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Prevalence and Trends in Morbidity and Disability Among Older Mexican Americans in the Southwestern United States, 1993–2013

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Abstract

This study examines the prevalence of morbidity and disability among older Mexican Americans using 5-year age groups. Twenty-year panel data from the Hispanic Established Populations for the Epidemiological Study of the Elderly are used to make detailed comparisons by nativity and gender. Results show that prevalence rates for most chronic conditions for both males and females do not vary by nativity. For disabilities, nativity is a significant predictor of increased instrumental activity of daily living disability for foreign-born females and reduced activity of daily living disability for U.S.-born males. Additionally, results show significant interactions between nativity and age cohorts, with the gap increasing with age for males and decreasing with age for females. These results have important implications for health services and health policy. Given the rapid aging of the Mexican American population, the prevention and treatment of medical conditions, particularly among the foreign-born, should be a major public health priority to reduce dependence from disabilities.

Keywords

morbidity; disability; nativity; Mexican American

Recent research shows that nativity status has a robust relationship with health among Hispanics (Angel, Angel, & Hill, 2014; Hummer & Hayward, 2015; Markides & Gerst, 2011). There is an emerging consensus that upon arrival to the United States, the physical health of most Hispanic immigrants is superior to the health of the native-born (Markides & Rote, 2015a). Selective migration, the disproportionate migration by individuals in good health compared with those in poor health, is generally thought to account for this phenomenon. A number of studies have documented health advantages for U.S. immigrants that are attributed in part to the effects of positive selection (Akresh & Frank, 2008; Antecol

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& Bedard, 2006; Bostean, 2013; Garcia, Angel, Angel, Chiu, & Melvin, 2015; Riosmena, Wong, & Palloni, 2013).

Increasingly, research has expanded on these findings to examine the role of nativity as an important factor for determining health and functioning in later life. The foreign-born may have worse health in late life, given they have less access to formal and informal support systems that include health care, support of family and friends, and socioeconomic resources (Angel & Angel, 1996; Angel, Buckley, & Sakamoto, 2001; Markides & Gerst, 2011). Mexican immigrants, the single largest group (28%) of all U.S. immigrants who arrived between 1965 and 2015, generally arrive with less education and weaker socioeconomic status (SES) health gradients than their U.S.-born counterparts (Lopez, Passel & Rohal, 2015; Turra & Goldman, 2007).

Although a substantial body of literature documents race/ethnic differences in disability, less scholarship has focused specifically on how morbidity and disability levels vary by *nativity* among the largest Hispanic subgroup in the United States, the Mexican-origin elderly. As this population grows and ages, it will comprise an increasingly large percentage of the elderly population with projections that Hispanics over age 65 will quintuple between 2012 and 2050 (U.S. Census, 2014). Clearly, a better understanding of the role nativity plays in life expectancy and disability for Mexican-origin men and women has important consequences for the large and growing elderly Hispanic population and by extension, the U.S. elderly population in general.

Consequently, this study makes an important contribution to the literature on Hispanic health by documenting differentials in morbidity, activities of daily living (ADLs), and instrumental activities of daily living (IADLs), by nativity and gender among Mexican-origin elderly. We build upon previous research by examining the prevalence of individual ADL and IADL items to investigate which if any measures are driving nativity differences in disability. This broad examination of chronic conditions and disability among older Mexican Americans takes into account the demographic heterogeneity of the U.S.-Mexican-origin population and is especially timely, given the rapid population aging that U.S. Hispanics are experiencing. We employ 20-year panel data from the Hispanic Established Populations for the Epidemiological Study of the Elderly (H-EPESE) to examine trends in morbidity and disability among elderly Mexican Americans to address the following question: Does morbidity and disability prevalence differ for older U.S.-born and foreign-born Mexican Americans residing in the southwestern United States?

Literature Review

Epidemiological Paradox

Hispanic health has become a widely studied topic as immigration streams from Mexico and other areas of Latin America have led to rapid growth in the U.S. Hispanic population. Literature on Hispanic health is dominated by the concept of the epidemiological paradox. The Hispanic paradox has been attributed in part to immigrant health selection, which is also present among other immigrant groups in the United States (Akresh & Frank, 2008). Specifically, researchers have found that Hispanics in the United States fare comparably to

non-Hispanic whites on many measures of health, including several morbidity measures, and all-cause mortality despite their low SES (Markides & Eschbach, 2005).

Hispanics also have significantly longer life expectancies than non-Hispanic whites; however, the overall Hispanic health advantage is largely driven by the foreign-born population (Markides & Rote, 2015b). These relatively long life expectancies are largely attributed to immigrant health selection (Arias, 2010; Markides & Eschbach, 2005) and cultural characteristics associated with positive health behaviors (Antecol & Bedard, 2006; Fenelon, 2013; Markides & Gerst, 2011). However, the erosion of positive health behaviors and weakening of the immigrant health advantage have been found overtime and across generations (Antecol & Bedard, 2006; Riosmena et al., 2013). A growing body of evidence suggests that foreign-born Hispanics are more likely to engage in negative lifestyle behaviors such as smoking, alcohol consumption, and unfavorable dietary changes with longer residence in the United States (Fenelon, 2013; Kimbro, 2009; Turra & Goldman, 2007). Although the foreign-born may be more likely to engage in negative lifestyle behaviors with increased duration in the United States, recent research by Riosmena, Kuhn, and Jochem (2017) finds Mexican immigrants have lower smoking initiation and higher smoking cessation rates after immigration compared to Mexican nonmigrants and non-Hispanic whites. Indeed, Lariscy, Hummer, and Hayward (2015) document the favorable longevity foreign-born Mexican Americans experience is in large part due to low levels of smoking and lower mortality from lung cancer and respiratory diseases, particularly among women.

Although a clear advantage has been documented in mortality and life expectancy among Hispanics, the evidence remains mixed with regard to other health indicators such as morbidity and disability (Markides & Rote, 2015a). These differences in health outcomes for aging Hispanics raise questions related to the quality of life this group experiences at older age. Thus, we explore recent research on disability and morbidity in greater detail to identify how our study extends on these important measures of health.

Disability

The extension of the mortality advantage experienced by the foreign-born to disabilities at older ages is unclear with findings varying by gender and disability measurement. Disabled life expectancy and prevalence of disabilities at older ages have been used to assess the health of older adults. Work looking at disabled life expectancies has found that foreign-born Hispanics in the United States exhibited the greatest burden of disability among all racial/ethnic groups, defined by the number of years of life spent with at least one ADL limitation (Hayward, Hummer, Chiu, González-González, & Wong, 2014). In addition, Angel, Angel, and Hill (2014) found that although foreign-born Mexican women have longer life expectancies than both their male counterparts and U.S.-born Mexican women, they spend an overwhelming two thirds of their remaining years after age 65 with a significant functional limitation measured by the performance-oriented mobility assessment. Similarly, other research has found foreignborn Mexican women spend a larger fraction of their elderly years with *both* ADL and IADL disability compared with U.S.-born Mexican women. Whereas foreign-born Mexican males spend more years after age 65 with IADL disability

compared with U.S.-born Mexican men but spend significantly less years after age 65 ADL disability-free (Garcia et al., 2015). Longer disabled life expectancies may be a result of longer life expectancy, higher prevalence of disability, or a combination of both. Research shows that foreign-born Hispanics have longer life expectancies than their U.S.-born counterparts (Cantu, Hayward, Hummer, & Chiu, 2013; Garcia et al., 2015; Hayward et al., 2014; Lariscy, Hummer, & Hayward, 2015); however, more research on differences in the prevalence of disability by nativity for Hispanics is needed.

Nam, Al Shih, and Markides (2015) examined the effect of gender and nativity on ADL disability and mobility limitation in Mexican Americans aged 75 years and over. They found a significant interaction effect between gender and nativity on ADL disability. Foreign-born men were less likely to report ADL disability compared to U.S.-born men and women and foreign-born women. However, foreign-born women showed no health advantage compared to U.S.-born women in ADL disability.

Research on specific age patterns of disability have been used to help tease out these mixed results on the disability advantage among older immigrants. Melvin, Hummer, Elo, and Mehta (2014) utilized data from National Health Interview Survey (NHIS) for 1998–2011 and found that foreign-born Mexican-origin men and women aged 65 and older have significantly higher rates of ADL and IADL disability as well as functional limitations in comparison to non-Hispanic whites. They document a health advantage for foreign-born Mexican men in early and mid-late life (50–64 and 65–74 years) relative to their U.S.-born counterparts but not at older ages. However, a similar advantage is not found among foreign-born Mexican women. In fact, the pattern is quite the opposite: Foreign-born Mexican-origin women exhibit substantially higher rates of ADL, IADL, and functional limitations relative to U.S.-born Mexican-origin women. Our study extends this research by analyzing disability and morbidity using 5-year age categories to provide a more nuanced analysis of nativity differentials among older Mexican Americans. Furthermore, this study examines the prevalence of individual ADL and IADL items to gain a more complete understanding of gender and nativity differences in the prevalence of disabilities for older Mexican Americans.

Chronic Health Conditions/Morbidity

Less research focuses on how this heterogeneous population compares on measures of chronic health conditions that effect life expectancy, disability, and overall quality of life. In general, several studies have found Hispanics to be disproportionately vulnerable to certain health conditions such as diabetes, obesity, and infectious and parasitic diseases compared with non-Hispanic whites (Flegal, Carroll, Ogden, & Curtin, 2010; Markides & Gerst, 2011). Research focusing on older foreign-born Hispanics by Zhang, Hayward, and Lu (2012) documented higher rates of diabetes and lower levels of heart disease, most cancers, and lung disease than U.S.-born non-Hispanic whites. In particular, low levels of smoking among foreign-born Hispanics may contribute to their relatively favorable morbidity profiles (Lariscy et al., 2015). Although these benefits may decrease overtime, Markides and Gerst (2011) document a significant increase in the prevalence of diabetes and hypertension among older Mexican Americans residing in the United States. Work on chronic disease

morbidity and physiological functioning has found that compared to non-Hispanic whites, foreign-born Hispanics have a lower prevalence of chronic conditions and functional limitations among older adults using NHIS from 1997 to 2006 (Cantu et al., 2013). However, they did not find evidence of these advantages for U.S.-born Hispanics, who spend more years with chronic conditions and functional limitations compared to foreign-born Hispanics and non-Hispanic whites.

Additionally, foreign-born Mexican Americans have more undiagnosed conditions, including diabetes, compared to U.S.-born Mexican Americans in the United States, although this discrepancy does not fully explain the better health observed among the foreign-born (Barcellos, Goldman, & Smith, 2012). The current study builds on this body of research by assessing nativity differentials in six measures of chronic health conditions.

In sum, reaching definitive conclusions regarding relative health advantages and disadvantages of the U.S. Mexican-origin population has proven difficult, in part because comparisons are generally made to non-Hispanic whites. Yet nativity differences in Mexican American health are crucial since they shed light on whether the initial immigrant advantages in health dissipate over time or in successive generations (Antecol & Bedard, 2006; Markides & Eschbach, 2005). Therefore, by comparing morbidity and disability rates for both foreign-born *and* U.S.-born Mexican American elderly, this study may uncover late life health differences that may be linked to the cumulative toll of physically demanding and riskier jobs with low autonomy, reduced occupational opportunities, and the stress of living in the context of an environment different from the country of origin.

Research Design

Data

This research employs data from the H-EPESE to document nativity differentials in morbidity and disability among older people of Mexican-origin. The H-EPESE is a large, multistage probability sample of older Mexican Americans who reside in five southwestern states: Arizona, California, Colorado, New Mexico, and Texas (Markides, Rudkin, Angel, & Espino, 1997). Aggregated individual level data from 1993 to 2013 are used to obtain prevalence estimates across survey years. Thus, the present study used baseline data (1993/1994, $n = 3,050$) and data obtained from 2-year (1995/1996, $n = 2,438$), 5-year (1998/1999, $n = 1,980$), 7-year (2000/2001, $n = 1,682$), 11-year (2004/2005, $n = 2,069$), 13-year (2006/2007, $n = 1,542$), 17-year (2010/2011, $n = 1,078$), and 20-year (2012/2013, $n = 744$) follow-up assessments. Due to attrition in the original cohort, a new cohort of 902 individuals was added in 2004 to increase sample size and statistical power. Proxy respondents are omitted as are those with missing data on covariates. The final analytic sample includes 3,511 unique individuals and 12,581 observations.

Measures

The assessment of morbidities is based on six self-reported items that asked whether the respondent had ever been diagnosed by a doctor or medical personnel with one or more of the following six medical conditions: (a) heart attack, coronary, myocardial infraction, or

coronary thrombosis; (b) stroke, blood clot in the brain, or a brain hemorrhage; (c) cancer or a malignant tumor of any type; (d) high blood pressure; (e) arthritis or rheumatism; or (f) diabetes, sugar in your urine, or high blood sugar. The original response categories for each item were yes, no, or suspect/possible. Response categories for each item were coded 1 for "yes" and "suspect/possible" and 0 for "no." These six medical conditions are used specifically, as each condition has the potential to influence physical function and disability (Patel, Peek, Wong, & Markides, 2006). Although newly arrived foreign-born Mexicans have been shown to have a higher prevalence of undiagnosed disease due to lack of health care coverage (Barcellos et al., 2012); given nearly universal health insurance through Medicare/Medicaid (approximately 90% of respondents in our sample) for the elderly, previous research has shown self-reported medical conditions by older adults to be fairly consistent with medical records and physician reports (Simpson et al., 2004; Skinner, Miller, Lincoln, Lee, & Kazis, 2005). In the current study, recent immigrants accounted for nearly 40% of uninsured respondents at baseline (results not shown). However, health care coverage for this group increased in each successive wave.

Disability refers to an individual's difficulty or inability to perform social roles and self-care tasks, which are crucial for independent living (Verbrugge, 2016). Disability is measured through two separate indicators: ADLs and IADLs. Both ADL and IADL measurements are commonly used in aging research and are well documented as reliable scales to assess disability. To assess ADLs, respondents were asked if they could independently perform the following tasks: walk across a small room, bathe or shower, perform personal grooming (brush hair/teeth), dress, eat, get into or out of a bed, and use a toilet (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). ADL disability was dichotomized as "no help needed" versus "unable to," or "need help to do one or more of the tasks." A positive response was coded as an ADL limitation.

IADLs (Lawton & Brody, 1969; Rosow & Breslau, 1966) are self-reported measures commonly used in studies of the elderly to identify individuals who have difficulty performing important activities of living and as such may be at risk for loss of independence in a community setting. The 10 IADL activities measured are as follows: use a telephone without assistance, drive a car/use public transportation, go shopping, prepare own meals, do light housework, take medicine, handle finances, do heavy housework, walk up and down the stairs without help, and walk a half mile without help. Respondents were asked to indicate if he or she was unable to perform the activity without help. IADL disability was dichotomized as no help needed versus "unable to perform" or "need help with one or more of the tasks." A positive response was coded as an IADL limitation.

Sociodemographic variables used in the analysis include nativity, gender, age, and years of education. Nativity was assessed by asking the respondents if they were born in the United States. Gender corresponds to whether the respondent identifies as female or male. To assess how morbidity and disability patterns vary by age, five age categories are included that allow for reasonable cell sizes and encompass different stages of late life: 65–69, 70–74, 75–79, 80–84, and 85 years and older. Finally, educational level is measured by the years of schooling the respondent has completed.

Statistical Analysis

In the descriptive analysis described below, comparisons across morbidity and disability status were made using χ^2 and z tests for independent proportions to assess nativity differentials by gender and age. Prevalence is estimated for all morbidity and disability conditions by dividing the total number of cases of a condition (i.e., ADL/IADL) by the total population and multiplying this proportion by 100. For the multivariate models, random effects Poisson regression with normally distributed individual level random effects is used to account for repeated measurements on the same individual for up to eight waves of data and estimate risk ratios to quantify the association between nativity, disability, and morbidity by gender and age-group. Models are specified with robust standard errors, resulting in a modified Poisson regression, which has been shown to be a valid method to estimate relative risk in binary response data (see Zou, 2004). Moreover, the standard errors are adjusted since individuals can contribute more than one observation to the data during the period under study. That is, the individual measures are clustered by subject, and this specification takes that aspect of the data into account in a general way to produce the appropriate standard errors for a design such as this.

Results

Descriptive Statistics

Table 1 reports descriptive characteristics for the study sample by nativity and gender. The total Mexican-origin population in this study is 43% foreign-born and 57% U.S.-born. Approximately 61% of respondents are female compared to 39% males. Nearly 42% of female respondents are foreign-born compared to 58% of U.S.-born, while 45% of male respondents are foreign-born compared to 55% of U.S.-born. The mean age for foreign-born females (78.6 years) is slightly higher (0.7 years) than U.S.-born females (77.9 years). Similarly, the mean age of foreign-born males (78.3 years) is slightly higher (1.2 years) than U.S.-born males (77.1 years). In addition, mean years of education was higher among U.S.-born respondents than among foreign-born respondents. As expected, there are statistically significant differences in age and education by nativity for both females and males ($p < .001$).

Morbidity

Table 2 presents the prevalence of six self-reported medical conditions in five age categories among U.S.-born and foreign-born elderly. Note that for females (Panel A), foreign-born respondents exhibit lower or equal proportions of morbidity across all age categories. With the exception of statistically lower rates of cancer among foreign-born females in the 65–69 age-group (3.2% vs. 16.4%), 70–74 age-group (4.2% vs. 7.7%), 75–79 age-group (3.7% vs. 7.0%), diabetes in the 65–69 age-group (24.2% vs. 37.0%), and 70–74 age-group (23.7% vs. 32.2%), there are no major nativity differences in the distribution of morbidities across age categories. Among males (Panel B), a similar pattern can be seen with foreign-born males reporting lower or equal proportions of morbidity relative to their U.S.-born counterparts. However, foreign-born males exhibit significantly lower rates of morbidity for heart attack (5.5% vs. 13.9%) in the 70–74 age-group, and hypertension in the 65–69 age-group (26.2%

vs. 35.4%). Overall, there are no clear patterns in nativity differentials across the six types of self-reported medical conditions and age-groups among women. In contrast, foreign-born males report lower rates of morbidity across all age-groups with the exception of cancer (85+), arthritis (65–69, 75–79, and 80–84) and hypertension (70–74 and 85+).

Disability

Table 3 presents the prevalence of any ADL disability and seven individual ADL items among U.S.-born and foreign-born elderly. For females (Panel A), both the U.S.-born and foreign-born report similar prevalence rates for any ADL and each individual ADL item in the 65–69, 70–74, 75–79, and 80–84 age-groups. However, there are significant differences in the prevalence of limitation in grooming and dressing (ADLs) between U.S.-born and foreign-born females in the 85 years and older age category. Foreign-born females report a 16.9% prevalence rate of grooming disability compared to 11.1% for U.S.-born females ($p < .001$), and a 22.1% prevalence rate of difficulty getting dressed compared to 17.5% for U.S.-born females ($p < .01$). For males (Panel B), a slightly different pattern emerges with foreign-born males reporting overall lower levels of any ADL relative to their U.S.-born counterparts. However, no significant nativity differentials are evident for ADL disability among the five age-groups with the exception of transferring in or out of bed in the 80–84 and 85+ age-groups, with foreign-born males exhibiting significantly lower rates (8.7% vs. 14.7% and 16.4% vs. 27.4%, respectively).

Table 4 presents the prevalence of any IADL disability and 10 individual IADL items among U.S.-born and foreign-born elderly. Panel A illustrates that foreign-born females report levels of any IADL disability across all five age-groups: 65–69 (57.7%), 70–74 (58.7%), 75–79 (69.1%), 80–84 (78.7%), and 85+ (89.2%) that are *significantly higher* than their U.S.-born counterparts (42.6%, 45.0%, 57.5%, 75.5%, and 87.2%, respectively). These nativity differences in IADL disability are largely driven by transportation, shopping, money management, telephone use, and heavy housework, with foreign-born females being at a disadvantage relative to the U.S.-born. For males (Panel B), a different pattern emerges with no major nativity differences for any IADL disability across age-groups. However, significant differences arise for telephone use in the 70–74 (10.3%) age-group with foreign-born males at a disadvantage relative to their U.S.-born counterparts (7.0%, respectively). Conversely, U.S.-born males (19.0% vs. 9.9%) in the 70–74 age-group report higher levels of difficulty walking a half mile and climbing stairs (55.8% vs.42.7%) in the 85+ age-group than their foreign-born peers.

Multivariate Results

The multivariate analysis examines the relationship between nativity and disability for older Mexican Americans residing in the southwest United States (Table 5). The models were fit to males and females separately to account for well-known gender differences in the age patterns of disability. Prior research has found a complex interplay between gender and nativity among the U.S. Mexican-origin population (Angel et al., 2001, 2014; Garcia et al., 2015; Nam, Al Shih, & Markides, 2015). Mexican-origin women live longer than men and have a greater opportunity to experience health problems (Angel et al., 2014). Furthermore, health selection likely varies by gender and age-groups. Analysis by nativity has supported

the notion of selectivity among male migrants who likely migrate for occupational opportunities (Angel, Angel, Díaz Venegas, & Bonazzo, 2010). In the same way, health selectivity may be weaker among female migrants who are more likely to migrate for family reunification (Markides, Eschbach, Ray, & Peek, 2007). Model 1 in Table 5 is a baseline model that examines nativity differentials in disability controlling for age-group. Models 2 and 3 control for education and six self-reported health conditions that may be partially responsible for nativity differences in disability. Model 4 adds controls for negative health behaviors (smoking, drinking, and obesity) to examine the effects of acculturation on health outcomes, given the relevance of smoking in influencing chronic health and mortality (Fenelon, 2013; Lariscy et al., 2015). Finally, nativity by age interactions are included in addition to the controls to better understand how nativity moderates the association between age and disability (model is not shown, but marginal predictions from the interaction model are depicted graphically in Figure 1).

ADL Disability

The results in Panel A for females show that nativity is not associated with any ADL disability, whereas age and education are related in the expected direction (Models 1 and 2). That is, advancing age is associated with increased risk, and greater educational attainment is associated with decreased risk of ADL disability. In Model 3, the six self-reported medical conditions are added to the previous model. Female respondents who reported having a heart attack, hypertension, stroke, arthritis, or diabetes were between 18% and 66% more likely to report any ADL disability. Conversely, cancer is not associated with any ADL disability among females. Smoking and drinking are not associated with ADL disabilities for females, although being obese does increase odds of reporting ADL disabilities (Model 4). In addition, nativity does not appear to moderate ADL disability among women by age cohort (results not shown).

For males (Panel B), nativity and age are positively related to any ADL disability. U.S.-born males are 20% more likely than foreign-born males to report any ADL disability. When education is added to Model 2, nativity remains significant ($p < .01$), with U.S.-born males 26% more likely to report any ADL disability relative to their foreign-born counterparts. In Model 3, stroke, hypertension, arthritis, and diabetes are positive predictors of any ADL disability among older Mexican-origin males. Having reported cancer or a heart attack is not associated with any ADL disability among males. Model 4 adds in controls for health behaviors. Similar to women, smoking and drinking are not significantly associated with ADL disabilities. Obesity significantly increases odds of reporting ADL disability, although nativity differences remain significant. Lastly, an interaction term for nativity and age cohort is included. Figure 1 (Panel A) shows nativity strongly moderates disability among men for age-groups: 75–79, 80–84, and 85+. That is, there are significant differences in any ADL disability by age cohort with foreign-born males exhibiting a health advantage relative to their U.S.-born counterparts.

IADL Disability

Model 5 shows that nativity and age are related to disability for any IADL in the expected direction. That is, nativity and age are positively related to IADL disability for females. The

risk of having any IADL disability is 11% less likely for U.S.-born females as for foreign-born females. In Model 6, education explains part of the variation in any IADL disability. However, nativity and age are still significant predictors of any IADL disability. In Model 7, all self-reported medical conditions are positive predictors of any IADL disability among older Mexican-origin women with the exception of cancer. Nativity continues to remain significant with U.S.-born females 7% less likely to report any IADL disability relative to their foreign-born counterparts. Model 8 controls for three measures of health behaviors. Only obesity is associated with IADL disability among older Mexican-origin females. We next fit an interaction term for nativity and age cohort. Figure 1 (Panel B) shows how nativity differences in IADL disability among women are moderated for age-groups: 65–69, 70–74, and 75–79. There are significant differences in any IADL disability by age cohort, with foreign-born females at a significant disadvantage compared to their U.S.-born counterparts at younger age-groups.

Nativity is not associated with any IADL disability for males (Model 5), although age and education are positively related as expected (Model 6). In Model 7, all but two morbidities (cancer and hypertension) are significant predictors of any IADL disability among males. Including controls for health behaviors in Model 8, only obesity is associated with IADL disability among males. Furthermore, interactions for nativity and age cohort were nonsignificant (results not shown).

Discussion

The U.S. Hispanic population has experienced unprecedented growth in the past several decades, with aging Mexican Americans composing a significant part of this increase. Although the Hispanic population remains relatively young as the result of high fertility and immigration, its composition is aging along with the rest of the population (U.S. Census, 2014). One distinguishing feature of the Hispanic population is that despite relatively low levels of material wealth and education, Hispanics have longer life expectancies at birth and at age 65 than non-Hispanic whites (Markides & Rote, 2015a). The combination of a relatively unfavorable socioeconomic and educational profile and long life expectancies raises fundamental questions concerning health and functional capacity in old age. Although the Hispanic mortality advantage has been widely documented, less research has focused on how the prevalence of morbidity and disability varies by nativity among Mexicanorigin elderly, the largest Hispanic subgroup in the United States. This analysis examined nativity differentials by gender and 5-year age categories based on morbidity, ADLs, and IADLs among Mexican-origin individuals 65 and older residing in the southwestern United States to assess whether the immigrant advantage that has been documented in mortality extends to morbidity and disability.

The results presented indicate that foreign-born and U.S.-born Mexican Americans, with a few exceptions, have similar prevalence rates for morbidity regardless of gender. Consistent with other studies, foreign-born Hispanic and Mexican immigrants exhibit little or no health advantages in terms of chronic illnesses (Gonzalez et al., 2009; Zhang, Hayward, & Lu, 2012). The few advantages documented in the present study among foreign-born females for cancer and diabetes, and foreign-born males for hypertension in younger age cohorts may be

attributed in part to lack of health care access among newly arrived immigrants (less than 10 years in the United States), which has been found to lead to underreporting of health conditions, particularly among males (Barcellos et al., 2012; Gorman, Read & Krueger, 2010).

Likewise, the prevalence of individual items of ADL disabilities for both males and females is similar across nativity for older Mexican Americans. This is true across all age-groups. These results are consistent with previous work, which has found similar prevalence of ADLs by nativity, with the largest differences being for males aged 85 and older (Melvin, Hummer, Elo, & Mehta, 2014). While the prevalence of individual items of IADL disabilities is similar for males at all ages in the present study, foreign-born females have significantly higher prevalence of IADL disabilities at all ages with 4 items underscoring this difference: telephone, transportation, shopping, and heavy housework.

Once controls for sociodemographic characteristics are included, the findings indicate that the only health advantage for the foreign-born is ADL disability among older immigrant males. These results are consistent with previous findings that support a slight foreign-born Mexican advantage among men relative to their U.S.-born counterparts (Garcia et al., 2015; Hayward et al., 2014; Markides et al., 2007; Nam et al., 2015). Interestingly, nativity age cohort interactions suggest that for immigrant males, health advantages on ADL disability persist through late life. However, this result may be due in part to selection effects in mortality among foreign-born males. Our results suggest foreign-born Mexican males spend less years with any ADL disability due to lower prevalence rates and lower mortality. Even with controls for smoking, this advantage for older foreign-born males persists. As with previous research, this health advantage was found only among immigrant men and not immigrant woman. This finding lends support to the idea that older immigrant men are positively selected on health because they migrate primarily for occupational opportunities, while older immigrant women are more likely to migrate for family reunification purposes (Markides et al., 2007).

Our results for ADL disability are consistent with previous findings that show a significant interaction effect between gender and nativity among Mexican Americans aged 75 years and older, with foreign-born males less likely to report any ADL disability relative to their U.S.-born counterparts (Hayward et al., 2014; Nam et al., 2015). However, this finding contradicts results from Melvin et al. (2014), which document a foreign-born male disadvantage in ADL disability in older age-groups (75–84 and 85+). Although, it is important to note that Melvin and colleagues did not include personal grooming, use of toilet, and walking across a small room in their ADL measurements. U.S.-born males are at a clear disadvantage in older age cohorts in these disability items.

Furthermore, foreign-born Mexican women are at a significant disadvantage in IADL disability compared to U.S.-born Mexican women across all age cohorts. Our finding of higher prevalence of IADL disability among foreign-born women, coupled with previous research finding longer disabled and shorter nondisabled life expectancies, suggests that the higher prevalence rates at all ages contribute to significantly longer disabled life expectancies (Garcia et al., 2015). Results for IADL disability demonstrate the importance

of considering nativity and gender when planning for long-term care in the growing elder Mexican-origin population. These results are consistent with previous findings that foreign-born women exhibit higher rates of IADL at younger ages and spend significantly less years after age 65 IADL disability-free (Garcia et al., 2015; Melvin et al., 2014). These results further suggest a convergence of immigrant women's health with that of the U.S-born population at about age 80, at which point both groups experience a similar amount of IADL disability.

The current analysis adds to previous research on ADL and IADL disabilities by examining differences in the prevalence of individual items. Disaggregating the prevalence of the full scale of IADL disability into individual items reveals that many of the items driving this difference are likely related to acculturation. For example, large differences are found in transportation and handling money, two tasks which are likely complicated by low levels of acculturation.

The possibility of a longer life characterized by compromised health and material hardship raises serious questions about the potential burden on government and family. The family plays a critical role for individuals of Mexican descent in providing social support for elderly parents, given that they tend to resist going to nursing homes (Thomeer, Mudrazija, & Angel, 2015). The disadvantages in IADL disability among foreign-born women and ADL disability among U.S.-born men suggest the risk for caregiver burden may be especially high among older Mexican Americans. Indeed, recent research shows Mexican American caregivers engage in more time intensive caregiving activities and report more frequent elder care provisions than non-Hispanic whites (Rote & Moon, In Press). As these data suggest, as they grow older, Mexican immigrant families will need to mobilize their support systems since they will be heavily burdened with physical impairments.

Mexican immigrants arrive in good health relative to the U.S.-born population, but over time their health deteriorates and thus they become more disabled in late life (Markides & Gerst, 2011). Despite recent evidence that smoking influences chronic health and mortality, our results indicate smoking is not an important predictor of disability in late life. Deaths attributed to smoking may occur at earlier ages that preclude the observation of disability onset. High levels of disability in late life may be a result of decades of physically demanding occupations that have characterized a large concentration of the lives of Mexican immigrants who arrived as part of the Bracero Program between 1942 and 1964 (Hummer & Hayward, 2015). Additionally, older Mexican immigrants have inadequate access to health care and worsening health behavior due to negative acculturation (Angel et al., 2001; Antecol & Bedard, 2006; Lariscy et al., 2013). Previous studies have focused on comparing morbidity and disability outcomes across racial and ethnic groups, but less research has focused specifically on health outcomes among Mexicanorigin elders as a function of nativity, gender, and age cohort (Cantu et al. 2013; Hayward et al., 2014; Melvin et al., 2014). These findings have important implications for the immigrant health literature. This research contributes to ongoing discussions related to the degree to which Mexican elderly immigrants exhibit positive or negative health selectivity by documenting that nativity differences in prevalence of disabilities and morbidities vary by gender *and* measure of disability.

Overall, the findings show nativity to be an important predictor of ADL disability for males and IADL disability for females. In addition, the results indicate that health selectivity is a complex process that works differently for immigrant men and women. Although immigrants may be positively select on health at time of migration, at older ages male migrants retain this health advantage in terms of ADL disabilities but not IADL disabilities. However, at older ages, female migrants have no health advantages for ADL disabilities and have more IADL disability than their U.S.-born counterparts. The differences reported have important implications for health services and health policy. The robust relationship between nativity, gender, and age means that foreign-born women and U.S.-born men may place particularly serious burdens on state and family finances. The potential magnitude of the problem is increased when taking into account that over 50% of the H-EPESE survivors rely primarily on Medicaid for their health care needs. Given the rapid aging of the Mexican American population, the prevention and treatment of medical conditions and disabilities must become a major national public health priority in order to reduce ADL and IADL dependence for a population that is already economically and socially disadvantaged.

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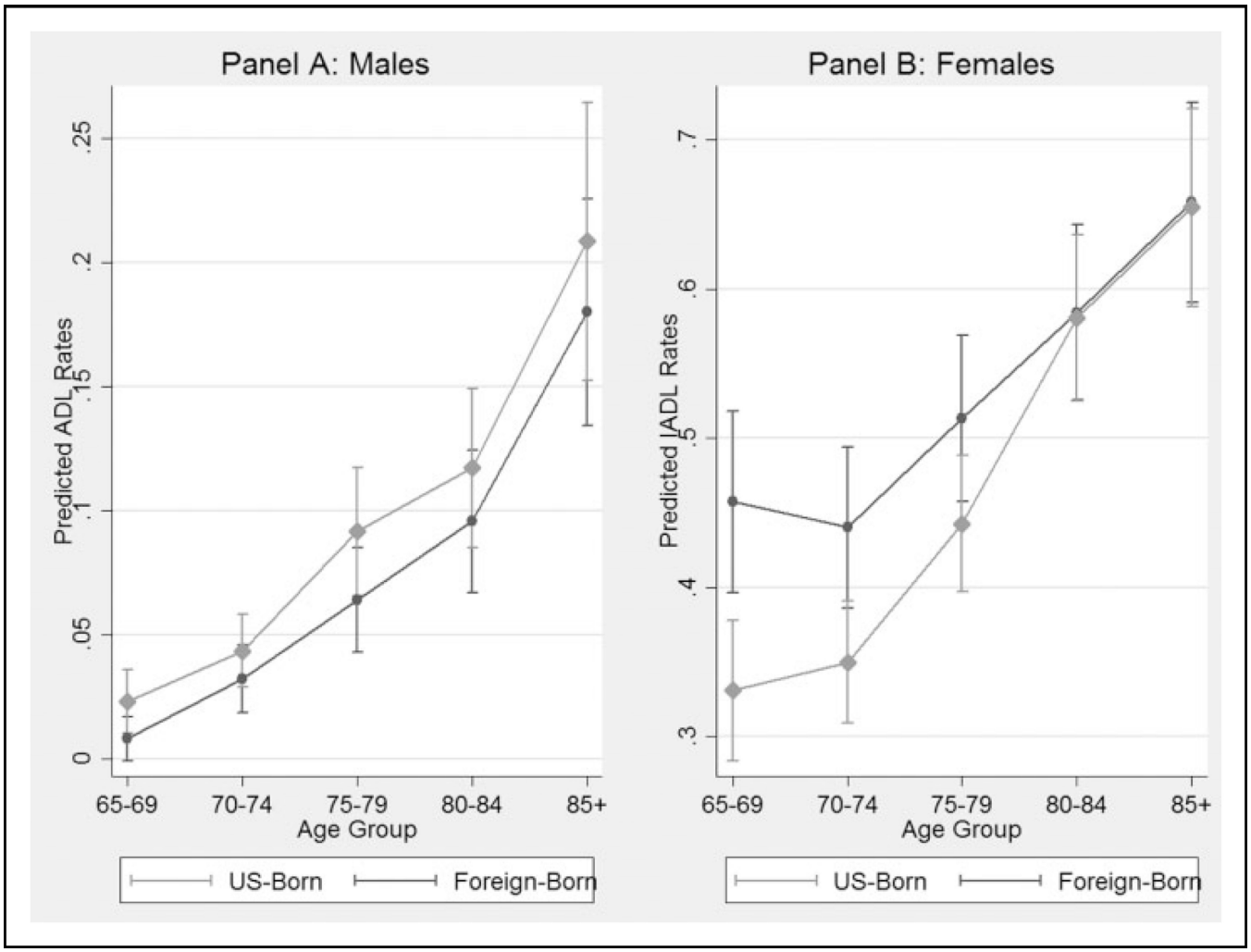

Figure 1.
Activity of daily living/instrumental activity of daily living age cohort nativity interactions.

Table 1

Sociodemographic Characteristics Among Mexican-Origin Elders Age 65 and Older by Gender and Nativity.

	Females		Males	
Totals	**U.S.-Born**	**Foreign-Born**	**U.S.-Born**	**Foreign-Born**
	***N* (%)**	***N* (%)**	***N* (%)**	***N* (%)**
	4,412 (58%)	3,211 (42%)	2,726 (55%)	2,232 (45%)
Age-group				
65–69	577 (13.1)	428 (13.3)	404 (14.8)	265 (11.9)
70–74	913 (20.7)	550 (17.1)	628 (23.0)	461 (20.7)
75–79	1,093 (24.8)	736 (22.9)	672 (24.7)	536 (24.0)
80–84	1,009 (22.9)	797 (24.8)	627 (23.0)	509 (22.8)
85+	820 (18.6)	700 (21.8)	395 (12.2)	461 (20.7)
Mean age (*SD*)	77.9 (6.9)	78.6 (7.2)***	77.1 (6.7)	78.3 (7.2)***
Mean education (*SD*)	5.8 (4.1)	4.0 (3.4)***	6.1 (4.3)	3.7 (3.2)***
Ever smoke	1,237 (28.2)	901 (28.2)	1,741 (65.2)	1,393 (65.2)
Ever drink	1,452 (33.0)	853 (26.6)***	2,135 (78.6)	1,804 (81.0)*
Obese	1,831 (41.5)	1,313 (40.9)	814 (29.9)	641 (28.7)
Total population	7,623 (61%)		4,958 (39%)	

Source. Hispanic Established Populations for the Epidemiological Study of the Elderly Waves 1–8: 1993–2013.

Note. *N* = 12,581. Proportions are weighted and significant differences are from *t* test.

* Significant at the .05 level.

** Significant at the .01 level.

*** Significant at the .001 level.

Table 2

Prevalence of Morbidities Among Mexican-Origin Elders Aged 65 and Older.

Panel A: Females														
	Total *N*'s		**Heart Attack**		**Stroke**		**Cancer**		**Hypertension**		**Arthritis**		**Diabetes**	
	USB	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**
Age-Group			**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
65–69	576	424	7.1	4.4	1.6	3.1	16.4	3.2***	49.5	51.2	52.0	47.4	37.0	24 2**
70–74	910	550	8.0	7.7	4.6	5.6	7.7	4.2**	51.5	57.0	52.5	55.1	32.2	23.7*
75–79	1,087	733	9.6	7.0	6.8	6.2	7.0	3.7**	61.5	64.4	60.9	63.3	33.5	29.8
80–84	1,005	795	6.6	9.3	7.3	4.6	8.7	6.6	65.3	66.0	63.0	65.8	36.5	31.7
85+	817	699	10.1	8.2	8.1	4.7	9.6	7.5	67.5	62.5	67.6	70.5	29.5	21.9
Panel B: Males														
			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
65–69	404	264	10.3	6.0	6.6	3.2	4.5	2.6	35.4	26.2**	23.3	30.8	27.8	24.0
70–74	627	461	13.9	5.5***	6.3	5.5	6.6	4.2	40.5	42.1	34.7	32.1	31.0	30.4
75–79	669	534	15.1	5.9	6.2	5.7	12.2	5.9	53.4	48.5	42.9	45.1	30.2	29.2
80–84	622	507	13.8	11.1	10.3	5.7	14.9	9.8	60.2	54.4	42.4	51.0	27.7	32.0
85+	393	458	14.6	13.3	7.3	5.4	8.7	9.4	55.5	56.3	53.2	52.8	27.4	23.5

Source. Hispanic Established Populations for the Epidemiological Study of the Elderly Waves 1–8: 1993–2013.

Note. Proportions are weighted. USB = U.S.-born; FB = foreign-born.

*Significant at the .05 level.

**Significant at the .01 level.

***Significant at the .001 level.

Table 3

Prevalence of ADL Disability Among Mexican-Origin Elders Aged 65 and Older.

Panel A: Females																		
	Total *N*s		**Any ADL**		**Walk**		**Bathe**		**Groom**		**Dress**		**Eat**		**Transfer**		**Toilet**	
	USB	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**
Age-Group			**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
65–69	577	426	5.6	3.1	2.4	1.9	4.4	2.3	1.2	1.5	1.9	2.6	0.4	1.1	2.2	2.0	1.0	1.8
70–74	910	550	8.7	11.9	5.5	8.0	5.3	6.0	2.6	2.9	4.4	5.3	1.8	1.3	5.0	5.4	3.2	4.4
75–79	1,090	736	19.3	25.2	13.2	17.3	11.2	15.6	4.9	6.6	7.3	11.2	3.1	3.5	12.3	15.6	6.3	8.9
80–84	1,009	795	28.0	27.6	18.5	18.6	18.3	18.8	5.6	7.3	8.5	12.3	2.9	3.4	14.6	15.6	9.3	9.8
85+	820	699	49.4	52.4	35.9	37.2	35.5	37.8	11.1	16.9***	17.5	22.1**	5.8	7.0	26.4	29.2	18.7	16.0
Panel B: Males																		
65–69	404	265	3.5	1.2	2.1	0.5	2.7	1.0	0.9	0.0	2.8	0.4	0.4	0.0	2.2	0.8	1.6	0.2
70–74	626	460	7.9	5.8	5.8	4.9	6.1	3.9	3.0	2.0	5.0	3.0	2.1	1.7	4.2	3.6	3.5	2.8
75–79	671	536	17.1	11.2	13.1	8.8	8.3	5.4	3.9	2.5	6.6	4.4	3.0	2.1	11.2	6.5	5.3	3.3
80–84	626	509	24.5	17.3	17.2	13.4	12.9	9.2	6.5	5.0	6.8	7.5	3.9	3.5	14.7	8.7*	8.6	6.2
85+	395	461	42.5	31.5	33.4	22.2	23.1	19.5	10.7	6.5	11.2	12.8	3.9	4.6	27.4	16.4*	12.3	11.2

Source. Hispanic Established Populations for the Epidemiological Study of the Elderly Waves 1–8:1993–2013 (Markides et al., 1997).

Note. Proportions are weighted. USB = U.S.-born; FB = foreign-born; ADL = activity of daily living.

* Significant at the .05 level.

** Significant at the .01 level.

*** Significant at the .001 level.

Table 4

Prevalence of IADL Disability Among Mexican-Origin Elders Aged 65 and Older.

Panel A: Females

	Total *N*s		**Any IADL**		**Tele**		**Trans**		**Shop**		**Meal**		**Lighthw**	
	USB	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**	**USB**	**FB**
Age-Group			**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
65–69	577	428	42.6	57.7***	2.7	3.9**	24.8	43.6***	12.2	10.4	4.0	2.7	6.8	5.1
70–74	913	549	45.0	58.7***	3.5	4.5**	24.3	41.4***	13.1	18.9**	6.5	5.4	8.0	9.0
75–79	1,092	735	57.5	69.1***	4.9	5.9*	33.2	47.2***	21.6	32.0***	10.1	12.8	12.7	16.0
80–84	1,009	797	75.5	78.7*	6.2	11.9***	44.2	57.6***	32.4	39.6*	13.5	18.3*	15.3	22.0**
85+	819	700	87.2	89.2*	12.7	19.8***	66.9	72.1**	55.9	61.6	32.3	38.8	30.1	36.8
	Total *N*s		Any IADL		Med		Money		Heavyhw		Stairs		HalfMile	
65–69	577	428	42.6	57.7***	1.8	3.1*	3.0	4.1	33.9	39.7*	15.9	15.9	19.7	14.5
70–74	913	549	45.0	58.7***	3.6	4.9	5.5	5.6	34.5	45.0*	20.6	22.7	22.9	22.1
75–79	1,092	735	57.5	69.1***	6.3	7.5	11.4	17.1***	46.0	56.2**	32.6	37.4	33.2	38.3
80–84	1,009	797	75.5	78.7*	7.9	14.0	14.0	24.7***	60.7	70.1***	44.0	47.2	45.4	49.0
85+	819	700	87.2	89.2*	21.1	28.2**	28.3	39.0***	77.5	83.3*	59.1	61.0	69.8	61.3*

Panel B: Males

	Total *N*s		Any IADL		Tele		Trans		Shop		Meal		Lighthw	
	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB
Age-Group			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
65–69	404	265	24.1	22.9	4.5	1.6	6.1	12.2	4.4	4.1	3.7	3.9	4.0	4.0
70–74	627	460	32.2	31.5	5.3	8.2	12.8	16.0	10.6	7.5	8.2	4.2	10.1	7.1
75–79	672	536	42.0	46.1	7.0	10.3**	17.1	22.1	13.4	14.0	11.3	12.6	11.3	11.0
80–84	627	509	59.0	56.8	8.5	13.0	23.3	30.8	16.4	19.7	16.1	18.5	15.9	21.8
85+	395	461	75.8	76.6	23.4	19.8	45.8	45.8	41.6	37.9	33.1	39.3	34.1	28.8
	Total *N*s		Any IADL		Med		Money		Heavyhw		Stairs		HalfMile	

Panel A: Females

	Total *Ns*		Any IADL		Tele		Trans		Shop		Meal		Lighthw	
	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB	USB	FB
Age-Group			(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
65–69	404	265	24.1	22.9	3.0	2.0	1.9	4.6	16.0	9.1	6.9	5.0	9.8	4.6
70–74	627	460	32.2	31.5	5.2	2.9	5.9	4.8	25.0	20.4	15.9	9.1	19.0	9.9***
75–79	672	536	42.0	46.1	5.4	7.2	9.7	13.5	34.2	34.1	24.4	18.1	25.1	19.5
80–84	627	509	59.0	56.8	9.2	11.9	17.6	14.4	49.1	43.4	31.5	28.5	30.0	28.1
85+	395	461	75.8	76.6	19.1	20.8	28.0	26.4	64.8	65.4	55.8	42.7**	59.1	47.8

Source. Hispanic Established Populations for the Epidemiological Study of the Elderly Waves 1–8: 1993–2013.

Note. Proportions are weighted. USB = U.S.-born; FB = foreign-born; IADL = instrumental activity of daily living.

*Significant at the .05 level.

**Significant at the .01 level.

***Significant at the .001 level.

Table 5

Risk Ratios Predicting ADL/IADL Disability Among Mexican-Origin Elders Aged 65 and Older, 1993–2013.

	Any ADL				Any IADL			
Predictor Variables[ab]	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Panel A: Females								
U.S.-born	0.94	0.98	0.97	0.96	0 89***	0.93**	0.93**	0.93*
Age								
70–74	2.37***	2.34***	2.15***	2.19***	1.07	1.06	1.02	1.03
75–79	5.09***	5.08***	4.54***	4.82***	1.34***	1.33***	1.27***	1.28***
80–84	7.45***	7.43***	6.44***	6.71***	1.65***	1.65***	1.56***	1.58***
85+	12.91***	12.72***	10.81***	11.13***	1.92***	1.89***	1.79***	1.81***
Education		0.98**	0.99	0.99		0.98***	0.98***	0.98***
Morbidities								
Cardio			1.30***	1.30***			1.16**	1.16**
Stroke			1.49***	1.45***			1.20*	1.19**
Cancer			0.99	1.00			1.07	1.07
Hypertension			1.18**	1.14*			1.09**	1.08*
Arthritis			1.66***	1.60***			1.251***	1.24***
Diabetes			1.42***	1.32***			1.18***	1.15***
Behaviors								
Smoke					1.10			1.06
Drink					0.91			0.96
Obese					1.67***			1.07*
Constant	.04***	.04***	.03***	.02***	.49***	.54***	.43***	.41***
N	7,612	7,579	7,432	7,408	7,619	7,585	7,438	7,414
Panel B: Males								
U.S.-born	1.20*	1.26**	1.22*	1.18*	0.96	1.03	1.02	1.02
Age								
70–74	2.52***	2.51***	2.36***	2.31***	1.28*	1.27*	1.26*	1.25*

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	Any ADL				Any IADL			
Predictor Variables[ab]	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
75–79	4.56***	4.50***	4.03***	3.94***	1.68***	1.66***	1.60***	1.61***
80–84	7.38***	7.23***	6.18***	6.09***	2.39***	2.35***	2.23***	2.25***
85+	13.68***	13.29***	10.97***	10.63***	3.12***	3.02***	2.84***	2.85***
Education		0.98	0.98*	0.98*		0.97***	0.97***	0.97***
Morbidities								
Cardio			1.21	1.18			1.31***	1.31***
Stroke			1.78***	1.73***			1.42***	1.41***
Cancer			1.19	1.17			1.15	1.15
Hypertension			1.25**	1.19*			1.07	1.05
Arthritis			1.41***	1.35***			1.21***	1.20***
Diabetes			1.46***	1.41***			1.25***	1.25***
Behaviors								
Smoke				1.09				0.99
Drink				0.90				0.94
Obese				1.64***				1.15**
Constant	.02***	.03***	.02***	.02***	.24***	.28***	.22***	.22***
N	4,953	4,914	4,802	4,793	4,956	4,917	4,805	4,795

Note. ADL = activity of daily living; IADL = instrumental activity of daily living.

[a]The reference categories in the logistic regression include (a) foreign-born persons and (b) persons 65–69 years of age.

*Significant at the .05 level.

**Significant at the .01 level.

***Significant at the .001 level.