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Does the Hispanic Paradox in U.S. Adult Mortality Extend to Disability?

Mark D. Hayward,
Population Research Center and Department of Sociology, University of Texas at Austin, Austin, TX 78712, USA, mhayward@prc.utexas.edu

Robert A. Hummer,
Population Research Center and Department of Sociology, University of Texas at Austin, Austin, TX 78712, USA

Chi-Tsun Chiu,
Duke-NUS Graduate Medical School, Singapore, Singapore

César González-González, and
National Institute of Geriatrics, Mexico, Mexico

Rebeca Wong
University of Texas Medical Branch, Galveston, TX, USA

Abstract

Studies consistently document a Hispanic paradox in U.S. adult mortality, whereby Hispanics have similar or lower mortality rates than non-Hispanic whites despite lower socioeconomic status. This study extends this line of inquiry to disability, especially among foreign-born Hispanics, since their advantaged mortality seemingly should be paired with health advantages more generally. We also assess whether the paradox extends to U.S.-born Hispanics to evaluate the effect of nativity. We calculate multistate life tables of life expectancy with disability to assess whether racial/ethnic and nativity differences in the length of disability-free life parallel differences in overall life expectancy. Our results document a Hispanic paradox in mortality for foreign-born and U.S.-born Hispanics. However, Hispanics' low mortality rates are not matched by low disability rates. Their disability rates are substantially higher than those of non-Hispanic whites and generally similar to those of non-Hispanic blacks. The result is a protracted period of disabled life expectancy for Hispanics, both foreign- and U.S.-born.

Keywords

Hispanic paradox; Disability; Mortality; Disabled life expectancy; Nativity

Studies consistently document a Hispanic paradox in adult mortality in the United States, with Hispanics displaying mortality rates that are comparable to—or are lower than—the

Correspondence to: Mark D. Hayward.

non-Hispanic white population (Markides and Eschbach 2011). The Hispanic comparative advantage in mortality has been documented using Social Security Administration data (Turra and Elo 2008), vital registration data (Arias 2010; Arias et al. 2010; Eschbach et al. 2006), and nationally representative surveys linked to follow-up mortality data such as the National Health Interview Survey Linked Mortality Files (Hummer et al. 2000; Rogers et al. 2000). Although there is evidence of "salmon bias" (the selective emigration of less healthy Hispanics, whose deaths are not recorded in the United States) and ethnic misclassification on death certificates and census data, studies documenting and correcting for these effects typically report that the biases are too small in magnitude to be the primary explanations of the paradox (Arias et al. 2010; Elo et al. 2004; Eschbach et al. 2006; Hummer et al. 2007; Turra and Elo 2008).[1] Complete resolution of these methodological issues will ultimately depend on future longitudinal studies that follow individuals as they move in and out of the United States (Turra and Elo 2008).

Our study contributes to the literature on the paradox in two important ways. First, we assess whether the paradox in mortality extends to a more general health advantage. Markides and Eschbach (2005, 2011) recently suggested that the paradox as documented in mortality patterns may not extend to related health outcomes such as rates of disability. Presumably, the arguments of health selection processes (e.g., the in-migration of healthy migrants and the out-migration of unhealthy migrants) and cultural practices (e.g., low smoking rates and strong social support) often advanced to explain the low mortality of Hispanics—especially immigrants—should also extend to a lower prevalence of disease conditions and disability (Blue and Fenelon 2011; Palloni and Arias 2004; Palloni and Morenoff 2001). However, the bulk of research on the Hispanic paradox has largely focused on mortality and not considered whether Hispanic mortality advantages are conferred more generally across health domains. Here, we focus on disability as a key health domain that usually reflects the downstream consequences of pathology and functional limitations—the main pathway of the disablement process (Verbrugge and Jette 1994). Disability is especially important to consider, since it reflects the manifestation of physical or mental limitations in a person's social context and is a critical marker of health-related quality of life. We measure disability using survey-based questions on activities of daily living (ADLs), which capture limitations in providing self-care that are necessary for survival.

We also compare the disability and mortality experiences of foreign-born Hispanics with U.S.-born Hispanics. Population estimates of disability and mortality among U.S.-born Hispanics are much less influenced by health selection processes characteristic of foreign-born Hispanics (e.g., the out-migration of unhealthy Hispanics). In addition, because prior research points to U.S.-born Hispanics' adoption of unfavorable health behavior patterns, experiences of social discrimination, and the erosion of social and family support (National Research Council 2006; Rodriguez et al. 2008), we expect to see higher mortality and—possibly—an elevated level of disability among U.S.-born Hispanics compared to their foreign-born counterparts.

[1]Palloni and Arias (2004) suggest that "salmon bias" may largely explain the mortality advantage of foreign-born Mexican Americans.

Second, we combine high quality mortality incidence rate estimates for U.S. racial/ethnic groups with race/ethnic specific prevalence estimates of disability to produce demographic models of disabled and disability-free life expectancy for foreign-born and U.S.-born Hispanics as well as for non-Hispanic whites and blacks. These models provide the means to quantify whether the greater longevity of Hispanics is accompanied by a relatively lengthy period of disability-free life. In essence, is the longevity of Hispanics brought about through the postponement of health problems until later in life? Research on race and educational differentials in healthy life typically point to a higher overall life expectancy for whites and highly educated persons paired with a compressed period of disability for these groups (Crimmins et al. 1996; Hayward and Heron 1999; Montez and Hayward in press). The idea stems from Fries (1983), who argued that historical changes in reductions in U.S. mortality in the 20th century were brought about by an expansion of healthy life and the postponement of disease and disability until later ages of life.

Although a conceptual framework based on the work of Fries is appealing for examining racial/ethnic disparities in disabled and disability-free life expectancy, it is important to keep in mind a crucial assumption of this framework. The assumption is that disability is primarily a downstream consequence of pathology and loss of physiological functioning leading to death. However, racial/ethnic groups may differ dramatically in the social conditions and exposures that give rise to health and some of these differences may be reflected in how tightly disability is coupled with morbidity processes (e.g., pathology) leading to death. For example, some conditions such as working in physically demanding jobs (e.g., construction, hotel and domestic service work, and agriculture) may not have especially long-term adverse effects on mortality but may be highly taxing in terms of musculoskeletal demands and long-term wear and tear. Hispanics, especially the foreign-born, have historically been highly concentrated in such jobs throughout their adult lives (Kochhar 2005; Toussaint-Comeau 2006), pointing to the possibility of elevated disability rates compared to other racial/ethnic groups. In addition, recent research has pointed to low levels of smoking among Hispanics compared to U.S.-born whites as an important factor in explaining Hispanics' paradoxically low mortality rates (Blue and Fenelon 2011; Hummer et al. 2011). Although it is beyond this study to evaluate the factors giving rise to disability and mortality for the different racial/ethnic groups, our analysis lays the groundwork for future, more in-depth research on racial/ethnic differences in the etiologies of these health outcomes. To the extent that the disability experiences of non-Hispanic whites and blacks largely stem from chronic diseases and the loss of physiological capacity leading to death, we should expect to see significant differences in the ways in which mortality and disability are linked for these groups compared to Hispanics.

While evidence of a Hispanic paradox in U.S. mortality has been accumulating in recent years, it is unclear to what extent this paradox extends to health or how Hispanics' health is associated with mortality in terms of healthy life expectancy. Some studies report that Hispanics have a health profile of chronic conditions that is somewhat better than non-Hispanic whites (Jerant et al. 2008; Zhang et al. 2012; Zsembik and Fennell 2005), and this is particularly true for foreign-born Hispanics. Other studies, however, point to complex differences in the health profiles of the major U.S. racial/ethnic groups. For example, despite having higher rates of obesity and diabetes than non-Hispanic whites, both foreign- and

U.S.-born Hispanics have lower rates of hypertension, stroke, and coronary heart disease (Crespo et al. 1996). The prevalence of major cancers also appears to be lower among Hispanics. And while some studies report a lower prevalence of functional problems among Hispanics (Zsembik and Fennell 2005), other studies point to significantly higher rates of disability among Hispanics compared to whites; this is especially the case for women (Ostchega et al. 2000) and foreign-born Hispanics (Eschbach et al. 2007).

Crimmins et al. (2004) drew on five major population health studies to examine older adults' disease and disability profiles across racial/ethnic groups, including U.S.-born and foreign-born Hispanics. The surveys were the Health and Retirement Study (HRS), the study of Assets and Health Dynamics among the Oldest Old (AHEAD), the National Health and Nutrition Examination Survey (NHANES), the National Health Interview Survey (NHIS), and the Longitudinal Study on Aging (LSOA). Overall, their results suggested the following. Compared to non-Hispanic whites, foreign-born and U.S.-born Hispanics have lower or comparable reported rates of cancer, cardiovascular and chronic lung conditions (a possible exception being the higher rate of stroke for foreign-born Hispanics in the HRS), and higher rates of diabetes. However, despite this relatively favorable health profile in terms of chronic morbidity conditions, foreign-born Hispanics also appear to have a significantly higher level of disability than non-Hispanic whites. Further, it is unclear whether U.S.-born Hispanics and whites differ in disability prevalence, as the relative risks were not consistent across data sets. When Crimmins and colleagues controlled for education and income, few of the differences noted above changed substantially.

Drawing on previously published mortality evidence and the health patterns described above, we anticipate that both foreign-born and U.S.-born Hispanics will have relatively advantaged older adult mortality levels, particularly in comparison to non-Hispanic blacks but also in relation to non-Hispanic whites. We also expect that foreign-born Hispanics' advantaged mortality will be accompanied by higher rates of disability than whites, a somewhat paradoxical pattern given their overall advantaged chronic disease profile (with the major exception of diabetes). Should these patterns be evident, we anticipate that foreign-born Hispanics will be advantaged in life expectancy relative to non-Hispanic whites, but disadvantaged in terms of a comparatively lengthy life expectancy with disability. At the same time, it is unclear how the mortality patterns of U.S.-born Hispanics will be linked to disability and how such coupling will differ from either non-Hispanic whites or blacks.

Data, Measures, and Approach

We integrate mortality and disability information to calculate healthy life expectancy for non-Hispanic whites, non-Hispanic blacks, and Hispanics in the United States, where Hispanics are differentiated by nativity. Our integration of mortality and disability information in a demographic model of healthy life expectancy allows us to identify whether the Hispanic paradox in mortality is accompanied by a paradox in disability. Throughout the analysis, we take account of possible gender differences to identify whether the patterns of interest operate similarly for men and women.

Data

The mortality and disability experiences of Hispanics, blacks, and whites are investigated using two high quality data sources, which are combined in a demographic model of disability-free life expectancy. Our estimates of mortality are derived from the public-use National Health Interview Survey Linked Mortality Files (NHIS-LMF), available from the Integrated Health Interview Series (IHIS) (Center 2011). The NHIS-LMF provides mortality follow-up data from the National Death Index matched using a probabilistic algorithm to respondents in the annual NHIS cross-sectional surveys of the civilian non-institutionalized population. The NHIS-LMF is specifically designed to analyze U.S. adult mortality differences and trends, making it an excellent source to ascertain mortality rates by racial/ethnic group and sex. Here, we use the 1989–2004 NHIS interview waves with mortality follow-up through December 31, 2006. The source of disability prevalence is the Health and Retirement Study, a very large nationally representative survey designed to study retirement processes, economic well-being, and health among the civilian, non-institutionalized population in the U.S. 50 years of age and older (HRS 2008). The present study uses the RAND HRS Version L Data File, which is a cleaned and consolidated file of all 1992–2010 survey waves developed by the RAND Center for the Study of Aging (RAND 2011). The file contains 30,671 adults who are representative of cohorts born between 1890 and 1953 and their spouses. The analysis is based on a subset of the HRS data, the six waves from 1998 to 2008. Disability is measured consistently across this period, and the observation period is comparable to that for the NHIS-LMF mortality rates.

Although the HRS contains information on both mortality and disability for the racial/ethnic groups considered in this analysis, we turned to the NHIS-LMF to estimate mortality incidence because of the small number of HRS deaths among Hispanics between 1998 and 2008 (e.g., $N = 301$ deaths for all U.S.-born Hispanics and $N = 339$ deaths for all foreign-born Hispanics). Compared to the HRS, there are significantly more deaths (e.g., 979 NHIS-LMF deaths for foreign-born Hispanic males aged 50 years and older, 970 for U.S.-born Hispanic males, 1,014 for foreign-born Hispanic females, and 975 for U.S.-born Hispanic females). Hummer et al. (2011) documented that the NHIS-LMF estimates of life expectancy for older Hispanics closely matched those in the first-ever Hispanic life tables published by the National Center for Health Statistics (Arias 2010). In addition, Lariscy (2011) showed that the overall quality of the mortality record linkages in the NHIS-LMF is quite good for Hispanics at older ages.

The multiple waves of HRS data for 1998–2008 allow us to identify each age-eligible person's age-specific ADL status at each biennial wave between 1998 and 2008. Each survey wave is treated as a cross-section, and the six survey waves are pooled in order to enhance the age-specific density of ADL status for the racial/ethnic groups by sex. Although it is possible to estimate disability incidence using the longitudinal design of the HRS, the reliability of the estimates is problematic for the smaller racial/ethnic groups at older ages. Note that individuals who are observed in the data at multiple times during the observation period contribute a unique age-specific observation for each of the waves. Table 1 shows the number of individuals and unique age-specific observations of our analytic sample by race/ethnicity and sex. For example, the total analytic sample of age-eligible individuals ($N =$

25,895) observed at some point over the 1998–2008 period contributed 108,448 unique age-specific observations. The 546 foreign-born Hispanic males in our analytic sample contributed 2,097 age-specific observations from the HRS waves from which disability prevalence was estimated. Similarly, the 764 foreign-born Hispanic women in the analytic sample contributed 3,093 age-specific observations.

Measures

Increasingly, demographers are combining information on disability and mortality in multistate life tables to gain a more sophisticated understanding of population health. In practical terms, articulating disability in a multistate life table model allows us to explicitly acknowledge and characterize numerically the phenomenon that people typically live with significant health problems for a number of years and do not simply die from them. Life expectancy is thus decomposed into the number of expected years spent disabled and not disabled, or disability-free (Crimmins et al. 1994; Laditka and Hayward 2003).

Disability is defined using five Activities of Daily Living (ADL) items that measure self-care: dressing, walking, bathing, eating, and getting in/out of bed. HRS respondents were asked whether they had difficulty with (including inability to do) these activities because of a health or memory problem, excluding difficulties that they expected to last less than 3 months. Each of the ADL items is scored as a dichotomous measure, indicating whether or not the respondent *has any difficulty* performing it (yes = 1). Individuals who have one or more ADLs are classified as having a disability. This measurement scheme has been used in numerous studies of trends and differences in disability-free life expectancy (Crimmins et al. 2009, 1994, 1996).

Race/ethnicity in the HRS and NHIS-LMF is self-reported. Non-Hispanic blacks and whites include all respondents who self identify as black or white and who also report that they do not consider themselves as Hispanic. If respondents consider themselves as Hispanic, they are asked whether they consider themselves to be Mexican-American/Chicano, Puerto Rican, Cuban American, or something else; unfortunately, we are unable to separately specify our results for the Hispanic subgroups because of sparse data.[2] Respondents were also queried whether or not they were born in the United States. We combined this information with race/ethnicity to differentiate foreign-born and U.S.-born Hispanics. While the NHIS underwent changes in survey design and the measurement of race, ethnicity, and nativity across the interview waves (particularly following design changes in 1997), the IHIS version of the NHIS-LMF harmonizes the data to maximize consistency of measurement across the repeated cross-sections used in our analysis. We exclude Asians and other racial/ethnic groups from our analysis because of insufficient sample sizes.

[2]We replicated all of our results specifically for Hispanics of Mexican Origin: foreign-born Mexicans and U.S.-born Mexican Americans. These supplemental results (available upon request from the authors) show that the mortality, disability, and disabled life expectancy patterns for the foreign-born and U.S.-born Mexican Origin subgroups closely mirror those of all foreign-born and U.S.-born Hispanics, respectively. This is not surprising given that Mexican Origin Hispanics comprise over 60 % of the U.S. Hispanic population. Future work on Hispanic mortality, disability, and disabled life expectancy patterns should attempt to disaggregate Hispanics based on national origin, given the overall heterogeneity of the group. At present, unfortunately, such disaggregation is impossible given the limited sample sizes of most Hispanic origin subgroups in the HRS.

Approach

We integrated information on mortality incidence from the NHIS-LMF with information on disability prevalence from the HRS to calculate Sullivan-based multistate life table models of disability-free and disabled life expectancy for each race/ethnic/nativity group (Sullivan 1971). The Sullivan health expectancy reflects the current disability of the population (or population subgroup) adjusted for mortality levels and is independent of age structure. In this framework, total life expectancy for persons of a given age is divided into the number of years expected to live with and without a health problem—in this case, disability. To the extent that the Hispanic paradox in mortality extends to disability, we would expect to see both a lengthy life expectancy and a lengthy disability-free life expectancy for Hispanics compared to groups with a lower life expectancy.

We constructed the multistate life tables by first obtaining the age schedules of disability prevalence and mortality incidence by race/ethnicity/nativity, separately by sex. We used the pooled observation waves to statistically estimate a model (of the log odds) of disability prevalence as a function of age for each of the race/ethnic/nativity groups, by sex. We also evaluated nonlinear functional forms to evaluate the best fitting functional form. Based on the parameter estimates for the best fitting models, we calculated the age schedules of disability for the multistate life tables; the schedules are analogous to exponentially smoothed rates (Teachman and Hayward 1993). With respect to mortality incidence, we similarly modeled the log of the risk of death as a function of age for each of the race/ethnic/nativity groups, also by sex, and used the parameter estimates to generate the age schedules of mortality incidence. The age schedules of mortality incidence determine the calculation of the life expectancies, while the age schedules of disability prevalence determine the distribution of survivors at each age in the disability states. The prevalence rates of disability are then used to partition the person-years lived at each age, and the disabled and disability-free life expectancies are calculated as the sum of person-years lived in each state from that age onward divided by the number of survivors at that age (Jagger et al. 2006). Separate life tables were constructed for each racial/ethnic group, by sex.

We also obtained confidence intervals for the life table expectancies in order to statistically evaluate whether the race/ethnic/nativity groups differed for each sex. We first standardized the sampling weights for each of our groups. The standardized weights were used as probabilities to draw bootstrap samples using the “sample” function in R. For each of 300 bootstrap samples (for each race/ethnic/nativity group for each sex), disability prevalence and mortality incidence were estimated, and multistate life tables were constructed. Based on the 300 life tables for a given group, 95 % confidence intervals were obtained for the life expectancy functions.

Results

Disability

Previous work demonstrates that U.S. Hispanics have lower adult mortality than U.S.-born whites and blacks; how do their patterns of disability compare to the other groups? Men’s occurrence/exposure disability prevalence rates for 5-year age groups are shown in Table 2,

along with confidence intervals that we developed using our bootstrap approach. The results suggest the following. Although foreign-born Hispanic men exhibit comparable disability to whites at age 50–54, their disability rates climb rapidly relative to whites until they converge a bit at ages 75 and above. To the extent that "salmon bias" is operating at the older ages, we would expect these differences to be even greater. The rates for foreign-born Hispanic men are also marginally lower than those of U.S.-born Hispanics and U.S.-born blacks at ages 50–54, but rise quickly and are similar to those of U.S.-born Hispanics and blacks at ages 55 and above. Thus, depending on age, foreign-born Hispanic men look both healthier than (at younger ages) and similar to (at older ages) U.S.-born Hispanics. The pattern for U.S.-born Hispanic men points to health disadvantages much like blacks throughout the age range. Moreover, U.S.-born Hispanic men exhibit much higher rates of disability than whites, pointing to the likely importance of minority status and/or socioeconomic disadvantage in influencing their levels of disability. On the whole, then, there is little evidence that the Hispanic paradox in male mortality extends to disability.[3]

The disability patterns for women shown in the bottom panel of Table 2 reinforce the patterns described for men. Foreign-born Hispanic and black women have the highest prevalence of disability through most of the age range of 50 and above, followed by U.S.-born Hispanics and then whites. White women clearly have the lowest levels of disability throughout the age range, although their confidence interval overlaps that of U.S.-born Hispanic women at age 80–84. In terms of gendered differences for the racial/ethnic groups, black women and foreign-born Hispanic women are more disabled compared to men through most of the age range. Thus, black women and foreign-born Hispanic women are the most disabled of all the demographic subgroups. Most notably in Table 2, the paradox of relatively low Hispanic female mortality compared to whites and blacks does not appear to translate to disability.

Life Expectancy and Disabled Life Expectancy

As is evident in Table 3, there is substantial support for the idea of the Hispanic paradox in mortality. Life expectancies at age 50 for foreign-born Hispanic men and women exceed those shown for non-Hispanic whites and are substantially higher than those of non-Hispanic blacks. Foreign-born Hispanic men at age 50, for example, are expected to live over 3 years longer than non-Hispanic white men (32.0 years compared to 28.8 years). The life expectancy for foreign-born Hispanic women at age 50 exceeds that for non-Hispanic white women by 2.7 years. The life expectancy estimates for U.S.-born Hispanics are almost indistinguishable from those of non-Hispanic whites. These life expectancy estimates closely approximate those produced by Arias (2010) using vital statistics data.[4]

[3]We turned to the NHIS to validate the race/ethnic/nativity disability differences shown in the Table 2 (results available upon request). Although the items used to measure ADLs in the NHIS differed from the HRS, our patterns of results were almost identical for males and females. The NHIS ADL questions are based on "needing help" carrying out key activities of self-care, while the HRS measures reference difficulty in self-care activities. This difference in wording usually results in significantly lower levels of disability using the "needing help" criterion (Jette 1994).

[4]Arias (2010) did not produce separate life expectancies for U.S.- and foreign-born Hispanics. Her estimates for all Hispanics aged 50 years were 34.9 years for women and 31.2 years for men. We combined the two Hispanic groups to derive an overall estimate for Hispanics. These expectancies (shown in Table 3) were 34.4 years for women and 30.7 years for men, slightly lower than the expectancies produced by Arias using vital statistics data. This makes perfect sense given that our mortality data are centered on the year 1999, while Arias based her life tables on vital statistics data from 2006.

Our results also show, however, that the extended life expectancy of foreign-born Hispanics is accompanied by a very lengthy period of ADL disability, particularly for women. Disabled life expectancy for foreign-born Hispanic men aged 50 is 6.5 years, compared to white men who have a disabled expectancy of 3.8 years, while foreign-born Hispanic men's disability-free life expectancy is roughly equal to that for whites at about 25 years. Thus, the additional 3.2 years of expected life (32.0 years compared to 28.8 years) for foreign-born Hispanic men compared to non-Hispanic whites largely reflects additional years spent with a disability. These differences reflect not only the greater prevalence of disability among foreign-born Hispanic men but also their lower rates of mortality; that is, foreign-born Hispanic men live more years than non-Hispanic white men, but do so in a disabled state. Note also that although U.S.-born Hispanic men's mortality is highly comparable to that of non-Hispanic white men (life expectancy at age 50 of 29.0 years compared to 28.8), the years lived with and without disability differ significantly. U.S.-born Hispanic men live 2.3 fewer years free of disability (22.7 compared to 25.0) and 2.5 more years with a disability (6.3 compared to 3.8).

For foreign-born Hispanic women, disabled life expectancy is an extraordinary 11.1 years at age 50 compared to 6.0 years for white women. Foreign-born Hispanic women also can expect to spend fewer years free of disability compared to whites (24.6 years compared to 27.0 years). This shows that the 2.7 additional years of expected life for foreign-born Hispanic women are years spent with a disability; moreover, they also experience fewer years free of disability compared to white women. Similar to men, although U.S.-born Hispanic women's life expectancy is very similar to that for non-Hispanic women, their years of disabled and disability-free life are not. U.S.-born Hispanic women spend fewer years free of disability and more years with a disability. Thus, disability is much more a feature of Hispanic women's lives compared to non-Hispanic white women.

Discussion and Conclusion

Our results clearly support the idea of a Hispanic paradox in the older U.S. population—but only for mortality. There is no evidence of advantaged or equivalent health for U.S. Hispanics compared to non-Hispanic whites in terms of disability, and, indeed, the opposite appears to be the case. Foreign-born Hispanics in the U.S. exhibit the greatest burden of disability of all of the racial/ethnic groups in terms of years of reported difficulty with key aspects of self-care. U.S.-born Hispanics also live significantly more years disabled compared to non-Hispanic whites. Although the mortality experiences of foreign-born and U.S.-born Hispanics are consistent with the idea of the Hispanic paradox, the disability experiences of these groups are not.

In recent years, the idea that advances in life expectancy over the long term are accompanied by the postponement (or the decline of the most pernicious effects) of disease and disability has gained traction. Comparing black and white Americans reinforces this idea. Blacks are clearly disadvantaged compared to whites in that their shorter lives are accompanied by a lengthier period of disability (Crimmins et al. 1996; Hayward and Heron 1999), and we have shown similar evidence here. The pattern for foreign-born and U.S.-born Hispanics,

however, is clearly counter to this idea. Their advantaged life expectancy, particularly among foreign-born Hispanics, is accompanied by a protracted period of disability.

What, then, accounts for the combination of low mortality and high disability of foreign-born Hispanics in the United States? They appear to be the “exception” to the general pattern of how morbidity and mortality are coupled among U.S. racial/ethnic groups. Part of the answer, we suggest, is that disablement may be less tightly linked to chronic diseases and physiological capacity among foreign-born Hispanics than it is among U.S.-born whites and blacks—and perhaps among U.S.-born Hispanics as well. That is, disability, as a sequela of disease, may be more common among non-Hispanic whites and blacks than it is among foreign-born Hispanics. However, disability, as a sequela of injury or musculoskeletal damage, may be more common among Hispanics than among blacks and whites. This interpretation is consistent with evidence that the low rates of smoking are an important explanation of the unexpectedly long life expectancies of Hispanics (Blue and Fenelon 2011; Hummer et al. 2011) and Hispanics’ very low morbidity and mortality rates of coronary heart disease, stroke, chronic lung conditions, and lung cancer (Hummer et al. 2011; Zhang et al. 2012). It also is consistent with the evidence of the heavy concentration of Hispanics working in backbreaking jobs (Kochhar 2005; Toussaint-Comeau 2006) and their disproportionate risk of work-related injury (Dong and Platner 2004; Smith et al. 2005). A significant portion of the older foreign-born Hispanics represented in this study came to the United States under the Bracero Program (1942–1964) or were illegal immigrants (Donato 1999). Mexican migrants to the U.S. during the Bracero Program often worked as migrant farm laborers, while others worked on the railroads and in other types of physically demanding manual or blue-collar occupations. Moreover, the very poor living conditions of most foreign-born Hispanics in these immigrant cohorts may have also worked to take an enormous toll on the physical skills needed for self-care in old age. This may not only be the case for male Hispanics, but perhaps especially so for females given their substantial childrearing, caregiving, and domestic labor responsibilities in largely adverse social environments in these older cohorts.

A limitation of this paper is that we are unable to directly assess whether different factors give rise to mortality and disability among foreign-born and U.S.-born Hispanics compared to non-Hispanic whites and blacks. In addition, the results also suggest that gender needs to be considered in this assessment, since foreign-born Hispanic women in particular have the highest burden of lifetime disability. Research by Haas (2008) on early life influences on later life disability trajectories may be highly informative in guiding future research, as his results showcase the importance of the independent effects of childhood social disadvantage and health problems on disability increases at older ages, net of adult socioeconomic status and chronic diseases. Group differences in the combinations of early and adult life exposures thus may be important in identifying the factors giving rise to the disability patterns observed here. Unfortunately, information about older adults’ lifetime work exposures, health behaviors and other important factors such as childhood exposures and adult caregiving responsibilities is absent from the data sources considered here. Nonetheless, the combination of extended longevity and disabled life expectancy point to the need in future research to explore potential explanations such as these to understand why

older Hispanics spend an extended period of their lives having difficulty with major self-care activities.

The results shown here have implications for the larger question of how best to characterize racial/ethnic disparities in population health in the United States. Relying on mortality data, it is evident that both foreign-born and U.S.-born Hispanics have “paradoxically” low mortality relative to non-Hispanic whites and blacks. Reported morbidity for some of the major and often fatal chronic conditions also appears quite low among Hispanics relative to non-Hispanic whites and blacks. Hispanics have lower reported heart disease, stroke, lung conditions, and some cancers (e.g., lung cancer) than non-Hispanic whites and blacks, with some evidence that foreign-born Hispanics fare somewhat better than U.S.-born Hispanics (Markides and Eschbach 2005; Zhang et al. 2012). The Hispanic paradox thus may be a story about a favorable morbidity process encompassing chronic diseases and physiological capacity from which death arises. It is not a story, however, of a favorable disablement process. The consequence of extended longevity and an unfavorable disablement process results in a significantly extended period of life when older Hispanics have difficulty with key self-care activities. This suggests that while Hispanics may be advantaged in terms of longevity relative to other groups, they are disadvantaged in their health-related quality of life at older ages. This metric of population health appears to be critical to understanding racial/ethnic disparities. As such, a broad portfolio of metrics may be necessary to fully understand the degree and nature of health disparities among older adults in the U.S. Moreover, there are no simple patterns that work in consistent fashion across groups.

A question rarely asked by those examining the Hispanic paradox is whether the paradox is likely to persist into the future. Although it is axiomatic that immigrants “move to opportunity,” whether immigrants in new cohorts will arrive with the same or similar sets of social and behavioral characteristics than previous cohorts is less clear. For example, what changes are occurring in the Mexican population, in particular, that will alter the characteristics of immigrants to the United States? The Mexican population has undergone rapid changes, as evidenced in increases in educational attainment but also increases in obesity, diabetes, and hypertension (Rivera et al. 2002), and there is evidence pointing to a lessening of positive educational selection in more recent cohorts of U.S. immigrants from Mexico (Feliciano 2005). In addition, Mexicans are increasingly less likely to smoke—lowering an already relatively low prevalence of smoking (Franco-Marina 2007). Last but not least, it is unclear whether changes in exposures to disadvantaged social conditions associated with immigration and immigration policy in the U.S. will have a bearing on foreign-born Hispanics’ future health and mortality patterns.

What is clear is that foreign-born Hispanics, as a demographic group, are not easily characterized in terms of their epidemiological risks based on our current data monitoring systems and nationally representative surveys. This makes it very difficult to anticipate whether the Hispanic paradox in mortality will persist in the decades to come. It also is difficult to anticipate whether, at some future time, Hispanics will become increasingly similar to non-Hispanic whites and blacks in their etiologies of mortality and disability. Clearly, much future monitoring of racial/ethnic/nativity disparities in older adult health will

be needed as the U.S. population becomes more heterogeneous and patterns of social inequality across groups remain resilient.

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Table 1

Number of HRS respondents and number of exposure times by race/ethnicity and sex, U.S. adults aged 50 and above, 1998–2008

Race-ethnicity	Males		Females		Total	
	Exposure	Number (%)	Exposure	Number (%)	Exposure	Number (%)
Non-Hispanic Whites	35,917	8,658 (77.6)	47,841	11,071 (75.1)	83,758	19,729 (76.2)
Non-Hispanic Blacks	5,732	1,511 (13.5)	9,639	2,346 (15.9)	15,371	3,857 (14.9)
All Hispanics	3,875	991 (8.9)	5,444	1,318 (8.9)	9,319	2,309 (8.9)
U.S.-born Hispanics	1,778	445 (4.0)	2,351	554 (3.8)	4,129	999 (3.9)
Foreign-born Hispanics	2,097	546 (4.9)	3,093	764 (5.2)	5,190	1,310 (5.1)
Total	45,524	11,160 (100)	62,924	14,735 (100)	108,448	25,895 (100)

The column totals reflect non-Hispanic whites + non-Hispanic blacks + all Hispanics

Source Health and Retirement Study, 1998–2008

Table 2

Age-specific prevalence rates of ADL disability by race/ethnicity and sex

Sex	Age	Non-Hispanic whites		Non-Hispanic blacks		U.S.-born Hispanics		Foreign-born Hispanics	
		Prev	95 % CI	Prev	95 % CI	Prev	95 % CI	Prev	95 % CI
Males	50–54	0.072	(0.064, 0.080)	0.141	(0.119, 0.162)	0.179	(0.137, 0.221)	0.076	(0.049, 0.103)
	55–59	0.087	(0.081, 0.093)	0.149	(0.131, 0.168)	0.150	(0.117, 0.183)	0.131	(0.105, 0.157)
	60–64	0.094	(0.086, 0.101)	0.164	(0.141, 0.188)	0.131	(0.097, 0.165)	0.169	(0.131, 0.207)
	65–69	0.101	(0.093, 0.109)	0.162	(0.135, 0.189)	0.137	(0.097, 0.177)	0.190	(0.144, 0.236)
	70–74	0.126	(0.116, 0.136)	0.229	(0.193, 0.264)	0.193	(0.133, 0.252)	0.236	(0.183, 0.289)
	75–79	0.174	(0.162, 0.186)	0.294	(0.249, 0.338)	0.284	(0.196, 0.372)	0.258	(0.185, 0.331)
	80–84	0.232	(0.217, 0.248)	0.305	(0.249, 0.361)	0.382	(0.268, 0.496)	0.331	(0.247, 0.416)
Females	50–54	0.084	(0.078, 0.090)	0.167	(0.149, 0.185)	0.129	(0.101, 0.158)	0.147	(0.121, 0.174)
	55–59	0.097	(0.091, 0.103)	0.213	(0.196, 0.230)	0.176	(0.144, 0.208)	0.240	(0.211, 0.268)
	60–64	0.108	(0.101, 0.115)	0.227	(0.207, 0.247)	0.227	(0.186, 0.268)	0.254	(0.217, 0.291)
	65–69	0.119	(0.110, 0.128)	0.208	(0.185, 0.230)	0.221	(0.168, 0.274)	0.272	(0.227, 0.317)
	70–74	0.142	(0.133, 0.151)	0.240	(0.216, 0.264)	0.198	(0.145, 0.251)	0.290	(0.235, 0.345)
	75–79	0.198	(0.187, 0.209)	0.312	(0.280, 0.344)	0.285	(0.218, 0.353)	0.337	(0.276, 0.399)
	80–84	0.280	(0.267, 0.293)	0.446	(0.403, 0.489)	0.311	(0.230, 0.392)	0.425	(0.339, 0.510)

Source Health and Retirement Study, 1998–2008

Table 3

Healthy life expectancies at age 50 by race/ethnicity and sex

	Males				Females			
	TLE	**DFLE**	**DLE**	**%dfle/tle**	**TLE**	**DFLE**	**DLE**	**%dfle/tle**
Non-Hispanic whites	28.8 (28.72–28.90)	25.0 (24.88–25.14)	3.8 (3.69–3.91)	86.8 (86.44–87.17)	33.0 (32.88–33.07)	27.0 (26.85–27.10)	6.0 (5.88–6.12)	81.8 (81.47–82.15)
Non-Hispanic blacks	25.4 (25.18–25.72)	20.2 (19.88–20.55)	5.2 (4.96–5.51)	79.4 (78.37–80.49)	30.0 (29.74–30.24)	21.5 (21.19–21.77)	8.5 (8.22–8.79)	71.6 (70.75–72.51)
Hispanics	30.7 (30.33–31.08)	24.2 (23.50–24.86)	6.5 (5.88–7.17)	78.8 (76.69–80.82)	34.4 (34.04–34.72)	24.9 (24.34–25.40)	9.5 (9.00–10.03)	72.3 (70.89–73.77)
U.S.-Born Hispanics	29.0 (28.51–29.49)	22.7 (21.85–23.58)	6.3 (5.41–7.16)	78.3 (75.40–81.26)	32.5 (32.06–33.04)	24.9 (24.20–25.51)	7.7 (7.03–8.36)	76.4 (74.44–78.30)
Foreign-born Hispanics	32.0 (31.54–32.54)	25.5 (24.80–26.19)	6.5 (5.85–7.24)	79.6 (77.49–81.65)	35.7 (35.34–36.15)	24.6 (23.85–25.42)	11.1 (10.34–11.88)	68.9 (66.82–71.03)

Sources Health and Retirement Study, 1998–2008, and National Health Interview Survey—Longitudinal Mortality Follow up, 1989–2006. The 95 % confidence interval for each estimate is provided in parenthesis beside the estimate

TLE total life expectancy, *DFLE* disability-free life expectancy, DLE disabled life expectancy, *%dfl/tle* percent of life expectancy disabled