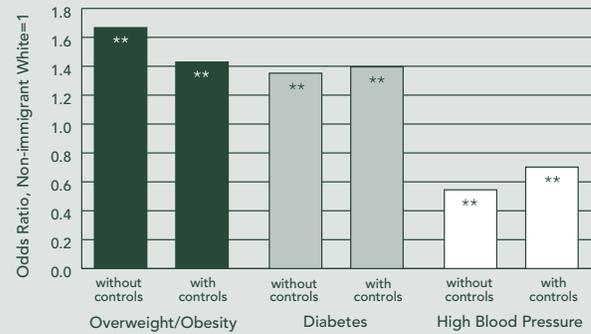
**FIRST-GENERATION LATINO IMMIGRANTS VS. THIRD-GENERATION WHITES FOR MENTAL HEALTH AND OVERALL HEALTH**



NOTES:  
 1. The higher the score, the healthier the person.  
 2. Comparison group = non-Immigrant Whites  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 8**

**FIRST-GENERATION LATINO IMMIGRANTS VS. THIRD-GENERATION WHITES FOR OVERWEIGHT/OBESITY, DIABETES AND HIGH BLOOD PRESSURE**



NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = non-Immigrant Whites  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

and non-Latinos both as first-generation immigrants and across generations.

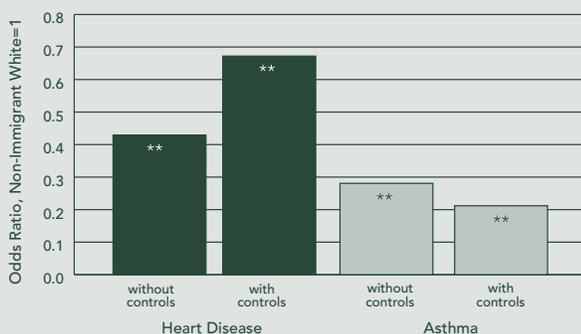
The results in figures 10-12 show whether or not Latinos and non-Latinos acculturate in similar patterns. Results show that both immigrant and second-generation Latinos clearly do better when it comes to mental health and asthma when compared with non-Latinos. There is no difference, however, between how Latinos and non-Latinos acculturate when it comes to overall physical health.

**HOW DO HEALTH OUTCOMES VARY BETWEEN FIRST-GENERATION LATINO IMMIGRANTS AND FIRST-GENERATION NON-LATINO IMMIGRANTS?**

This last set of models attempts to analyze how the first-generation Latino immigrant compares with other first-generation immigrants (Figs. 13-15). Consistently, results suggest that Latino immigrants have better mental health and less likelihood to have asthma than non-Latino immigrants.

**FIGURE 9**

**FIRST-GENERATION LATINO IMMIGRANTS VS. THIRD-GENERATION WHITES FOR HEART DISEASE AND ASTHMA**

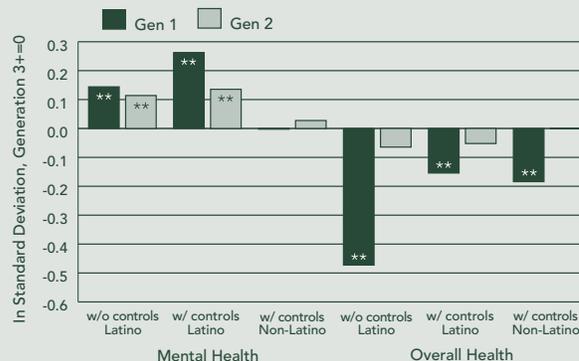


NOTES:

1. The lower the odds ratio, the healthier the person.
2. Comparison group = non-Immigrant Whites
- \* Significantly different from zero, at 95% confidence level
- \*\* Significantly different from zero, at 99% confidence level

**FIGURE 10**

**LATINOS AND NON-LATINOS ACROSS GENERATIONS FOR MENTAL HEALTH AND OVERALL HEALTH**

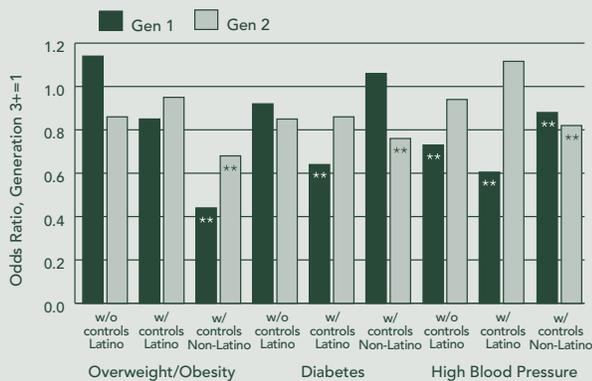


NOTES:

1. The higher the score, the healthier the person.
2. Comparison group = Generation 3 and up
- \* Significantly different from zero, at 95% confidence level
- \*\* Significantly different from zero, at 99% confidence level

**FIGURE 11**

**LATINOS AND NON-LATINOS ACROSS GENERATIONS FOR OVERWEIGHT/OBESITY, DIABETES AND HIGH BLOOD PRESSURE**

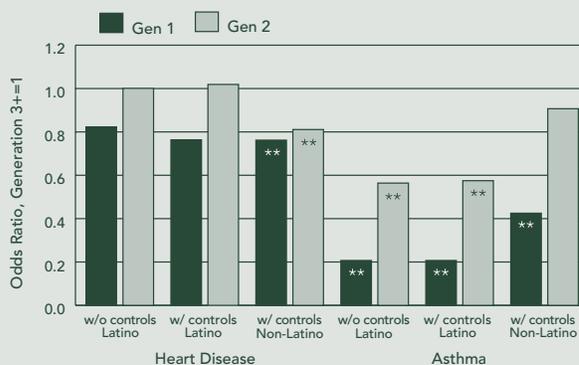


NOTES:

1. The lower the odds ratio, the healthier the person.
2. Comparison group = Generation 3 and up
- \* Significantly different from zero, at 95% confidence level
- \*\* Significantly different from zero, at 99% confidence level

**FIGURE 12**

**LATINOS AND NON-LATINOS ACROSS GENERATIONS FOR HEART DISEASE AND ASTHMA**



NOTES:

1. The lower the odds ratio, the healthier the person.
2. Comparison group = Generation 3 and up
- \* Significantly different from zero, at 95% confidence level
- \*\* Significantly different from zero, at 99% confidence level

Findings consistently suggest a paradox for mental health and asthma that, in these findings, cannot be explained by socioeconomic characteristics or health behaviors. Results also show that the paradox lessens upon acculturation, unlike the case for non-Latino immigrants who had more mental health issues and higher rates of asthma in the first place. There seems to be something about being a Latino immigrant that leads to better mental health and less asthma.

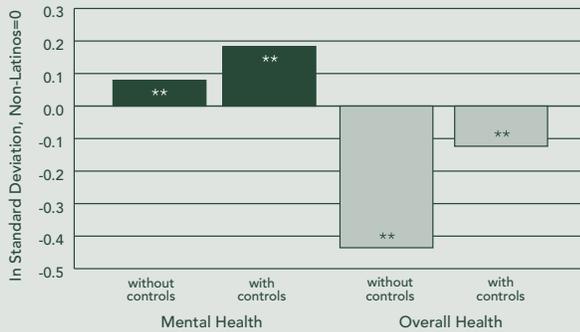
There is some evidence that a paradox may exist for high blood pressure, as well. Meanwhile, results throw doubt on the Latino paradox when it comes to overall health, weight problems, and diabetes.

**VI. POLICY RELEVANCE**

This study explores the relevance of the Latino health paradox. TRPI findings indicate the paradox exists for some health conditions but not others, and they help

**FIGURE 13**

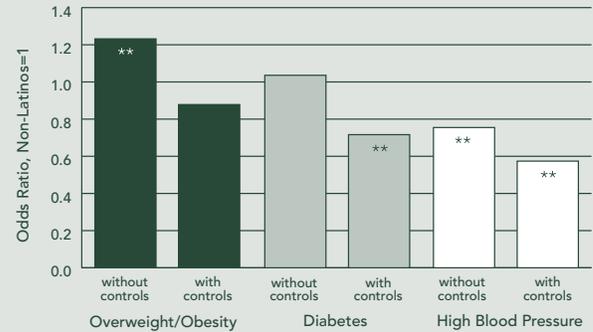
**FIRST-GENERATION IMMIGRANTS: LATINOS VS. NON-LATINOS FOR MENTAL HEALTH AND OVERALL HEALTH**



NOTES:  
 1. The higher the score, the healthier the person.  
 2. Comparison group = non-Latino first-generation immigrants  
 \* Significantly different from zero, at 95% confidence level  
 \*\* Significantly different from zero, at 99% confidence level

**FIGURE 14**

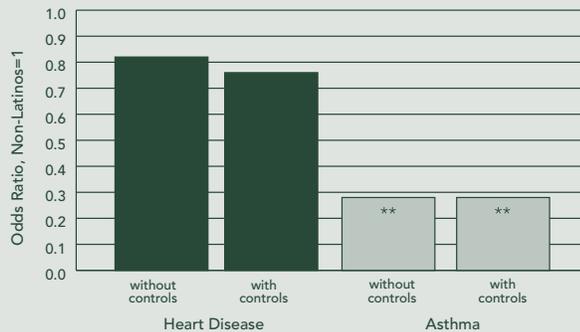
**FIRST-GENERATION IMMIGRANTS: LATINOS VS. NON-LATINOS FOR OVERWEIGHT/OBESITY, DIABETES, AND HIGH BLOOD PRESSURE**



NOTES:  
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**FIGURE 15**

**FIRST-GENERATION IMMIGRANTS: LATINOS VS. NON-LATINOS FOR HEART DISEASE AND ASTHMA**



NOTES:  
 1. The lower the odds ratio, the healthier the person.  
 2. Comparison group = non-Latino first-generation immigrants  
 \* Significantly different from zero, at 95% confidence level  
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counterparts. Programs should focus on how to avoid the erosion of health status due to diabetes, mental health, asthma, and high blood pressure when Latinos become acculturated.

Results also show that Latinos can be worse off than non-Latinos, especially in terms of being overweight or obese. Being overweight or obese does not appear related to acculturation for Latinos, as there does not appear to be any difference among Latinos across generations. Health programs focused on weight issues should be promoted within the Latino community.

identify vulnerable generations within the California Latino population when exploring specific health outcomes. This study also helps identify potential public health interventions for all U.S. Latinos. For example, health care policy should focus on immigrant Latinos (first-generation) who tend to be in worse overall health than their acculturated counterparts. Meanwhile, acculturated Latinos (second-generation and up) tend to have a higher probability of suffering from diabetes than first-generation Latinos. This is also true for mental health conditions, asthma, and high blood pressure; namely, Latinos who are third generation and higher have worse outcomes than their first-generation

**TABLE 2**  
**CAN ACCULTURATION EXPLAIN THE PARADOX?**

OUTCOMES	WHICH GROUP IS HEALTHIER?		
	LATINOS ACROSS GENERATIONS (GEN 1 & 2 VS. GEN 3 & UP)	NON-LATINOS ACROSS GENERATIONS (GEN 1 & 2 VS. GEN 3 & UP)	1ST GENERATION: LATINOS VS. NON-LATINOS
<b>Mental Health</b>	Gen 1 & 2	No difference	Latino immigrants
<b>Overall Health</b>	Gen 2 and up	Gen 2 and up	Non-Latino immigrants
<b>Overweight or Obese</b>	No difference	Gen 1 & 2	No difference
<b>Diabetes</b>	Gen 1	Gen 2	Latino immigrants
<b>High Blood Pressure</b>	Gen 1	Gen 1 & 2	Latino immigrants
<b>Heart Disease</b>	No difference	Gen 1 & 2	No difference
<b>Asthma</b>	Gen 1 & 2	Gen 1	Latino immigrants

NOTES:

Generation 1 refers to non-U.S. born, generation 2 refers to U.S.-born with at least one of the parents non-U.S. born, and generation 3 and up refer to U.S.-born with both parents U.S.-born, as well.

Results above are from models run "with controls."

I would like to extend a special note of appreciation to the WellPoint Foundation for their support of this brief and the TRPI WellPoint Foundation Health Policy Fellowship.

I would also like to thank Sarita Mohanty, M.D., M.P.H. of the USC Keck School of Medicine for her valuable technical and editorial inputs to this policy brief. Special thanks, as well, to Harry P. Pachon, Ph.D., President and CEO of the Tomás Rivera Policy Institute, for his ongoing guidance and leadership.

Maria Teresa V. Taningco, Ph.D.  
TRPI Wellpoint Foundation Health Policy Fellow

## APPENDIX A: DATA

**TABLE 3  
VARIABLES USED IN THE MODELS AND HOW THEY WERE CONSTRUCTED**

VARIABLES	DATA CONSTRUCTION
<b>DEPENDENT VARIABLES</b>	
Mental Health	Mental Health=Distress*-1, where Distress is a measure of serious psychological distress (0-24) based on the Kessler (K6) scale
Overall Health	Refers to general health condition, respondent self-rating (poor, fair, good, very good, excellent)
Overweight or Obese	Binary variable based on Body Mass Index
Diabetes	Binary variable on whether or not doctor ever told respondent he/she has diabetes (includes pre-diabetes)
High blood pressure	Binary variable on whether or not doctor ever told respondent he/she has high blood pressure
Heart Disease	Binary variable on whether or not doctor ever told respondent he/she has heart disease
Asthma	Binary variable on whether or not doctor ever told respondent he/she has asthma
<b>INDEPENDENT VARIABLES</b>	
Latino, Asian, Black, White, Other	Binary variables on race/ethnicity
Generation 1	Binary variable for non-U.S. born
Generation 2	Binary variable for U.S.-born, with either or both parents non-U.S. born
Generation 3 and up	Binary variable for U.S.-born, with both parents U.S.-born
<b>Explanatory Variables</b>	
Insured	Binary variable on current insurance status
Female	Binary variable on gender
Age	Continuous variable on age (18 and up)
Partner	Binary variable on living with partner
Divorced	Binary variable on widowed/separated/divorced
Never married	Binary variable on never married
Married	Binary variable on married
Drinking habit	Binary variable on binge drinking (5+ for males, 4+ for females)
Education level: No education	Binary variable on no formal education
Education level: Elementary – junior H.S.	Binary variable on elementary to junior high school
Education level: High school	Binary variable on finished or some high school
Education level: Some college	Binary variable on AA, some college, vocational degree
Education level: College	Binary variable on BA/BS degree
Education level: Graduate school	Binary variable on any graduate school level
Poverty level: below	Binary variable on 0%-99% FPL
Poverty level: 100%-199%	Binary variable on 100%-199% FPL
Poverty level: 200%-299%	Binary variable on 200%-299% FPL
Poverty level: 300% plus	Binary variable on 300% FPL and up
Physical exercise: regular	Binary variable on regular physical activity
Physical exercise: some	Binary variable on some physical activity
Physical exercise: none	Binary variable on sedentary lifestyle
Regularly eats fruits and vegetables	Continuous variable on daily servings of fruits and vegetables (1-19)

**TABLE 4**  
**DESCRIPTIVE STATISTICS FOR RAW DATA USED**

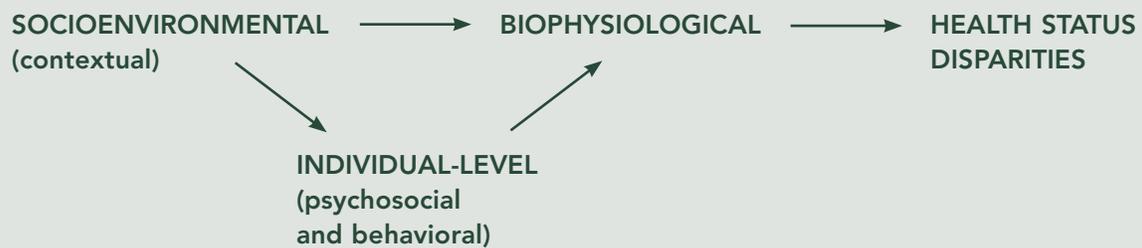
<b>VARIABLE</b>	<b>OBS</b>	<b>MEAN</b>	<b>STD. DEV.</b>	<b>MIN</b>	<b>MAX</b>
<u>RACES/ETHNICITIES</u>					
Latino	42936	.1473822	.3544906	0	1
Other	42936	.0408748	.1980024	0	1
Asian	42936	.0916946	.2885977	0	1
Black	42936	.045463	.2083198	0	1
White	42936	.6745854	.468535	0	1
<u>RACES/ETHNICITIES</u>					
Mental health	42795	-3.291272	3.880422	-24	0
Physical health	42936	3.512763	1.120949	1	5
Overweight/obese	42936	.5496553	.497534	0	1
Asthma	42936	.1372508	.3441159	0	1
Diabetes	42936	.0907164	.2872088	0	1
High blood pressure	42936	.299795	.4581734	0	1
Heart disease	42936	.0854761	.2795921	0	1
<u>EXPLANATORY/CONTROL VARIABLES</u>					
Insured	42936	.8878796	.3155182	0	1
Female	42936	.5937908	.4911302	0	1
Age	42936	50.77101	17.13607	18	85
Married	42936	.5290898	.4991589	0	1
With Partner	42936	.0585057	.2346999	0	1
Divorced/Sep	42936	.2574297	.4372232	0	1
Unmarried	42936	.1549748	.3618849	0	1
No education	42936	.0055664	.0744014	0	1
Elementary/Mid	42936	.048747	.2153411	0	1
High School	42936	.2847494	.4513003	0	1
Some college	42936	.2733138	.4456658	0	1
College	42936	.2217719	.4154433	0	1
Graduate school	42936	.1658515	.3719516	0	1
Below poverty	42936	.1001491	.3002021	0	1
Pov FPL100-199	42936	.1611934	.3677135	0	1
Pov FPL200_299	42936	.1291224	.3353393	0	1
Pov FPL300_up	42936	.6095351	.4878602	0	1
Drinking prob	42936	.1427939	.3498666	0	1
Reg exercise	42936	.3254379	.4685437	0	1
Some exercise	42936	.5582495	.4966012	0	1
No exercise	42936	.1163127	.3206032	0	1
Eats fruits/veg	42619	5.21888	1.743124	.671677	19.12916

## APPENDIX B: THEORETICAL FRAMEWORK

Laveist (2005) grouped the theories behind racial/ethnic health disparities into three categories: "Socioenvironmental or context" determinants are causes associated with social factors or environmental exposures. "Psychological or behavioral" are causes associated with characteristics of the individual. "Biophysical" determinants are causes associated with genetic or biological processes.

This study focused on what happens to the Latino Health Paradox once the groups are made comparable by controlling for socioenvironmental, psychosocial, and behavioral determinants. These determinants included potential predisposing variables (age, sex, marital status) as well as enabling factors (insurance, income, education).

**FIGURE 16**  
**DETERMINANTS OF HEALTH STATUS**



SOURCE: LaVeist, 2005

## APPENDIX C: ANALYTIC STRATEGY

"Latino" is the key independent variable and was adjusted as follows according to research questions. For the question, "Are Latinos healthier than non-Latinos?" the independent variable is simply "Latino." For the questions: "Are Latino immigrants healthier than non-immigrant whites in the U.S.?", "Are Latino immigrants similar to non-Latino immigrants?" and "Are all Latinos alike across generations?", the independent variable is a binary variable on being first-generation immigrant Latino.

**Health Outcomes = f ("Being Latino," insurance status, marital status, education attainment, poverty status, physical activity, drinking habits, and diet)**

Unlike other studies on the Latino paradox that only control for gender and age, this study also controlled for socioeconomic variables such as insurance status, marital status, education attainment, and poverty status. Lifestyle choices such as physical activity, drinking habits, and diet also were included. These are some of the factors that have been assumed as explanatory variables for the paradox, regardless of comparison groups. Including these in the model tested whether or not a large part of the paradox disappeared once confounding variables were controlled for. If the so-called paradox persisted, then it truly is a paradox.

## APPENDIX D: METHODOLOGY

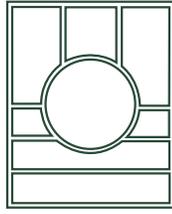
There is a need to use sample weights because the California Health Interview Survey (CHIS) does not sample units with equal probability (it over-sampled on some groupings). Sample weights are useful to compensate for differential probabilities of selection and sampling rates for households and persons, to reduce bias from non-response, to adjust for under-coverage of some groups in the sampling, and to reduce the variance of the estimates by using auxiliary information.

In addition, data are clustered within certain groupings, so there is a need to ensure that the standard errors of the coefficients are correct, and the results of the tests for significance of the coefficients are valid. This study used the survey commands under Stata, taking into consideration the 'clustering' of the data.

This Stata command was used to address sampling concerns:  
`svyset [pweight=rakedw0], jkrw(rakedw1-rakedw80, multiplier(1)) vce(jack) mse`

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