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Will the Latino Mortality Advantage Endure?

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Abstract

Persons of Mexican origin and some other Latino groups in the US have experienced a survival advantage compared with their non-Latino white counterparts, a pattern known as the Latino, Hispanic or epidemiological paradox. However, high rates of obesity and diabetes among Latinos relative to whites and continued increases in the prevalence of these conditions suggest that this advantage may soon disappear. Other phenomena, including high rates of disability in the older Latino population compared with whites, new evidence of health declines shortly after migration to the US, increasing environmental stressors for immigrants, and high risk values of inflammatory markers among Latinos compared with whites support this prediction. One powerful counterargument, however, is substantially lower smoking-attributable mortality among Latinos. Still, it is questionable as to whether smoking behavior can counteract the many forces at play that may impede Latinos from experiencing future improvements in longevity on a par with whites.

Keywords

Latino; future survival; Hispanic paradox

The finding that life expectancy for Latinos is at least as high as that for non-Latino whites has been well-established in the demographic and epidemiologic literatures. The presence of this differential despite the much lower socio-economic status of Latinos has led researchers to refer to this pattern as the Latino, Hispanic or epidemiological paradox. This Latino mortality advantage, which is most pronounced among certain nationalities and regions (Mexicans, Central Americans and South Americans), middle and older age groups, and first-generation immigrants, has persisted over time (see, for example, Markides & Eschbach (2005)). Fenelon & Blue (2014) calculate that in 2010 life expectancy at age 50 was 3.5 years higher for Latino women and 2.9 years higher for Latino men compared with their non-Latino white counterparts – a mortality differential that increased since 1990. Recent US life tables by Latino origin, corrected for potential misreporting of age, race and ethnicity, reveal that the Latino population has higher life expectancy at almost every age than non-Latino whites (Arias 2010). The principal explanations for the Latino mortality advantage are (1) health-related migration to and from the US; and (2) social and cultural protection mechanisms, such as maintenance of healthy lifestyles and behaviors adopted in the countries of origin, and availability of extensive social networks in the US (Palloni and Arias 2004; Riosmena, Wong & Palloni 2013).

Despite this survival advantage, some chronic health conditions have been more prevalent among older Latinos than older non-Latino whites and have been worsening over time, suggesting that the survival advantage of Latinos may diminish in the coming decades. In this paper, we evaluate this possibility by exploring recent data on health status, health-related behaviors, physiological function, and social factors. We consider arguments both for and against an imminent reduction of the Latino mortality advantage. We consider six arguments that suggest that the Latino survival advantage will decline or, at minimum, is unlikely to increase: (1) obesity, (2) diabetes, (3) disability, (4) health declines associated with migration, (5) exposure to stressors, and (6) physiological dysfunction. We present only one counterargument, although a potentially powerful one: the prevalence of smoking.

Latinos comprise a large number of national groups, which vary substantially with regard to health status and immigration patterns (for example, Puerto Ricans have substantially higher mortality than non-Latino whites and are US citizens). Since about two-thirds of Latinos are of Mexican ancestry (Gonzalez-Barrera & Lopez 2013), studies on the health of Latinos often focus on persons of Mexican origin, and because Mexican Americans are one of the groups most likely to show the Latino survival advantage, we report findings for both Mexican Americans and Latinos as a single (albeit heterogeneous) group. As has been the convention in this literature, non-Latino whites form the comparison group for most of our assessments. For convenience, we refer to non-Latino whites simply as whites.

Arguments supporting a change in the Latino survival advantage

Scholars recognize the complexity of the health differentials between Latinos and whites: higher survival for Latinos despite a higher prevalence of several chronic health conditions, most notably obesity, diabetes and, more generally, disability. These health conditions are interrelated and current patterns suggest that, in the coming decades, Latino health in these areas is likely to worsen relative to whites.

Obesity

Until the past few years, the US had the questionable distinction of having the highest recorded adult obesity prevalence among countries with adequate data for assessment (see for example, OECD Health Data (2011)) – more than one-third of adults classified as obese (BMI ≥ 30), about twice the average for the OECD countries. That designation has now gone to Mexico, whose obesity prevalence slightly exceeds that of the US (United Nations 2013). Obesity rates within the US demonstrate a similar differential: Latinos as a group, and Mexican-Americans in particular, have higher levels of obesity than whites. For example, data from 2009–10 indicate a prevalence of obesity among adults of about 40% for Mexican Americans and 35% for whites (Flegal, Carroll, Kit, & Ogden 2010); the differential is even larger between Mexican American and white women (National Center for Health Statistics 2014a). Mexican children and adolescents are also more likely to be obese than their white counterparts (Kumanyika & Grier 2006). The causes of the underlying nutritional transition are well-known: increases in consumption of energy-rich processed foods and soft drinks, which are generally high in fats and sugars and replace healthier products such as fruits and

vegetables. At the same time, there have been substantial reductions in physical activity through changing occupations and leisure activities conducive to a sedentary life-style.

Migrant networks in the US have likely accelerated the speed of the obesity epidemic in Mexico. Children and adolescents in Mexico who have an extended family member in the US are more likely to become overweight or obese within a several-year follow-up period than those without such migrant networks, perhaps because of remittance income or because of diffusion of information about diets and behaviors prevalent in the US (Creighton, Goldman, Teruel, & Rubalcava 2011).

The net impact of increasing obesity in Mexico is likely to be altered patterns of obesity by nativity and generation in the US. Past studies have demonstrated that first-generation immigrants typically have lower rates of obesity than second or higher-generation immigrants and that the prevalence of obesity generally increases with length of immigrant residence in the US (see, for example, Oza-Frank & Cunningham (2010) and Singh, Siahpush, Hiatt & Timsina (2011)). Using data for Mexican-origin children and young adults, Buttenheim, Pebley, Hsieh, Chung, & Goldman (2013) speculate that this pattern is evolving: recent data from California show no evidence of lower overweight/obesity prevalence among immigrant youth compared to US-born Mexicans, suggesting that the so-called protective effect against obesity among recent or first-generation immigrants may no longer hold for Mexican-origin youth. More generally, immigrants from Mexico of all ages may soon face the same negative health consequences of obesity as their US-born counterparts.

Diabetes

Although the extent to which obesity poses higher mortality risks is a topic of considerable controversy (see, for example, Mehta & Chang (2011)), there is little debate regarding the negative consequences of obesity for a wide range of diseases and health limitations. Foremost among the conditions associated with obesity is type 2 diabetes; it is the most common form of diabetes among adults and is characterized by insulin resistance, partly as a result of excess fat. Diabetes is cited as one of the two leading causes of death in Mexico today, accounting for about 14% of recent deaths (World Health Organization 2014). This estimate stands in contrast to the US, where fewer than 3 percent of deaths are attributed to diabetes (Centers for Disease Control and Prevention 2014a). The frequency with which the underlying cause of death on a death certificate is attributed to diabetes may be overestimated in Mexico, leading to an exaggeration of this differential. For example, a study in Mexico by Hernandez et al. (2011), which examines concordance between the cause of death indicated on death certificates and the causes determined from medical records and physician consultation, concludes that Mexican physicians overstate diabetes as an underlying cause.

Despite the potential overestimate of diabetes-related mortality for Mexico, data indicate high rates of diabetes morbidity and diabetes-related hospital care for the Mexican population (Villalpando et al., 2010). Moreover, estimates in the US suggest much higher rates of both diabetes mortality and diabetes morbidity for Latinos, including Mexican Americans, than for whites. In 2010, the diabetes death rate was 50 percent higher for

Latinos than for whites: 27.1 vs. 18.2 per 100,000 (Centers for Disease Control and Prevention 2013). Studies that consider specific national-origin groups show rates for Mexican Americans that exceed those of most other Latino groups (Kposowa 2013; Smith & Barnett 2005).

Data on the incidence and prevalence of diabetes by ethnicity substantiate the Latino disadvantage. Age-adjusted rates of diagnosed diabetes among US adults in 2010–12, obtained from self-reports, were 12.8% among Latinos (13.9% among Mexican Americans), in contrast to 7.6% among whites (Centers for Disease Control and Prevention 2014b). The ethnic differential would be even higher with the inclusion of cases of undiagnosed diabetes (Smith 2007): based on tests for fasting glucose and glycosylated hemoglobin, undiagnosed diabetes occurs at about twice the rate for persons of Mexican origin as for whites (National Center for Health Statistics 2014b). This differential is not present for type 1 diabetes, a form of diabetes, unrelated to obesity, in which the body fails to produce sufficient insulin. For example, whereas, Latino children and adolescents experience incidence rates of type 2 diabetes about three times as high as whites, incidence rates for type 1 diabetes are substantially higher among whites (Writing Group for the SEARCH for Diabetes in Youth Study Group 2007). Gestational diabetes, which poses a risk of type 2 diabetes not only for the pregnant woman but also for her offspring, is more prevalent among Latinos, particularly foreign-born Mexicans, than whites (Hedderson, Darbinian & Ferrara 2010). Although methodological issues prevent clear assessments of trends in gestational diabetes, the available data suggest that the overall rates have been increasing, a trend which does not bode well for future generations (Ferrara 2007).

A relevant question with regard to the future of the Latino survival advantage is whether obesity and diabetes rates have increased more rapidly for Latinos than for whites. With regard to obesity, the prevalence among adults has increased substantially for Mexican American and for white adults to a similar extent. For example, the prevalence increased from 12.4% to 34.8% among white males from 1976–80 to 2009–12, while that for Mexican origin males increased from 16.0% to 41.0% over the same period (National Center for Health Statistics 2014a). The same is generally true for children and adolescents: obesity rates have been consistently higher for Mexican Americans than for whites, but the pace of increase has been comparable for the two groups (National Center for Health Statistics 2014c).

With regard to diabetes, both Mexican Americans and whites experienced an increase in prevalence over the past two decades but the increase is slightly higher in absolute (but not relative) terms for Mexican Americans. For example, the prevalence of physician-diagnosed diabetes grew from 5.1% to 6.7% for whites and from 9.8% to 12.3% for Mexican Americans over the period from 1988–94 to 2007–10 (National Center for Health Statistics 2014b). In a study of trends in metabolic syndrome among US adults from 1999 to 2010 based on data from the National Health and Nutrition Examination Survey (NHANES), Mexican American men were found to have the most rapid rate of increase in the prevalence of hyperglycemia (defined as elevated levels of fasting plasma glucose) among all subgroups (Beltrán-Sánchez, Harhay, Harhay & McElligott 2013).

Higher prevalence rates for obesity and diabetes do not fully reveal the greater risks of complications, disability and mortality Latinos face. In particular, lower quality health care, lack of health insurance, and poor glycemic control among Latino diabetics are likely to exacerbate chronic problems resulting from obesity and diabetes, increasing the probability of severe limitations, disability and mortality for this group. Although relative rates of complications from diabetes vary across ethnic groups, Latino diabetics appear to have the highest rates of nephropathy, retinopathy and cardiovascular disease (Osborn, de Groot & Wagner 2013). Poorer glycemic control (e.g., higher levels of glycosylated hemoglobin) among Latinos as compared with whites likely results in increased risk of vascular complications (Kirk et al., 2008; Stratton et al., 2000; National Center for Health Statistics 2014b). An analysis of the quality of care received by Latino diabetics finds that Latinos are less likely than whites to self-monitor their disease and to receive appropriate diabetes-related quality of care (Mainous, Diaz, Koopman & Everett 2007). Much lower rates of health insurance among Latinos compared with other ethnic groups, lack of a usual health care provider and poor access to quality medical care almost certainly underlie many of these differentials as well as diabetes-associated risks of disability and mortality (Schneiderman et al., 2014; Stratton et al., 2000; Mainous, Diaz, Koopman & Everett 2007).

We limit the discussion of chronic disease in this paper to diabetes because the prevalence rates for many other major diseases – heart disease, cancer, stroke, bronchitis and emphysema – are lower for Latinos than for whites (National Center for Health Statistics 2014d; Crimmins, Kim & Vasunilashorn 2010). Whereas some of these differences may result from lower rates of smoking among Latinos (discussed below), others are likely due to misreporting issues. Most national estimates of ethnic disparities in morbidity are based on self-reports of (diagnosed) disease, obtained from such sources as the National Health Interview Survey (NHIS) or NHANES. Lower rates of utilization of providers and health care facilities among Latinos compared with whites undoubtedly result in fewer diagnoses and subsequently lower rates of reporting for many diseases. Whereas diabetes reports may suffer from similar problems, studies in diverse settings have shown relatively high accuracy for self-reports of diabetes compared with other conditions (Huerta, Tormo, Egea-Caparrós, Ortolá-Devesa & Navarro 2009; Goldman, Lin, Weinstein & Lin 2003; Bowlin, Morrill, Nafziger, Lewis & Pearson 1996). Moreover, the severity of symptoms at advanced stages of diabetes is likely to require medical intervention, thus increasing the chance that respondents report the disease, and the availability of data on undiagnosed diabetes further improves the accuracy of the estimates.

Disability

Obesity and diabetes are each strongly linked to declines in functional ability and disability. Given the relatively high prevalence of obesity and diabetes among Latinos along with low rates of health insurance, lack of regular providers, and limited access to high quality health care, it is perhaps not surprising that Latinos have higher rates of disability than whites. Nevertheless, this disjuncture has presented a puzzle to researchers in light of the Latino survival advantage and the typically strong links between disability and mortality. In a recent paper, Hayward, Hummer, Chiu, Gonzalez-Gonzalez, & Wong (2014) use data on limitations with regard to activities of daily living to demonstrate that both foreign-born and

US-born Latinos experience higher rates of disability than whites. They calculate that the consequence of the Latino mortality advantage coupled with their disability disadvantage is that Latinos can expect to live more of their older years with a serious disability than whites: more than six years lived with a disability at age 65 among Latinos in contrast to fewer than four years among whites. Markides, Eschbach, Ray, & Peek (2007) find consistent results based on different data and measures of disability: with only one minor exception among foreign-born women, both foreign- and native-born Latinos over age 65 experience higher rates of disability in each of five domains (sensory, physical, mental, self-care, and going outside the home) than whites and considerably higher rates of overall disability.

Since disability is generally viewed as the consequence of functional impairments resulting largely from chronic disease, and since Latinos appear to have a lower prevalence of several major chronic diseases than whites including heart disease (see, for example, Crimmins, Hayward, & Seeman (2004)), their higher disability rates pose another conundrum. Hayward, Hummer, Chiu, Gonzalez-Gonzalez & Wong (2014) speculate that high disability rates among Latinos may be driven more by physically demanding and dangerous occupations and poor living conditions and perhaps less by chronic disease in comparison with other ethnic groups. Whether or not this is the case, increasing rates of obesity and diabetes, in conjunction with inadequate health care, are very likely to result in higher disability rates for Latinos in coming years. Data on trends in disability by ethnicity are scarce and subject to various data problems (particularly consistency over time in definitions of ethnic groups and disability as well as sample size considerations). But, there is some evidence to suggest that disability rates (measured as self-care, social activity or work limitations) among older Latinos have risen over the past 15 years whereas they have declined among whites (National Center for Health Statistics 2014e), providing some support for a future erosion of the Latino survival advantage.

Health Declines Associated with Migration

One hypothesis for the Latino survival advantage is that Latinos, especially immigrants, have more favorable health behaviors, risk factors, and health outcomes than whites because of their cultural practices (e.g., dietary preferences), but, with increasing assimilation to mainstream US culture, they adopt less healthy lifestyles and their health worsens (see, for example, Abraido-Lanza, Chao, & Florez (2005); Lara, Gamboa, Kahramanian, Morales, & Bautista (2005)). Many – but not all – studies have provided some support for this hypothesis, typically by comparing health-related behaviors between Latino immigrants of different durations of residence in the US or between immigrants and US-born Latinos. Very few of these studies include any information on pre-migration health, making it impossible to determine when health deterioration begins. Moreover, few studies have had longitudinal data to follow cohorts of immigrants over time, instead relying on problematic comparisons across different cohorts. In a recent paper, Goldman et al. (2014) use data from two rounds of the Mexican Family Life Survey (MxFLS) to assess directly how the health of immigrants changes in the period immediately after migration. Short-term changes in health for Mexicans who migrated to the US between 2002 and 2005 are compared to those for persons who remained in Mexico. The results show that the health of recent migrants is much more likely than that of non-migrants to have declined in the year or two after

migration, whereas both groups are about equally likely to have experienced improvements in health. Thus, overall, it appears that the process of migration and/or the migrants' experience during the immediate post-migration period detrimentally affects the health of Mexican immigrants to the US.

Unfortunately, the limited set of health questions asked of migrants in the second wave of MxFLS provides no information regarding what aspects of immigrants' health deteriorated during the migration period. An analysis of data from the Mexico Migration Project (MMP), which is based on interviews of return migrants, suggests that both mental and physical health may decline during immigrants' time in the US: Ullmann, Goldman, & Massey (2011) find that, although return migrants from the US had better early life health than Mexicans who never migrated, in later adulthood they had a higher prevalence of both heart disease and emotional/psychiatric disorders. Still the evidence from the MMP is indirect since less healthy individuals may have been more likely to return to Mexico (a pattern of selective migration known as the "salmon bias"), and their health status may have declined gradually over their time in the US rather than close to the time of migration.

The speed of the health decline reported by Goldman et al. (2014) suggests that the acculturation process, which typically takes place over many years, is unlikely to account for much of the short-term decline in migrant health. It seems more plausible that the process of border crossing for undocumented immigrants, now more costly and dangerous than in past years, along with difficulties in finding suitable work, lodging, and health care after arrival in the US, play an important role. The move to the US likely entails many stressors, particularly among undocumented immigrants who comprise over half of migrants from Mexico (Passel, Cohn, & Gonzalez-Barrera 2012). Although some stressors may diminish after the move, others may increase or continue to affect the health of Latino immigrants and US-born Latinos, perhaps more so than whites, for much of the life course.

Impact of stressful experience

A huge literature examines the effects of stressful experience on physical and mental well-being. Chronic stressors are believed to have wide-ranging physiological impacts, resulting in dysfunctions in the neuroendocrine, immune, metabolic and cardiovascular systems (see, for example, Juster, McEwen, & Lupien (2010)). These physiological changes in turn are thought to increase the risk of a broad set of chronic health conditions, including heart disease, cancer, diabetes, cognitive impairment and depression, as well as survival (Juster, McEwen, & Lupien 2010; McEwen & Stellar 1993). The negative impacts of stressors appear to operate not only through experiences typically identified as stressful but also through individuals' appraisals of potentially threatening events, which affect their psychological, behavioral and physiological responses (Cohen, Kessler, & Gordon 1977).

The lives of many Latinos in the US involve a large number of stressors, including both life events and psychosocial factors. The most obvious stressor is the illegal and dangerous border crossing undertaken by undocumented migrants, who, if successful, then face anxiety about possible apprehension and deportation. But other stressors are plentiful and are likely to be present long after the border crossing. Immigrants often leave close family members behind in their home countries, including spouses and children. They generally face

difficulties finding employment, locating housing, accessing health care and coping with a new language. Working and housing conditions are often sub-standard, education levels low and poverty levels high (Passel & Cohn 2009). Health insurance through the Affordable Care Act is unavailable to undocumented immigrants and, for this and other reasons, Latinos continue to have the lowest health insurance rate among racial/ethnic groups in the US (Hummer & Hayward 2015). The term “acculturative stress” underscores these and other stressful experiences encountered by immigrants as they adapt to US society. In addition, discrimination has been shown to negatively affect both the mental and physical health status of immigrants including Latinos (Finch, Hummer, Kolody, & Vega 2001).

The most relevant issue for this paper is whether these stressors have been increasing over time or are likely to increase in the near future for Latinos. Although no data bear directly on the magnitude of stress that individuals are subject to over time, there is evidence that some challenges faced by immigrants have been on the rise: US-Mexico border crossings have become more costly and dangerous (Gathmann 2008), increased enforcement has led to more deportations of migrants to Mexico (Lopez, Gonzalez-Barrera, & Motel 2011), family members of immigrants are being left behind in Mexico for longer periods than in the past (Dreby 2010), and the political climate in the US has become increasingly hostile to immigrants through such mechanisms as local anti-immigrant ordinances and enforcement of federal immigration law (Hopkins 2010). In addition, the majority of Latino immigrants see their situation as having worsened over time and many now worry about deportation for themselves or someone they know (Lopez & Minushkin 2008). Thus, it is plausible that the physiological consequences of these experiences and anxieties will increase in the ensuing years.

Physiological Markers

Comparable estimates for Latinos and whites on multi-system biomarkers associated with stressful experience and chronic disease are rare. Estimates for metabolic and cardiovascular parameters from the Health and Retirement Study show a generally similar prevalence of high blood pressure and abnormal levels of cholesterol between Latinos and whites; however, not surprisingly in light of their much larger prevalence of diabetes, on average Latinos have much higher values of glycosylated hemoglobin (Zhang, Hayward, & Lu 2012). Based on NHANES data on five components of metabolic syndrome, Beltrán-Sánchez and colleagues find that, in addition to higher levels of blood glucose, Mexican-Americans have a higher prevalence of low HDL cholesterol and high triglycerides than other ethnic groups (Beltrán-Sánchez, Harhay, Harhay & McElligott 2013). Part of this differential may result from lower use of medication, including lipid-lowering drugs, among Latinos (Beltrán-Sánchez, Harhay, Harhay & McElligott 2013; Crimmins, Kim & Vasunilashorn 2010).

Using similar data from NHANES, Crimmins and colleagues examine ethnic differences in ten physiological markers linked to chronic disease and survival, grouped into categories of blood pressure, metabolic and inflammation risk (Crimmins, Kim, Alley, Karlamangla & Seeman 2007). They report that Latinos as a whole, as well as Mexican Americans, have significantly higher risk than whites for all three groups of parameters, although some of the

differences diminish and become insignificant with controls for social and demographic variables. Of particular interest for future survival are the higher risks of inflammation for Latinos and Mexican Americans. A growing body of literature has identified inflammatory markers as especially important for survival among middle-aged and older adults, more notable than standard clinical markers of cardiovascular and metabolic disease (Glei, Goldman, Rodriguez, & Weinstein 2014; Goldman, Glei, Lin, & Weinstein 2009). There is also substantial evidence that exposure to stressful experience is linked to higher inflammation risk (for reviews, see Segerstrom & Miller (2004); Zorrilla et al. (2001)). These findings suggest one of the many possible pathways linking stressful lives to higher morbidity and mortality among Latinos in the coming years.

Smoking

We have put forth an extensive set of arguments predicting a future decline in the Latino survival advantage. Some of these arguments also suggest that, contrary to the data, Latinos should have had little longevity advantage in the recent past. However, Latinos have had one major health advantage over whites – a lower prevalence of smoking. Fenelon and Blue use data on lung cancer death rates to estimate that, from 1990 to 2010, smoking-attributable deaths accounted for over half of the difference in life expectancy at age 50 (e_{50}) between Latinos and whites (Fenelon & Blue 2014). Over this period, they estimate that the contribution of smoking behavior to the Latino-white gap in e_{50} increased for women, although not for men.

Since these estimates of smoking-attributable mortality are based on deaths rather than smoking behavior in a given period, they implicitly reflect smoking patterns over the preceding decades (e.g., lung cancer induced by smoking generally takes many years to develop clinically). Likewise, current smoking patterns have implications for mortality in the ensuing decades. Recent data show that Latinos are considerably less likely to smoke than whites: the latest estimates (2013) indicate that the prevalence of cigarette smoking among adults (18+) is 19.5% among whites in contrast to only 11.4% among Latinos (Centers for Disease Control and Prevention 2013). This Latino-white difference reflects a relatively modest differential for men but a very large one for women. Mexican Americans are both less likely to smoke cigarettes than other Latinos (considered as a single group) and to have lower daily cigarette consumption (Fenelon, 2013).

Latino youth (ages 12–17) also appear to be considerably less likely to smoke cigarettes than white youth (U.S. Department of Health and Human Services 2014) – a future advantage for Latinos since smoking behavior is often adopted at young ages and maintained in adulthood. In a recent survey that compares use of various tobacco products across racial and ethnic groups for young adults (ages 18–34), Lariscy et al. (2013) distinguish between foreign- and US-born Latinos. Cigarette use is lower among foreign-born Latinos (both men and women) than their white counterparts, but the results are less clear for US-born Latinos. The findings suggest that current cigarette smoking (as well as several other forms of tobacco use) among US-born Latino males is higher than for white males, but use among US-born Latino females is lower than for white females. However, because of relatively small sample sizes, even substantial differences between US-born Latinos and whites are not statistically

significant with one exception: US-born Latino males are more likely than white males to report being social or occasional smokers.

Thus, unless Latinos experience a substantial rise in smoking intensity or prevalence compared with whites – if, for example, social smokers become regular or heavy users – Latinos are likely to have lower mortality attributable to smoking than whites in the coming years. Steeper declines in smoking among Latinos than whites could, in theory, lead to an increasing survival advantage among Latinos. A widening advantage could also emerge if Mexico were to experience very rapid declines in smoking – likely greater than the reductions reported for the past decade or two (Christopoulou, Lillard, & Balmori de ola Miyar 2013; Waters, Saenz de Miera, Ross, & Reynales Shigematsu 2010) – and the resulting low smoking rates extended to immigrants. Although Mexico has enacted restrictive anti-smoking policies in recent years, including limits on marketing activities, banning of smoking in public places, and progressively higher taxes on cigarettes (Euromonitor International 2014), the current prevalence of smoking in Mexico is similar to that in the US (Waters, Saenz de Miera, Ross, & Reynales Shigematsu 2010; Centers for Disease Control and Prevention 2014c).

Other Mechanisms

There are other plausible mechanisms for a diminishing longevity advantage among Latinos, but many of these are either highly speculative, do not bear directly on changing health patterns of Latinos in the US, or reflect composition effects. It is particularly difficult to make predictions for a *differential* between two groups. For example, the Latino survival advantage could decline because of stagnation in expected improvements in their health and survival – owing to some of the causes described above – or because of greater-than-anticipated improvements for whites. Moreover, Latino health status is determined in part by the health of new immigrants from Mexico, Central America and South America. Changes in health-related behaviors, such as smoking, diet and exercise, in the sending countries would in all likelihood affect the health and survival of immigrants to the US.

Changing patterns of selective migration would also impact the survival advantage, boosting it if future migrants are considerably healthier (or of higher socioeconomic status) than their predecessors and reducing it if future migrants are less well-off. Reductions in the immigration rate from Mexico to the US over the past decade (Passel, Cohn, & Gonzalez-Barrera 2012), resulting from changes in immigration laws, border enforcement and the economies of both Mexico and the US, may have altered the health selectivity of migrants, although there are few findings that shed light on the nature of the changes. One exception is Villarreal (2014), who suggests that a reduction in the demand for labor in some US industries during the Great Recession resulted in a more positive education selectivity of young immigrants from Mexico. Declining rates of immigration could have an additional impact on the future health of Latinos by changing the composition of the Latino population: increasing the proportion of the Latino population that is US-born, a group with higher morbidity and mortality risks than their immigrant counterparts (Hummer and Hayward 2015). Changes in the proportion of migrants that are undocumented could also influence the subsequent survival of Latinos, particularly since economic and social marginalization of

the undocumented likely impacts not only the well-being of the migrants themselves but also their children and even grandchildren (Bean, Bachmeier, Brown, Van Hook & Leach 2014).

Conclusion

Can we be confident that the Latino survival advantage will wane in the coming decades? It seems quite likely that Latino disability rates will increase relative to those of whites, driven in part by obesity, diabetes and associated complications of these conditions. Will mortality patterns follow suit? Although mortality is strongly associated with disability, Latinos have already been experiencing a disability disadvantage coupled with a survival advantage, so it is possible that the survival advantage can be maintained. However, a continuation of lower death rates in middle and older ages among Latinos compared with whites rests heavily on differentials in smoking behavior between the two groups. It is questionable as to whether lower smoking-attributable mortality can counteract the many forces at play that may impede Latinos from experiencing improvements in longevity on a par with whites.

Still, there are many potential influences on the future survival of Latinos and whites. Some, but not all, of these have been explored in this paper, although often with sparse or inconclusive data. The increasing availability of longitudinal survey data, both in Latin America and the US, should allow researchers to provide additional insights regarding changes in migration patterns, health-related behaviors and utilization, health status, residential mobility, and social support, each of which may affect the future longevity of Latinos. Changes in immigration policy, such as provision of pathways to legalization or citizenship for undocumented migrants, could also have a substantial impact on the future health and survival of Latinos through many of the pathways described above.

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Biography

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