Does the Hispanic Paradox in Mortality Extend to Disability?[1]

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Abstract

Hispanics in the U.S. have life expectancies comparable to non-Hispanic whites, despite their disadvantaged socioeconomic status - a pattern coined the Hispanic Paradox. This study uses five waves of the Health and Retirement Study (1998-2006) to examine whether the Hispanic paradox in mortality extends to disability for persons aged 50 and older. Life expectancies with and without activities of daily living (ADL) disability are calculated and simulated for race-gender groups: non-Hispanic white, non-Hispanic black, and Hispanic (subgroups) men and women. Our results provide evidence in support of the Hispanic paradox in mortality for foreign-born Hispanic/Mexican men and both native-born and foreign-born Hispanic/Mexican women. Significant health selection processes seem to be operating. The Hispanic paradox in mortality, however, does not appear to be accompanied by a Hispanic paradox in disability. Different processes appear to be at work in influencing Hispanics' mortality and disability processes.

Race disparities in health constitute a fundamental form of inequality in the United States. Black Americans live many fewer years than whites at most ages (NCHS 2008), and blacks also live more years with chronic health problems (Hayward and Heron 1999; Hayward et al. 2000). The race gap in health spread across most domains of health, and the gaps in health are rooted in race differences in socioeconomic conditions over the life course (Hayward et al. 2000; Warner and Hayward 2006).

Despite Hispanics sharing similar socioeconomic disadvantages with blacks, it is less clear that Hispanics suffer the same health consequences. Studies of Hispanic mortality report similar mortality to that for the non-Hispanic more socioeconomically advantaged whites (Arias et al. 2010; Elo et al. 2004; Markides and Eschbach 2005). This pattern has drawn considerable attention with questions revolving around data artifacts, acculturation, health selection, and cultural factors as possible explanations for what appear to be paradoxical findings (Palloni and Arias 2004; Palloni and Morenoff 2001).

While evidence of a Hispanic paradox in mortality has been growing, it is unclear how far this paradox extends to health or how Hispanics' health is associated with mortality. Some studies report that Mexican Americans have a health profile of chronic conditions that is somewhat better than non-Hispanic whites (Jerant et al. 2008; Zsembik and Fennell 2005), and this is particularly true for foreign-born Mexican Americans. Other studies, however, point to complex differences in the health profiles of the major race/ethnic groups. Some studies report, for example, that despite having higher rates of obesity and diabetes than other race/ethnic groups, Hispanics have lower than expected hypertension, stroke, and coronary heart disease (Crespo et al. 1996; Crimmins et al. 2004b). The prevalence of major cancers also appears to be lower among Hispanics. And, while some studies report lower prevalence of functional problems among Mexican Americans (Zsembik and Fennell 2005), other

studies point to significantly higher rates of disability among Hispanics compared to whites (Crimmins et al. 2004b), and this is especially the case for Mexican American women (Ostchega et al. 2000).

Which images of Hispanic health are true? The evidence thus far suggests that Hispanics are characterized by long life but it is unclear whether they also spend a significant portion of that life spent in poor health. If, indeed, Hispanics live a long life and also a long life in poor health, this pattern is at odds with the idea that mortality advantages are brought about through the postponement of disease and disability – a pattern exemplified by blacks and whites. Part of the confusion in the literature may stem from the fact that studies of Hispanic mortality and morbidity typically rely on different data sources. Estimates of Hispanic characteristics such as education and earnings been shown to be highly sensitive to the data source (Crimmins et al. 2004a). In addition, estimates of Hispanic mortality and health very likely reflect the composition of Hispanic subgroups within the "Hispanic" ethnic classification. Palloni and Arias (2004) suggests, for example, that the Hispanic adult mortality advantage is only the feature of foreign-born Mexican and foreign-born other Hispanic, not of Puerto Ricans or Cubans, whether born in the United States or abroad. Other studies also highlight the relative health advantages of Mexican Americans and especially Mexican American immigrants within the Hispanic group, pointing to the roles of health selection and negative acculturation (Borrell and Crawford 2009; Cho et al. 2004; Homa et al. 2000; Hummer et al. 2000).

This study provides new insights into these questions by examining the mortality and disability experiences of Hispanics from a single data source, the Health and Retirement Study (HRS, 1998-2006). We are particularly interested in identifying whether Hispanics in the HRS exhibit the same relatively advantaged mortality patterns documented in other studies and whether Hispanics also report higher rates of disability. If so, we should observe a pattern where Hispanics exhibit a relatively long life expectancy that is also accompanied by a comparatively lengthy period of disability. This pattern

of active life expectancy would provide evidence that, in contrast to blacks and whites, the link between disability and mortality is comparatively weaker and that the sources of disability and mortality may differ more for Hispanics than for other race/ethnic groups.

Because the Hispanics' mortality and health patterns very likely reflect compositional differences related to immigration and country of origin, we refine these estimates by first differentiating active life expectancy among foreign-born and native-born Hispanics. This speaks to the general issues of health selection and negative acculturation, although we acknowledge that the Hispanic "category" is heterogeneous in terms of country of origin. Health selection processes (i.e., the healthy immigrant phenomenon) leads us to expect that foreign-born Hispanics should have mortality rates that are comparable to native-born whites, while negative acculturation processes lead us to expect that native-born Hispanics will exhibit mortality (and perhaps disability) patterns more indicative of their minority and socioeconomic status. Finally, we refine the analysis even further by examining only the disability and mortality experiences of Mexican Americans, both native-born persons and immigrants. Although admittedly we are pushing the HRS data to its limits – perhaps even beyond its limits – restricting our analysis to Mexican Americans allows us to obtain a finer grained assessment of health selection and negative acculturation processes that is cleansed of possible country-of-origin effects on health and mortality. Throughout this analysis we stratify by gender to determine whether health selection and negative acculturation processes are equally evident for males and females.

Data, Measures, and Analytic Approach

Data

The only longitudinal data that allows us to evaluate the disability and mortality experiences for major race/ethnic groups in the United States is the Health and Retirement Study. We make use of five

observation waves (1998, 2000, 2002, 2004, and 2006) to identify changes in disability status across waves and mortality incidence. An additional advantage of the HRS is that it identifies both native-born and foreign-born persons and it over-samples Hispanics and blacks. Overall, the HRS is representative of the U.S. non-institutional population ages 50 years and older and their spouses.

The key advantage of the HRS is that it allows us to assess changes in disability as well as mortality for persons who self-identify as Hispanics/Mexican Americans by nativity status. Thus, we improve on other studies that have larger relied on different data sources for evaluating Hispanic health and mortality. Despite this advantage, however, the HRS data still have limitations that are important to keep in mind. First, as we will show below, the sample sizes for Hispanics and Mexican Americans are not large despite over-sampling and the large sample size of the HRS (about 20,000 respondents). Given that we are basing our analysis largely on incidence rates, sparse data concerns are real for the Hispanic/Mexican American subgroups, and the standard errors we report reflect this. Second, despite having overall excellent rates of longitudinal follow-up, sample attrition is somewhat higher among Hispanics. This leaves open the possibility that disability and mortality incidence rates are influenced by a "salmon bias", i.e., immigrant Hispanics with health problems who leave the United States. In the present analysis, we have not systemically assessed the possible implications of salmon bias. However, as this work progresses, we plan to incorporate a simulation strategy that assumes that some fraction of foreign-born attriters die. This would allow us to evaluate how our estimates would change based on different levels of salmon bias. Prior research by Turra and Elo (2008) suggests that overall magnitude of salmon bias on adult Hispanic mortality rates is likely to be small.

Measures

Disability is a classic measure of the health of the older population and is measured here in terms of activities of daily living (ADL) (Verbrugge and Jette 1994). Five ADL items are considered here

including dressing, walking, bathing, eating, and getting in/out of bed. All ADL items are dichotomous measures, indicating whether the respondent has difficulty performing each item of ADL (yes = 1), and ADL (range 0-5) scales were constructed by summing up the corresponding items. This study uses an ADL summary variable, RwADLA, provided from HRS RAND data file, where "w" refers to wave number. We define persons as “active” or not disabled if they have no ADLs; respondents are coded as “inactive” (or disabled) if they have one or more ADLs. Changes in disability status across observation waves are used to infer “events,” and persons can experience both the onset of and recovery from disability. Although it is evident that events are significantly undercounted given that we cannot observe disability changes within observation intervals, prior research documents that estimates of active and inactive life expectancy are not significantly altered.

Deaths were identified via the HRS Tracker file and/or the National Death Index. If either file indicated that a respondent was deceased, we coded the person as dead. Comparisons of the deaths uncovered via the HRS Tracker files and deaths uncovered via the NCHS matching algorithm in the HRS found that the algorithm fails to capture some deaths and depresses mortality rates especially among minority status women at older ages. Without the use of the HRS Tracker file to identify deaths, mortality rates for minority status persons – especially Hispanic women – would have been significantly biased in favor of the Hispanic paradox.

Race/ethnicity 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 a respondent considers themselves as Hispanic, they are asked whether they consider themselves as Mexican American/Chicano, Puerto Rican, Cuban American or something else, and from this information we identify Mexican-Americans for our analysis. Respondents were also queried whether they were born in the United States. We combined this information with race/ethnicity to differentiate

foreign-born and native-born Hispanics and Mexican Americans. We chose not to incorporate these interactions into the underlying statistical model because of sparse data concerns on bootstrapping.

Analytic Approach

Our multistate life tables (MSLTs) were estimated using a recently developed algorithm, SPACE -Stochastic Population Analysis for Complex Events (Cai et al. 2010). The SPACE approach offers several advantages over traditional ways of estimating MSLTs, including the use of microsimulation and the bootstrap method to estimate the sampling variability of MSLT functions. We began by fitting a multinomial logistic regression of the following form stratified by sex:

$$\log(p_{ij} / p_{ii}) = \alpha_{ij} + \beta_{1ij} age + \beta_{2ij} race / ethnicity$$

where p_{ij} is the transition probability from the current state i to state j ($i \neq j$), α_{ij} is the intercept and β_{1ij} is the coefficient for age at the beginning of the observation interval, and β_{2ij} is the coefficient for race/ethnic groups. Then, SPACE uses the estimated transition probabilities to produce a microsimulation of disability changes and mortality for a hypothetical cohort of individuals. This approach differs from traditional MSLTs in that complete life histories are simulated for each member of the population. For example, to simulate the disability and mortality experiences of a 100,000-person cohort of black women aged 50 years, SPACE first randomly assigns an initial health status (either disabled or not disabled) for each black woman at age 50 based on the information from the input data set. Then, SPACE simulates each life line according to the transition probabilities obtained from multinomial logistic regression above and repeats this for every black woman in the cohort. Summary measures of total and health-specific life expectancies are easily calculated, since a complete record of individual health histories in the cohort was generated. Bootstrapping is used to obtain standard errors for the life table functions. Bootstrapping generates repeated estimates of the life table functions by randomly drawing a series of bootstrap samples (n = 240) from our analytic sample. From

these bootstrap samples, distributions of the life table functions are generated that allow us to estimate sampling variability. We combine this information with the original estimates to construct confidence intervals and conduct significance tests across the race/ethnic groups.

Results

Although the HRS is a very large and nationally representative sample, the number of Hispanics in the sample is relatively small. Table 1 shows that of the 25,533 respondents included in our analysis (race/ethnic groups other than whites, blacks, and Hispanics are excluded), only 2,262 self-identify as Hispanics. Of these, 1,327 are native born and 935 are foreign born. The number of Mexican American respondents in the HRS, of course, is even smaller (N=980), of whom about 24% are foreign born. These numbers are important to keep in mind and point to the need for extreme caution in interpreting our results.

Tables 2 and 3 reinforce this point, showing the number of transitions between the active and inactive states and to death from these states. This is the primary reason for the functional form of the statistical model used to generate the probabilities for the MSLTs. We are only able to estimate the main effect of race/ethnicity, where ethnicity is broken down by nativity. The data are not sufficiently dense to test for age by race/ethnicity interactions. We chose to stratify by sex, because preliminary analyses showed, not surprisingly, significant gender differences in the disability processes.

Before turning to the MSLT results, we first document how the race/ethnic groups differ in terms of their mean ADL score.[2] The mean scores are more reliability estimated than incidence given the small number of events to estimate incidence, so the mean scores allow us to partially validate the MSLT results. Figures 1 and 2 show that the mean ADL score is lowest for non-Hispanic white males and females at all ages. Mexican American males (both native-born and foreign-born) have a higher

[2] We only report the results for Mexican Americans. The pattern of race/ethnic differentials is the same if we used Hispanics.

mean ADL score at ages 50-59 than non-Hispanic blacks which drops somewhat at ages 60-69, and then increases thereafter. The slope for native-born Mexican American males is especially steep and is the highest of all of the groups at ages 80 and older. In contrast, the ADL scores for foreign-born Mexican American men, while higher than whites, are lower than either native-born Mexican Americans or blacks.

Unlike males, Mexican females (both native-born and foreign-born) have lower mean ADL scores than non-Hispanic blacks at ages 50-59. Although foreign-born Mexican American women have lower ADL scores than native-born women or blacks up to age 69, their average disability climbs rapidly after age 70 and is higher or equivalent to blacks.

The MSLT results shown in Table 4 document this Hispanic paradox in mortality. Hispanic and Mexican American men's overall life expectancies, while less than that for white men, do not differ statistically from whites. In large part, the somewhat lower life expectancies for Hispanic and Mexican American men reflects the combination of relatively low life expectancies for native-born Hispanics and Mexican Americans and the relatively high life expectancies of foreign-born persons. Indeed, the life expectancies for native-born Hispanics and Mexican Americans do not differ statistically from blacks' life expectancy. This pattern is consistent with the negative acculturation argument. Similarly, the advantaged life expectancies of foreign-born Hispanics and Mexican American men are consistent with the "healthy immigrant" hypothesis.

Foreign-born Mexican American men's disabled life expectancy is significantly greater than that for whites ($p<.05$), reinforcing the idea that while health selection appears to be operating for mortality, there is less evidence that it extends to disability. The results for native-born Hispanic and Mexican American men also reinforce the idea that negative acculturation factors are in play. Their years of ALE and DLE are much more similar to black men than to white men. For males, minority status and

most likely socioeconomic resources appear to be operating very similarly for all of the native born minority status groups.

Life expectancy for Hispanic and Mexican American women is roughly equivalent to that for non-Hispanic white women. Unlike men, there are no differences in life expectancy by nativity status within Hispanics and Mexican Americans. This gender difference in the effects of nativity on mortality was unexpected, and the reasons are unclear. Health selection processes appear to be operating for native-born Hispanic women but not men. In contrast, however, health selection processes do not appear to be operating with regard to women's disability. Active life expectancies, on the whole, are significantly lower than that for white women and disabled life expectancies are significantly higher. Hispanic origin women appear to live long lives – comparable to non-Hispanic white women – yet their expected years of disability far outstrip those for non-Hispanic whites. Why health selection processes might be operating on mortality but not on disability is unclear. Such a pattern suggests different etiologies for mortality and disability for Hispanic women – an issue yet to be addressed in depth in the literature. Despite the statistical differences in ALE and DLE, we remain somewhat skeptical of these results since our estimates are based on relatively small sub-samples and numbers of events.

Because of our skepticism, we re-estimated MSLTs using the traditional prevalence-based approach. Inputs are disability prevalence rates and mortality incidence rates. Disability prevalence is more reliably estimated than incidence given the small sample sizes of the Hispanic subgroups. The results comparing Mexican American with whites and blacks are shown in Table 5. Although the prevalence-based approach yields somewhat different expectancies – an expected difference given the two approaches – the results parallel those generated by SPACE.

Conclusion

Prior studies have noted the enormous race gap in healthy life expectancy, with blacks living many few years than whites and living many more of those years in poor health (Hayward and Heron 1999). Where Hispanics fall between these groups has been ambiguous in part because of the difficulties in drawing health and mortality information from the same source to estimate healthy life expectancy. The Health and Retirement Study provides some leverage on this question, although as we have seen, significant data limitations remain. With this caveat in mind, what do our results suggest about the ways in which minority status and nativity combine to influence Hispanics' healthy life expectancy?

Overall, our results provide evidence in support of the Hispanic paradox in mortality for foreign-born Hispanic men and both native-born and foreign-born Hispanic women. Significant health selection processes seem to be operating. The life expectancy of native-born Hispanic men, however, is comparable to black men. This group appears to experience negative acculturation, and the pace is faster than for native-born Hispanic women. Thus, there is some indication that the Hispanic paradox in mortality is sensitive to negative acculturation processes.

In contrast to their life expectancy, Hispanic active and disabled life expectancies point to a lengthy portion of life with disability. This pattern is especially stark for Hispanic women, although evident among foreign-born men. The Hispanic paradox in mortality does not appear to be accompanied by a Hispanic paradox in disability. If anything, Hispanics' longer life foretells a longer life with disability. Different processes appear to be at work in influencing Hispanics' mortality and disability processes.

It is axiomatic that the "things that kill you" are not necessarily the "things that disable you." Still, given much of disability's origins in pathology (Verbrugge and Jette 1994), the results for Hispanics are puzzling and generate more questions than answers. Some studies suggest that "longer

life in worse health" is sometimes a characteristic of "populations in transition" (Hayward et al. 2006; Hidajat et al. 2007). For example, mortality from some causes (e.g., infectious diseases) may decline precipitously, leaving the population subject to a mortality regime of mostly degenerative causes. Given Hispanics' rather extraordinary low levels of mortality, however, it is not clear that this explanation applies.

We plan to pursue this issue in greater depth in the very near term. One question we have raised above is whether the etiologies of disability and mortality are more independent for Hispanics. One test of this idea is to assess the degree to which the association between disability and subsequent mortality varies across the race/ethnic groups. That is, does the effect of disability on the risk of death differ by race/ethnic group? Another test is to assess race/ethnic variation in the pathological origins of disability. If our hypothesis that the etiologies of disability and mortality are more independent among Hispanics, then we should observe lower associations between disability and mortality and between pathological conditions and disability. Statistical models to test this idea are in the works.

Other possible explanations for the observed patterns are more difficult for us to resolve within the framework of the HRS. Differences in lifestyle exposures (e.g., smoking and obesity) and working conditions (e.g., physical demands) almost certainly play important roles in understanding the relatively high rates of disability yet low rates of mortality; however, the measurement of these exposures over the adult life course is difficult. Not to be ignored, of course, is the question of possible salmon bias in the estimates of Hispanic mortality. The HRS is a longitudinal survey and Hispanics are somewhat more likely to drop out of the survey over time.

Finally, it is important to note that gender appears to play an important role in how mortality and disability are linked. Clearly, the link is weakest among Hispanic women and especially among foreign-born women. Almost one third of the life expectancy of foreign born women at age 50 is

disabled life expectancy, while their life expectancy is comparable to that for non-Hispanic white women who can expect to spend almost five years less as disabled. A long life in poor health is clearly a characteristic of foreign-born Hispanic women, and the reasons require sensitivity to gender related issues in health selection processes, lifestyles, and working conditions.

Although it is somewhat unsatisfying for an analysis to raise more questions than it addresses, it is important to keep in mind how primitive prior descriptive information has been. Prior studies almost exclusively focus either on health or mortality and draw on different data sources for these outcomes. Even studies of healthy life expectancy have typically drawn on different data sources. Here, we not only have drawn on a single data source but we also have integrated mortality and disability information to estimate healthy life expectancy for the major race/ethnic/nativity groups. Our results support the idea of a Hispanic paradox in mortality. However, our results also introduce a corollary paradox *within* the Hispanic subpopulation. Why do Hispanics have lengthy lives yet also have lengthy disabled lives?

Table 1. Sample size by race/ethnicity, sex, and nativity for HRS respondents 50 years of age and older (at the last time when respondents are measured among wave 1998, 2000, 2002, 2004, and 2006)

Race-Ethnicity	Male		Female		Total	
Non-Hispanic White	8571	33.6%	10893	42.7%	19464	76%
Non-Hispanic Black	1492	5.8%	2315	9.1%	3807	15%
Hispanics	974	3.8%	1288	5.0%	2262	9%
Native-Born Hispanics	604	2.4%	723	2.8%	1327	5%
Mexican	338	1.3%	407	1.6%	745	3%
non-Mexican	266	1.0%	316	1.2%	582	2%
Foreign-Born Hispanics	370	1.4%	565	2.2%	935	4%
Mexican	100	0.4%	135	0.5%	235	1%
non-Mexican	270	1.1%	430	1.7%	700	3%
Total	11037	43.2%	14496	56.8%	25533	100%

Table 2. Number and percents of events by race/ethnicity and nativity for HRS male respondents 50 years of age and older (among wave 1998, 2000, 2002, 2004, and 2006)

Race-Ethnicity	A->A	A->I	A->D	I->A	I->I	I->D	From A	From I	Total
non-Hispanic White	18099	1512	1160	892	1484	675	20771	3051	23822
	76.0%	6.3%	4.9%	3.7%	6.2%	2.8%	87.2%	12.8%	100.0%
non-Hispanic Black	2473	310	202	192	398	165	2985	755	3740
	66.1%	8.3%	5.4%	5.1%	10.6%	4.4%	79.8%	20.2%	100.0%
Native-born Hispanics	795	74	50	63	99	41	919	203	1122
	70.9%	6.6%	4.5%	5.6%	8.8%	3.7%	81.9%	18.1%	100.0%
Mexican	610	61	39	52	77	34	710	163	873
	69.9%	7.0%	4.5%	6.0%	8.8%	3.9%	81.3%	18.7%	100.0%
non-Mexican	185	13	11	11	22	7	209	40	249
	74.3%	5.2%	4.4%	4.4%	8.8%	2.8%	83.9%	16.1%	100.0%
Foreign-born Hispanics	884	104	48	72	137	35	1036	244	1280
	69.1%	8.1%	3.8%	5.6%	10.7%	2.7%	80.9%	19.1%	100.0%
Mexican	432	54	26	44	78	15	512	137	649
	66.6%	8.3%	4.0%	6.8%	12.0%	2.3%	78.9%	21.1%	100.0%
non-Mexican	452	50	22	28	59	20	524	107	631
	71.6%	7.9%	3.5%	4.4%	9.4%	3.2%	83.0%	17.0%	100.0%

Note: “A” refers to Active, “I” refers to Inactive (disabled), “D” refers to Dead.

Table 3. Number and percents of events by race/ethnicity and nativity for HRS female respondents 50 years of age and older (among wave 1998, 2000, 2002, 2004, and 2006)

Race-Ethnicity	A->A	A->I	A->D	I->A	I->I	I->D	From A	From I	Total
non-Hispanic White	22999	2319	916	1400	2897	1073	26234	5370	31604
	72.8%	7.3%	2.9%	4.4%	9.2%	3.4%	83.0%	17.0%	100.0%
non-Hispanic Black	3808	606	186	419	994	252	4600	1665	6265
	60.8%	9.7%	3.0%	6.7%	15.9%	4.0%	73.4%	26.6%	100.0%
Native-born Hispanics	973	124	31	94	207	44	1128	345	1473
	66.1%	8.4%	2.1%	6.4%	14.1%	3.0%	76.6%	23.4%	100.0%
Mexican	732	96	25	78	153	36	853	267	1120
	65.4%	8.6%	2.2%	7.0%	13.7%	3.2%	76.2%	23.8%	100.0%
non-Mexican	241	28	6	16	54	8	275	78	353
	68.3%	7.9%	1.7%	4.5%	15.3%	2.3%	77.9%	22.1%	100.0%
Foreign-born Hispanics	1136	197	36	143	318	52	1369	513	1882
	60.4%	10.5%	1.9%	7.6%	16.9%	2.8%	72.7%	27.3%	100.0%
Mexican	468	90	16	69	133	22	574	224	798
	58.6%	11.3%	2.0%	8.6%	16.7%	2.8%	71.9%	28.1%	100.0%
non-Mexican	668	107	20	74	185	30	795	289	1084
	61.6%	9.9%	1.8%	6.8%	17.1%	2.8%	73.3%	26.7%	100.0%

Note: “A” refers to Active, “I” refers to Inactive (disabled), “D” refers to Dead.

Table 4. TLE/ALE/DLE and 95% CI's by race/ethnicity, sex, and nativity for HRS respondents 50 years of age and older estimated from SPACE approach.

		TLE		ALE		DLE	
Sex	Race-Ethnicity	LE	95% CI	LE	95% CI	LE	95% CI
Male	White	28.32	27.73 - 28.91	24.34	23.71 - 24.97	3.98	3.73 - 4.23
	Black	24.66	23.62 - 25.70	19.73	18.65 - 20.81	4.93	4.20 - 5.66
	Hispanics(overall)	26.93	25.22 - 28.64	*22.27*	20.60 - 23.94	4.66	4.03 - 5.29
	NB Hispanics	**25.30**	23.56 - 27.04	**21.33**	19.88 - 22.78	3.97	3.24 - 4.70
	FB Hispanics	28.44	25.48 - 31.40	23.11	20.27 - 25.95	*5.33*	4.15 - 6.51
	Mexicans(overall)	26.33	24.45 - 28.21	*21.74*	19.96 - 23.52	4.60	3.84 - 5.36
	NB Mexicans	**24.65**	22.75 - 26.55	**20.60**	19.07 - 22.13	4.05	3.25 - 4.85
	FB Mexicans	29.25	25.37 - 33.13	23.20	19.26 - 27.14	**6.05**	4.44 - 7.66
Female	White	32.40	31.75 - 33.05	26.51	25.94 - 27.08	5.89	5.62 - 6.16
	Black	29.17	28.03 - 30.31	21.23	20.17 - 22.29	7.94	7.20 - 8.68
	Hispanics(overall)	33.28	31.91 - 34.65	**23.63**	22.32 - 24.94	**9.64**	8.37 - 10.91
	NB Hispanics	32.82	30.33 - 35.31	24.81	22.93 - 26.69	*8.01*	6.13 - 9.89
	FB Hispanics	33.73	31.30 - 36.16	**22.85**	21.22 - 24.48	**10.88**	8.70 - 13.06
	Mexicans(overall)	31.57	30.39 - 32.75	23.30	21.83 - 24.77	**8.27**	7.00 - 9.54
	NB Mexicans	31.21	28.94 - 33.48	*23.92*	21.72 - 26.12	7.28	5.36 - 9.20
	FB Mexicans	32.65	28.83 - 36.47	**22.39**	20.02 - 24.76	**10.26**	6.24 - 14.28

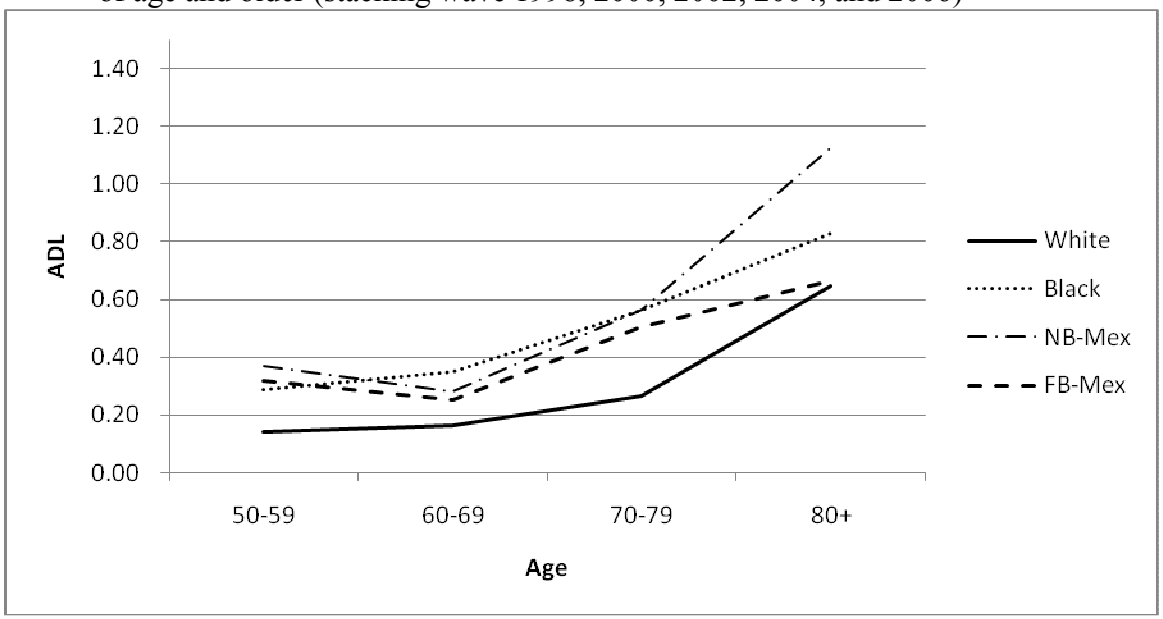
Note: "TLE" refers to total life expectancy, "ALE" refers to active life expectancy, "DLE" refers to disabled(inactive) life expectancy.
"White" and "Black" refer to non-Hispanic white and non-Hispanic black.
"NB" refers to native-born, "FB" refers to foreign-born, "CI" refers to confidence interval.
Bold values are where the Hispanics differ from whites ($p<.05$).
Italic & underlined values are where the Hispanics differ from whites ($p<.1$).
SPACE estimates are derived from 100,000 microsimulations and 240 bootstrap samples using HRS (1998-2006).

Table 5. TLE/ALE/DLE by race/ethnicity, sex, and nativity for HRS respondents 50 years of age and older.
(Comparison between SPACE approach and Sullivan method)

		SPACE approach				Sullivan method			
Sex	Race-Ethnicity	TLE	ALE	DLE	%ALE/TLE	TLE	ALE	DLE	%ALE/TLE
Male	White	28.32	24.34	3.98	85.9	29.5	25.7	3.8	87.0
	Black	24.66	19.73	4.93	80.0	25.4	20.3	5.1	79.8
	NB Mexicans	24.65	20.60	4.05	83.6	25.5	20.8	4.7	81.5
	FB Mexicans	29.25	23.20	6.05	79.3	30.6	23.8	6.8	77.7
Female	White	32.40	26.51	5.89	81.8	33.8	27.7	6.1	82.1
	Black	29.17	21.23	7.94	72.8	29.9	21.5	8.4	72.0
	NB Mexicans	31.21	23.92	7.28	76.6	32.3	24.5	7.8	75.9
	FB Mexicans	32.65	22.39	10.26	68.6	34.2	23.8	10.4	69.5

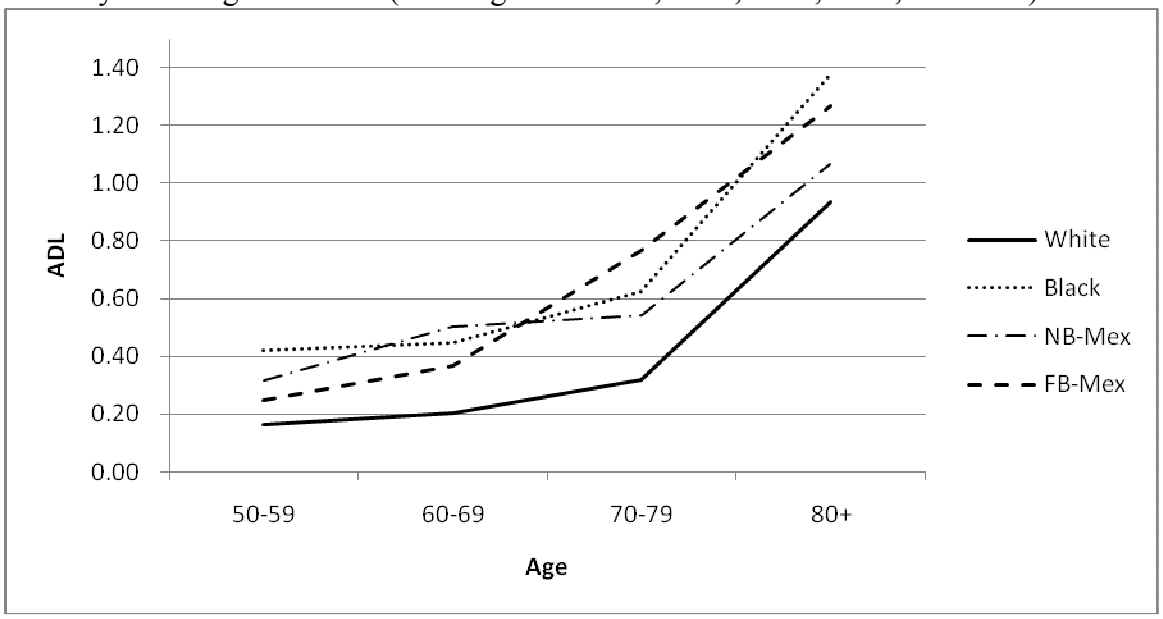
Note: “TLE” refers to total life expectancy, “ALE” refers to active life expectancy, “DLE” refers to disabled(inactive) life expectancy.
“White” and “Black” refer to non-Hispanic white and non-Hispanic black.
“NB” refers to native-born, “FB” refers to foreign-born.
SPACE estimates are derived from 100,000 microsimulations and 240 bootstrap samples using HRS (1998-2006).
Estimates derived from Sullivan method (Jagger et al. 2006) are using HRS(1998-2006).

Figure 1. Mean ADL score by age interval, race/ethnicity and nativity, for HRS male respondents 50 years of age and older (stacking wave 1998, 2000, 2002, 2004, and 2006)



Note: "White" and "Black" refer to non-Hispanic white and non-Hispanic black.
"NB" refers to native-born, "FB" refers to foreign-born, and "Mex" refers to Mexican

Figure 2. Mean ADL score by age interval, race/ethnicity and nativity, for HRS female respondents 50 years of age and older (stacking wave 1998, 2000, 2002, 2004, and 2006)



Note: "White" and "Black" refer to non-Hispanic white and non-Hispanic black.
"NB" refers to native-born, "FB" refers to foreign-born, and "Mex" refers to Mexican

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