# PARADOX LOST (OVER TIME)? DURATION OF STAY AND ADULT MORTALITY AMONG MAJOR HISPANIC IMMIGRANT GROUPS IN THE UNITED STATES

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## ABSTRACT

This paper compares mortality risks for Hispanic immigrants according to their level of exposure to U.S. society using data from the 1998 through 2004 National Health Interview Survey-Linked Mortality File (hereafter NHIS-LMF). We find Hispanic immigrants with the lowest levels of U.S. experience have lower mortality than those with the highest durations of stay and that these effects seem to be stronger for Cubans and "Other Hispanics" than Mexicans. On the other hand, we also find that those individuals who naturalized as U.S. citizens or are living in households where only English was used to answer the NHIS questionnaire have lower mortality than those who have not naturalized or are living in households where at least part of the NHIS questionnaire was used. These findings suggest that duration effects may not tell a simple acculturation story and that additional measures of acculturation must be included to fully inform the Hispanic Health Paradox.

**Keywords**: international migration, health, acculturation, assimilation, immigrant adaptation, mortality, Hispanic, Mexican, Cuban, Puerto Rican, United States

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Studies in the migrant health literature have found several paradoxical results (Goldman et al. 2006; Jasso et al. 2004; Palloni and Morenoff 2001), two of which particularly stand out. First, Hispanic immigrants in the United States generally exhibit lower mortality than the native-born non-Hispanic white population, a phenomenon known as the Hispanic Health Paradox (hereafter HHP). It is paradoxical that, compared to native-born non-Hispanic whites (hereafter NH whites), Hispanics have better health, given that they have lower socioeconomic status, and that social class has a strong and positive relationship with health in the general population (Adler and Ostrove 1999; Goldman 2001). The HHP was first found for Hispanics and various Hispanic national groups (Abraido-Lanza et al. 1999; Elo et al. 2004; Hummer et al. 2007; Hummer et al. 2000; Markides and Coreil 1986; Markides and Eschbach 2005; Singh and Hiatt 2006; Singh and Miller 2004) and was later confirmed to benefit only foreign-born individuals (e.g. Hummer et al. 1999; Singh and Hiatt 2006; Singh and Miller 2004; Singh and Siahpush 2002; Stern and Wei 1999).

Second, despite the fact that this advantage is observed in various health outcomes (for a review and meta-study, see Cunningham, Ruben and Narayan 2008), immigrant health seems to worsen throughout the process of adapting to the host society. Several measures of acculturation and exposure to U.S. society, such as duration of stay, are negatively correlated with various immigrant health outcomes (for a review and meta-study among Hispanics, see Lara et al. 2005). This process takes place even though people immigrate to improve their standards of living (e.g. Chiswick 1978, 1980) and that of their offspring in the first place (for a general argument, see Rumbaut 1997).

Even though plenty of studies have found a negative correlation between exposure to U.S. society and a plethora of health behaviors and chronic conditions (Abraído-Lanza, Chao and

Flórez 2005; Cho et al. 2004; Koya and Egede 2007; Lara et al. 2005: Table 1; Mooteri et al. 2004; Moran et al. 2007; Singh and Siahpush 2002), surprisingly very little research has been devoted to understand if the apparent erosion of immigrant health with increasing U.S. experience also translates into higher mortality.[1] This knowledge would allow us to understand if the HHP is lost among the more experienced or "acculturated" and, more importantly, provide a test for the extent to which the disadvantages acquired by immigrants throughout their incorporation (or lack thereof) to U.S. society accumulate and translate into mortality or if they may imply an extension of morbid life.

This paper compares general and some cause-specific mortality risks for Hispanic immigrants according to their level of exposure to U.S. society using data from the 1998 through 2004 National Health Interview Survey-Linked Mortality File (hereafter NHIS-LMF). We show contrasting results of acculturation measures. We find Hispanic immigrants with the lowest levels of U.S. experience have lower mortality than those with the highest durations of stay and that these effects seem to be stronger for Cubans and "Other Hispanics" than Mexicans. On the other hand, we also find that those individuals who naturalized as U.S. citizens or are living in households where only English was used to answer the NHIS questionnaire have lower mortality than those who have not naturalized or are living in households where at least part of the NHIS questionnaire was used. This suggests duration effects may not tell a simple acculturation story. We are in the process of developing a more complex but complete explanation of these effects. In the meantime, we introduce our data and proposed methods of study.

[1] We know of only one recent study exploring the relationship between acculturation (measured as age at migration) and cardiovascular mortality in a cohort study of Mexicans (Colón-López et al. 2009). Clearly, more replications of this result are needed in addition to using nationally-representative data for other Hispanic immigrant subgroups and by looking at all-cause mortality and other causes of death.

## DATA AND METHODS

Beginning in 1998, the NHIS asked respondents how long they had lived in the United States. Because we are interested in acculturation effects, we restrict our sample to NHIS years 1998 to 2004. The NHIS-LMF links respondents ages 18 and over to the National Death Index through the year 2006. To provide a public-use version of these data, NCHS perturbed the dates or cause of death for a select sample of records to ensure that individuals could not be identified. Our sample is restricted to foreign-born Hispanic respondents who are not missing information on the self-reported duration of time spent living in the United States. Our total sample consists of 43,695 respondents, of which 1,276 have died in the follow-up period.

To estimate relative mortality risks across we estimate Cox proportional hazard models. Following Kom, Graubard, and Midthune (1997), we use age at the time of interview plus time since interview as our time scale. Respondents are either right-censored, if alive, or coded as dead. We examine all-cause mortality as well as heart disease and cancer mortality, the two leading causes of death in the United States. We examine whether negative acculturation— assessed by national origin, duration in the United States, citizenship status, and language of interview— is associated with mortality among Mexicans, Puerto Ricans, Cubans, and "Other Hispanics." We also control for other relevant correlates of mortality such as sex, educational attainment, and marital status.

Table 1 provides weighted descriptive statistics for not only foreign-born Hispanics, but also native-born Hispanic populations and NH whites for comparison. Over 50% of the sample of foreign-born Hispanics is Mexican, 8% is Puerto Rican, 2% Cuban, and 34% "other" Hispanic origin. Among the U.S.-born Hispanic population an even greater percentage of the sample identifies as Mexican (63%). Over 50% of the foreign-born Hispanic population reports having

lived in the United States for 15 years or longer, whereas just 17% of the population reports living in the United States for less than 5 five years. Of the total sample of foreign-born Hispanics 38% have become naturalized. Only 50% of the foreign-born Hispanic sample completed the survey in English only, whereas almost 80% of the U.S.-born Hispanic sample and 90% of the U.S.-born non-Hispanic white sample completed the survey in English only. Greater proportions of both the foreign- and U.S.-born Hispanic population have less than a high school degree than NH whites.

-Table 1 about here -

Table 2 presents the results from Cox proportional hazard models that regress acculturation covariates on mortality among foreign-born Hispanics only. Model 1 shows that, compared to Mexican respondents, "other" Hispanic groups have a decreased mortality risk (HR=0.76, $p \leq .001$). This relationship persists after other demographic controls are added in Model 2. Model 3 adds years in the United States, which does not demonstrate a significant effect. U.S. citizenship decreases mortality risk (Model 4) and compared to interviews done in English only, interviews done in Spanish, or both Spanish and English are associated with increased mortality risk (Model 5). When duration in the United States, citizenship, and language of interview are included in the analysis (Model 6), respondents who have lived in the United States for less than five years are less likely to die in the follow-up period (HR=0.70, $p \leq 0.10$). Foreign-born Hispanic respondents who are U.S. citizens have a decreased mortality risk (HR=0.80, $p \leq .01$), but compared to those who completed the survey in English only, respondents who completed the survey in Spanish (HR=1.42, $p \leq .001$) or in both Spanish and English (HR=1.31, $p \leq .01$) experience higher mortality risks.

-Table 2 about here -

Our results shed light on the HHP. We find that measures of acculturation, including duration in the country, citizenship status, and language of interview inform the relationship between ethnicity and mortality.

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Table 1. Descriptive Statistics

| | Foreign Born Hispanic | U.S. Born Hispanic | U.S. Born Whites |
|---|---|---|---|
| | N=43,695 | N=30,323 | N=258,358 |
| Hispanic Origin | | | |
| Mexican | 55.39 | 63.42 | --- |
| Puerto Rican | 8.84 | 12.57 | --- |
| Cuban | 1.92 | 0.71 | --- |
| Other Hispanic | 33.85 | 23.3 | --- |
| Male | 50.45 | 48.42 | 48.31 |
| Female | 49.55 | 51.58 | 51.69 |
| Age | 40.49 | 38.01 | 46.7 |
| Duration in U.S. | | | |
| >5 yrs | 16.52 | --- | --- |
| ≤ 5 yrs and < 10 yrs | 16.42 | --- | --- |
| ≤ 10 yrs and < 15 yrs | 16.4 | --- | --- |
| ≥ 15 yrs | 50.66 | --- | --- |
| US Citizen | 37.81 | --- | --- |
| Language of interview | | | |
| English | 52.05 | 78.71 | 87.31 |
| Spanish | 24.65 | 5.13 | 1.45 |
| Dual Language | 12.75 | 5.06 | 0.69 |
| Language Unknown | 10.54 | 11.1 | 10.56 |
| Education | | | |
| < High school | 20.01 | 18.15 | 9.26 |
| High School | 20.8 | 31.23 | 31.57 |
| > High school | 57.52 | 49.43 | 58.28 |
| Uknown | 1.67 | 1.19 | 0.89 |
| Marital Status | | | |
| Married | 69.82 | 55.64 | 66.04 |
| Divorced/Separated | 9.12 | 10.96 | 9.86 |
| Widow | 3.94 | 3.7 | 7.28 |
| Never married | 16.91 | 29.43 | 16.6 |
| Missing | 0.21 | 0.27 | 0.22 |
| Dead | 2.73 | 3.12 | 6.05 |

Source: NHIS-LMF 1998-2006

Table 2. Hazard Ratios for Acculturation Effects on Mortality: Foreign-born Hispanic Respondents

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
|---|---|---|---|---|---|---|---|
| Race (Mexican) | | | | | | | |
| Puerto Rican | 1.09 | 1.07 | 1.07 | 1.18 | 1.11 | 1.26 + | 1.15 |
| Cuban | 0.94 | 0.93 | 0.93 | 0.95 | 0.86 | 0.9 | 0.88 |
| Other Hispanic | 0.76 *** | 0.75 *** | 0.75 *** | 0.77 *** | 0.74 *** | 0.77 *** | 0.8 ** |
| Duration (referent gt 15 yrs) | | | | | | | |
| US lt 5 yr | 0.77 | | 0.77 | | | 0.7 + | 0.71 + |
| US lt 10 yr | 1.04 | | 1.05 | | | 0.92 | 0.93 |
| US lt 15 yr | 0.99 | | 0.98 | | | 0.88 | 0.89 |
| US Citizen | | | | 0.83 ** | | 0.8 ** | 0.83 * |
| Language of interview | | | | | | | |
| Spanish | | | | | 1.46 *** | 1.42 *** | 1.35 *** |
| Spanish and English | | | | | 1.34 ** | 1.31 ** | 1.27 * |
| Language Unknown | | | | | 0.83 + | 0.83 + | 0.82 * |
| Education | | | | | | | |
| Lt hs | | 1.09 | 1.09 | 1.10 + | 1.09 | 1.08 | 1.12 |
| HS | | 0.98 | 0.98 | 1.00 | 1.03 | 1.04 | 1.06 |
| Uknown | | 0.75 | 0.75 | 0.73 | 0.81 | 0.8 | 0.92 |
| Male | 1.52 *** | 1.56 *** | 1.56 *** | 1.57 *** | 1.56 *** | 1.57 *** | 1.64 *** |
| Marital Status | | | | | | | |
| Divorced/Separated | | 1.26 * | 1.26 * | 1.26 * | 1.27 * | 1.27 * | 1.22 + |
| Widow | | 1.02 | 1.02 | 1.01 | 1.01 | 1 | 1.01 |
| Never married | | 1.26 + | 1.26 + | 1.24 + | 1.23 + | 1.22 | 1.19 |
| Missing | | 2.71 | 2.71 | 2.81 | 2.48 | 2.64 | 2.42 |
| SRH (very good, excellent) | | | | | | | |
| Good | | | | | | | 1.12 |
| Fair/Poor | | | | | | | 1.98 *** |
| UK | | | | | | | 0 *** |
| Log-likelihood | -7249 | -7244 | -7243 | -7132 | -7222 | -7111 | -7063 |

Source: NHIS-LMF 1998-2006; N=43,695

Ê p < .10.; * p < .05; ** p < .01; *** p < .00