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Rethinking the Hispanic Paradox: The Mortality Experience of Mexican Immigrants in Traditional Gateways and New Destinations

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Abstract

Mexican immigrants enjoy a substantial mortality advantage over non-Hispanic whites in the US, although their health declines with greater duration of residence. Many previous studies have suggested this advantage reflects higher levels of social support among Mexicans in enclave communities with high co-ethnic density. As the Mexican-origin population in the US has grown, it has expanded outside traditional gateway cities in California and Texas to new destinations throughout the US, and it has become increasingly important to understand how settlement in new destinations impacts the health of Mexican immigrants. This study examines the mortality outcomes of Mexican immigrants in *Traditional Gateways* versus *New* and *Minor Destinations* in the US. Using a nationally-representative survey with mortality follow-up the analysis finds that Mexican immigrants in new and minor destinations have a significant survival advantage over their counterparts in traditional gateways. This advantage largely reflects the mortality benefits of living in communities with smaller and less-established Mexicans immigrant communities, a finding that runs in contrast to prior work on the protective effects of immigrant enclaves. The results suggest that future research must reevaluate the relationship between neighborhood ethnic composition, social support, and immigrant health.

A wealth of recent studies demonstrate that the Hispanic-origin population in the United States experiences lower adult mortality rates than the non-Hispanic white population, despite lower average socioeconomic status among Hispanics. The “Hispanic Paradox” refers to the fact that Hispanics resemble African-Americans in terms of socioeconomic indicators but non-Hispanic whites in health and mortality indicators (Hummer et al., 2000, Markides and Eschbach, 2011). Although the earliest empirical findings demonstrated this for Hispanics as a whole, subsequent work demonstrates that the pattern varies significantly by country of origin and place of birth, with perhaps the most consistent advantage observed for Mexican immigrants (Palloni and Arias, 2004, Hummer et al., 2000, Fenelon, 2013). In spite of this advantage, the health of Mexican immigrants deteriorates with a greater amount of time spent in the United States, and is significantly worse for second- and third-generation individuals of Mexican-origin (Acevedo-Garcia et al., 2010). Although the specific reasons for this pattern are subject to debate, the fact that exposure to the US context reduces the advantage of Mexican immigrants is well-established (Riosmena et al., 2014, Antecol and Bedard, 2006).

The migration history of Mexican-origin arrivals in the United States is strongly patterned by geography. Established destinations for Mexican immigrants have traditionally been concentrated in the border states of California, Arizona, and Texas, although a few other destinations such as Chicago have been longstanding receiving areas. Many previous studies of the health and mortality advantage of Mexican immigrants in the US rely on the protective effects of ethnic enclaves, asserting that social support in dense Mexican communities promotes good mental and physical health for immigrants (Markides and Eschbach, 2005, Eschbach et al., 2004, Cagney et al., 2007). More recently, Mexican-origin populations have grown rapidly in areas with previously low immigrant presence. In-migrants to new destinations such as Atlanta, Georgia, Charlotte, North Carolina, and Columbus, Ohio have altered the regional demographic patterns of the United States and have expanded populations of Mexican immigrants outside the traditional gateway enclaves in the Southwest (Hall, 2013). This process is significant for understanding how communities with little previous experience with incoming migrants respond to new arrivals, and how immigrants respond to destinations without established ethnic enclaves or well-developed Hispanic community infrastructure (Zúñiga and Hernández-León, 2006, Massey, 2008). Although much of the research on new destinations for Mexican immigrants has sought to describe and explain new destination growth (Riosmena and Massey, 2012), the process of immigrant expansion itself provides us a unique opportunity to clarify the relationship between co-ethnic density, social support, and health as the diversity of immigrants' social contexts increases (Waters and Jiménez, 2005).

This study examines the mortality experience of Mexican[1] immigrants in the United States in *traditional*, *new*, and *minor* destinations using a nationally-representative population-based survey. Results show that Mexican immigrants living in new and minor migration destinations tend to have a larger mortality advantage over their counterparts in traditional gateways and over non-Hispanic whites. The analysis demonstrates that Mexican immigrants experience more favorable mortality outcomes in destinations with smaller and less-established immigrant communities, which explains the majority of the new and minor destination advantages. The results run in contrast to previous findings asserting that Mexicans receive a health benefit of living in communities with large numbers of other Mexicans, and indicate that researchers must rethink the concepts of community context, social support, and ethnic density in the context of the health of Mexican immigrants.

Background

Explaining the Hispanic and Immigrant Mortality Advantages

The literature on the Hispanic mortality advantage offers two broad sets of explanations: migration effects, and cultural effects. Since the majority of Hispanics over age 18 were born outside the United States (US Census Bureau, 2010), the migration effects explanation draws attention to the selective processes that determine who comes to the US as well as who remains in US over time (Palloni and Arias, 2004). Although this explanation is

[1]The United States will be referred to as "foreign-born Mexicans" or "Mexican immigrants". "US-born Mexicans" refers to individuals of Mexican origin born in the United States. The term "non-Hispanic whites" refers always to US-born white individuals who are not of Hispanic origin.

attractive, it cannot explain the deterioration of the advantage with greater time spent in the US, and many recent studies adopt a cultural-behavioral approach. Characteristics of Hispanic culture and communities may contribute to better health and lower mortality for particular subgroups. Indeed, Hispanics in the United States may uniquely benefit from strong community support and social networks that can help to buffer them from some of the negative effects of low socioeconomic status (Gallo et al., 2009). The contribution of neighborhood ethnic composition to the mortality experience of Hispanics, particularly Mexicans, has received considerable attention. Although evidence has been somewhat mixed (Palloni and Arias, 2004), researchers have generally agreed that Hispanics benefit from living around other Hispanics (Eschbach et al., 2004, LeClere et al., 1997, Ostir et al., 2003). In Chicago neighborhoods, community social cohesion and self-efficacy is associated with reduced risk of asthma for Hispanic immigrants (Cagney et al., 2007). Scholars suggest that this patterns reflects the maintenance of beneficial social, cultural, and behavioral characteristics in close-knit community enclaves (Markides and Eschbach, 2005, Osypuk et al., 2009). However, it remains unclear whether and how this process might differ across immigrant destinations.

The Rise of New Destinations

Research devoted to new immigrant settlement patterns in the 1990s has largely focused on explaining the expansion of immigrant populations beyond traditional gateway cities. *Traditional* gateways are typically considered to be those cities with relatively longstanding (since the 1970s) populations and in which immigrant communities developed in enclaves (Singer, 2004). The term “gateway” refers to their function as large-scale receiving “points of entry” for new international migrants, while migration to new destinations typically involved secondary moves (Lichter and Johnson, 2009). *New* destinations refer to areas that have experienced growth more recently, and although immigrant populations may be somewhat large, they are less established. In more recent years, there has been an increase in the fraction of new destination migrants coming directly from the country of origin (Ellis et al., 2014). While traditional destinations tend to have substantial immigrant-oriented infrastructure, new destinations experienced growth prior to the development of these communities and networks (Park and Iceland, 2011). Mexican-origin populations have also grown in *minor* destinations, such as the micropolitan and non-metropolitan areas of the South and Midwest, although this growth has been more recent and the local Mexican immigrant populations are smaller compared to new destinations (Kandel and Parrado 2005). There has been increased interest in the immigrant experience in non-traditional destinations, both in terms of residential and labor market outcomes as well as the processes of assimilation (Waters and Jiménez, 2005).

Immigrant Destinations and Health

The assimilation process depends on the characteristics of both the immigrant group and the destination, and examining the health of Mexican immigrants by the characteristics of their destinations can be informative (Waters and Jiménez, 2005). Immigrant incorporation into the United States involves both cultural assimilation as well as integration into the American racial classification system (Portes, 1997, Rumbaut, 1994). New immigrants, especially those from Latin America, may face racial discrimination, residential and occupational

segregation, and new panethnic classifications that may conflict with individual identities (Frank et al., 2010). The process of adaptation and integration for new arrivals likely differs across destination types, as does the construction of ethnic identity for immigrants and their children (Tienda and Fuentes, 2014).

Traditional perspectives on the Hispanic mortality advantage in the United States imply that aspects of Hispanic communities, particularly those of dense ethnic enclaves, contribute to Hispanics' favorable health and mortality outcomes (Palloni and Arias, 2004, Markides and Eschbach, 2005). This literature holds that co-ethnic populations, strong community networks, and immigrant organizations—characteristics typically associated with traditional gateways—provide a necessary source of social support for new arrivals and may protect immigrants from some of the negative effects of socioeconomic disadvantage (LeClere et al., 1997). Indeed, the mere social fact of larger minority populations in traditional gateways may shelter immigrant communities somewhat from labor market or housing discrimination (Ebert and Ovink, 2014). Social isolation may be less severe, or its effects less pronounced, in traditional receiving cities, particularly if social infrastructure geared towards Mexican communities is well-established (Leach and Bean, 2008). As Mexicans move to new and minor destinations without large co-ethnic communities, it is possible that they may forfeit the benefits of social and community support that come with traditional immigrant gateways (Lichter and Johnson, 2009).

Alternatively, the processes surrounding social support in Mexican communities in the US may operate differently in new destinations in response to the lack of existing immigrant infrastructure, communities, and networks (South et al., 2005). It is unclear whether current new and minor destination communities are similar to those of traditional destinations at earlier stages in the migration history of the United States (Singer, 2004). While traditional gateways may provide large co-ethnic communities (Gallo et al., 2009), new and minor destinations may offer stronger and more close-knit networks of family and friendship ties. Smaller co-ethnic populations in new destinations may lead to increased interaction between immigrants and non-Hispanic whites, inter-group friendships, and diverse work environments (Brown, 2006), but may also lead new destination arrivals to seek strong co-ethnic outlets to avoid isolation. Indeed, immigrants in new destinations may actively seek stronger social ties, and such ties may be strengthened by the relative isolation in destinations with little previous experience with immigrant incorporation (Hall and Stringfield, 2014). Furthermore, many immigrants in new destinations may maintain strong transnational ties, owing in part to the recency of immigration of many Mexicans in new destinations (Bloemraad et al., 2008). Thus, social support may be similarly strong in new and destinations, but it may manifest in ways different from those expressed in traditional ethnic enclaves, reflecting stronger micro-level social ties compensating for the weaker macro-level support (Levels et al., 2008).

Immigrant destinations may also have impacts on immigrant health through other pathways. For example, there are reasons to believe that the economic stratification is less strong in non-traditional destinations, particularly if expanded economic opportunities in new industries attract migrant growth (South et al., 2005, Kandel and Parrado, 2005). Some evidence indicates that immigrant workers receive greater earning-returns to human capital

in new destinations (Sanders and Nee, 1987, Kesler and Hout, 2010), and that employers in new destinations have worked to actively recruit Hispanic immigrants to their labor pools (Johnson-Webb, 2003). Expanded economic and employment opportunities for migrants in new and minor destinations may have positive benefits for health and provide economic stability that can help compensate for the uncertainty Mexicans face in unfamiliar locations (Leach and Bean, 2008). Individuals or families who migrate to new and minor destinations may also have more favorable socioeconomic or health profiles than those who move to traditional gateway cities, similar to the logic of the "healthy migrant effect" (Lindstrom and Ramírez, 2010). The lack of existing migration streams, both in terms of people as well as information, raises the initial difficulty of migration, and may thus select for migrants with more human capital (McConnell, 2008).

Established communities in traditional gateways can also work to integrate new arrivals into US culture and society. Spatial assimilation perspectives underscore the importance of understanding immigrant adaptation as a two-sided process, involving the relationship between the immigrant group and the receiving destination (Waters and Jiménez, 2005, Alba and Nee, 1997). Upon arriving to traditional gateway cities, new immigrants encounter large Mexican-origin communities who have been in the United States for varying amounts of time and are at various stages in the cultural and behavioral assimilation process (Massey, 2008). This will be particularly true if second and third generation Mexican-origin individuals can bridge some of the linguistic and cultural gaps that would otherwise isolate new immigrants and protract assimilation (Zúñiga and Hernández-León, 2006, Waters and Jiménez, 2005). In new and minor destinations, however, isolation from large co-ethnic communities may slow the convergence to native-born norms, especially if residential barriers are combined with social and linguistic isolation (Flippen and Parrado, 2012, Pfeffer and Parra, 2009). Existing populations in new destinations may also be reluctant to incorporate immigrant arrivals given lack of prior experience with outsiders (Viruell-Fuentes et al., 2012). Although these processes may have negative effects on socioeconomic attainment for immigrants in non-traditional destinations, they may have health benefits.

Data and Methods

Data

This paper uses data from the restricted-use National Health Interview Survey (NHIS) Linked Mortality Files (LMF) covering the period 1990–2009 with mortality follow-up through the end of 2011. NHIS is a large nationally-representative health and demographic survey collected in annual cross-sections by the National Center for Health Statistics. NHIS-LMF matches deceased individuals to mortality vital statistics through stochastic linkage to the National Death Index (NDI). The survey years 1990–2009 were chosen because they contain complete information on Hispanic origin and nativity status. The restricted-use version of NHIS-LMF provides information on US state and county of residence at the time of interview for all respondents, which allows respondents to be linked to contextual information from the US Census. Respondents are assigned to a destination type by metropolitan area of residence, for which the smallest divisible unit is county.

Sample

A substantial benefit of NHIS is the large and nationally representative sample. Pooled each year between 1990 and 2009, the total sample becomes large enough to obtain stable estimates for Hispanic subgroups by nativity, country of origin, and US destination. The analytic sample includes all individuals aged 25 or above at baseline with available information on the covariates. To ameliorate some of the problems with left censoring, individuals 18–24 are not permitted to age into the analytic sample, partially because individuals under age 18 at baseline are not eligible for interview and thus cannot enter the sample even if they reach 25 during follow-up. The primary focus is on the comparison between US-born non-Hispanic whites, US-born Mexicans, and foreign-born Mexicans. The total sample includes 825,107 individuals and more than 150,000 deaths observed through 2011.

Destination Type

The distinction between traditional and new destinations is a well-studied question (McConnell, 2008), and migration researchers have taken a few different approaches to classifying places, mostly with respect to metropolitan areas. The most common approach involves classifying destinations as a function of the number and proportion of immigrants in the metropolitan area and the rate of growth of the foreign-born population (Singer, 2004, Fischer and Tienda, 2006). Although many previous classifications have categorized immigrant gateways and destination types irrespective of immigrant country of origin, more recent work has developed group-specific destination typologies. This is an important distinction, because not all historical immigrant gateways are destinations for all groups (i.e. New York is a traditional immigrant gateway, but not for Mexicans). Hall (2013) used this approach to classify metropolitan areas according to destination type for specific immigrant origins. His analysis categorized metropolitan and non-metropolitan areas in the United States into three groups: (1) Traditional (Established) Gateways, (2) New Destinations, or (3) Minor Destinations. These groups reflect area differences in the historical size of the immigrant population as well as the period of major growth. Although Hall carried out this procedure for many different immigrant subgroups, this analysis specifically relies on his categorizations for Mexicans.

Hall's classification defines traditional destinations as those in which the percentage of Mexican immigrants in the population in 1970 or 1980 exceeded the average of the 100 largest metropolitan areas during the period 1970–2000.[2] New destinations refer to those experiencing a growth rate of the Mexican immigrant population between 1990 and 2000 exceeding the average growth rates for all immigrant groups. Minor destinations are those with neither large historical populations of Mexican immigrants nor recent rapid growth. Thus, all counties in the United States fall into one of the three categories.

This analysis adopts Hall's classification scheme for Mexican immigrants in the United States (see Table 1 for classification of the 100 largest metro areas by destination type). Mexican immigrants are attached to specific destination types through their county of

[2]By average population 1970–2000.

residence, which is collected in the restricted-use version of the NHIS. Counties are associated either with Metropolitan Statistical Areas which fall into one of the three destination types or to non-metropolitan areas which are categorized as minor.

Sociodemographic Characteristics

In order to examine selective migration, the analysis includes covariates for demographic and socioeconomic characteristics: age, sex, education, marital status, family size, family income, employment status, and year of interview. Education is measured using 4 categories: less than high school, high school graduate, some college, and college graduate or more.[3] Family income uses the restricted-use NHIS imputed income files to measure the ratio of respondents' family income relative to the federal poverty line (below the poverty line, 100%−199% of the poverty line, 200%−399%, 400%+). Employment status is categorized as employed, unemployed, or not in the labor force. T-tests are used to detect bivariate statistical differences.

Contextual Characteristics

In order to examine the impact of the characteristics of the destination location, respondents are linked to contextual information by county of residence using the US Census Summary File 3 (SF3) from the nearest census year to the individual's interview.[4] The analysis considers two sets of county-level covariates: social and economic characteristics and characteristics of the Hispanic community. Social and economic characteristics are: median household income, poverty rate, percent employed, percent of the workforce in manufacturing occupations, percent with a high school education, percent with a four-year college degree, percent foreign-born. The characteristics of the Hispanic community are intended to measure both the size of the co-ethnic community in the respondent's destination as well as its level of establishment and acculturation: the percentage of foreign-born individuals who are recent arrivals (lived in the US fewer than 10 years), the Hispanic Exposure Index[5], the percentage of the population speaking only English at home, and the percent of the population living in a different state 5 years ago (a measure of general mobility). The Exposure Index is a commonly-used measure of residential isolation/integration that specifies the degree of exposure or interaction expected between Hispanics and non-Hispanic whites across census tracts within a county. Palloni and Arias (2004) use this measure to indicate the effect of local ethnic density on the Hispanic mortality advantage. These four Hispanic community characteristics are interacted with the Mexican

[3]Education categories may differ slightly between Mexico and the United States, although previous studies have found these differences not to affect the estimation of mortality outcomes (Hummer et al. 1999).

[4]Data from the 1990 Census apply to individuals interviewed 1989–1994, the 2000 census to individuals interviewed 1995–2004, and the 2010 census to individuals interviewed 2005–2009.

[5]The Exposure Index ranges from 0 (no interaction with non-Hispanic whites) to 1 (complete interaction with non-Hispanic whites) (Massey and Denton, 1988). The index is calculated as

$$ {}_xP_y = \sum_i [x_i/X] \times [y_i/t_i] $$

where x_i, y_i, and t_i are the numbers of Hispanics, non-Hispanic whites, and the total population in unit i and X is the number of Hispanics county-wide.

subgroups to examine whether community context mediates destination-type differences in mortality.

Methods

Mortality comparisons are estimated using a hazard modeling approach predicting death during follow-up as a function of age, race/ethnic subgroup (non-Hispanic white, US-born Mexican, foreign-born Mexican), and socioeconomic and demographic controls. Since the exact date of interview and death are available in the restricted-use file, the model uses a continuous-time proportional hazards procedure

$$\ln(m_x) = \alpha + \beta_R R + \beta_D D + \beta_{RD} R \cdot D + \mathbf{\beta_X X} + \mathbf{\beta_C C} + \mathbf{\beta_H H} + \mathbf{\beta_{HR} H} \cdot R + \epsilon$$

where m_x is the death rate for individual x, R is a series of dummy variables for the race/ethnicity/nativity subgroup of the individual (non-Hispanic white, US-born Mexican, foreign-born Mexican), D is the destination type (*Traditional, New, Minor*). The key variable of interest in the analysis is an interaction between race/ethnicity/nativity and destination type, which allows us to investigate whether the mortality advantage of each Mexican subgroup differs across destination types.

The analysis involves the inclusion of three sets of covariates. (1) a vector of sociodemographic covariates (**X**) indicating the contribution of socioeconomic selection to differences in mortality across destination types; (2) a vector of socioeconomic characteristics of the respondent's county (**C**) and characteristics of the Hispanic community (**H**); (3) interactions between characteristics of the local Hispanic community and race/ethnicity/nativity subgroup (**H** · R), which demonstrate the contribution of the size and establishment of the Hispanic community to destination type differences in mortality for Mexicans. All models also contain a linear covariate for year of interview to capture changes in mortality risk over time. Respondents are weighted using NHIS mortality weights adjusted for eligibility status for mortality linkage.

Results

Despite growth in new destinations, the majority of Mexicans in the sample live in *traditional* destinations (74% of both foreign-born and 73% of US-born). 14% of Mexican immigrants and 13% of US-born Mexicans live in *new* destinations, while 12% Mexican immigrants and 13% of US-born Mexicans live in *minor* destinations. Table 2 shows descriptive characteristics of US-born and foreign-born Mexicans by type of destination.

Compared to Mexican immigrants in traditional destinations, those in new and minor destinations are younger, more likely to be male, and slightly less likely to be married. Immigrants in new and minor destinations are also more socioeconomically advantaged than those in traditional destinations. 71% of Mexican immigrants in new destinations are employed compared to 64% in traditional destinations. A slightly larger fraction of those in new destinations have at least a high school education. The largest differences by destination type are in duration of residence in the US. Immigrants in new and minor destinations are

much more likely to be recent arrivals. 38% of those in new destinations arrived in the US in the preceding 10 years, and 17% in the preceding 5 years, compared to 24% and 9%, respectively, in traditional destinations. 54% of Mexican immigrants in traditional destinations have lived in the US for more than 15 years, compared to just 38% of those in new destinations. US-born Mexicans in new and minor destinations also tend to be slightly younger and more socioeconomically advantaged than those in traditional destinations.

Mortality Differences by Immigrant Destination

Table 3 examines differences in mortality among non-Hispanic whites, and US-born and foreign-born Mexicans by type of destination. Model 1 examines the difference between non-Hispanic whites and the Mexican subgroups adjusting for age and sex. With no additional socioeconomic controls, the mortality advantage for US-born and foreign-born Mexicans over non-Hispanic whites is modest, only 4–6%. Model 2 adds the type of destination for Mexicans in the United States. The interactions between each Mexican subgroup and the destination type signify subgroup differences in mortality for each group by type of destination. Foreign-born Mexicans in new and minor destinations have a mortality advantage over their counterparts in traditional destinations. They experience an additional 30% reduction in the hazard of death in new destinations and 26% in minor destinations (the difference between new and minor destinations is not statistically significant). These advantages are considered the baseline coefficients of interest throughout the remainder of the analysis. A similar benefit is not observed for US-born Mexicans, and the results of this model also indicate that, unadjusted for covariates, neither US-born nor foreign-born Mexicans experience a statistically-significant advantage over non-Hispanic whites in traditional destinations.

Model 3 adds controls for socioeconomic and demographic characteristics, which has two effects on the model. First, the mortality advantage for foreign-born Mexicans over non-Hispanic whites in traditional destinations increases to 31%. Second, the additional advantage of Mexicans in new and minor destinations is attenuated some, declining from 30% to 26% for new destinations and from 26% to 18% for minor. Thus, beneficial socioeconomic characteristics explain some of the advantage of Mexicans in new and minor destinations, 13% and 31% respectively, relative to Mexicans in traditional destinations.

Contextual Characteristics

Destination types themselves also differ in terms of race/ethnic distributions, which have important implications for the size of community available to Mexican immigrants (Table 4). For example, the typical traditional destination county is 63% non-Hispanic white and 20% of Mexican origin. In contrast, Mexicans comprise just 3% of new destinations and minor destinations. The average traditional destination county has a Mexican population of more than 100,000, while new destinations are home to 8,000 Mexicans and minor destinations just 1,200 on average. 90% of new destination counties are home to fewer than 20,000 Mexican individuals (US and foreign-born) and half have populations smaller than 1,000. Mexican-origin populations in traditional destinations are also likely to be more established in the United States. 64% of Mexicans (all ages) in traditional destinations are US-born, compared to 59% in new destinations. And while 25% of Mexican immigrants in traditional

destinations arrived in the past 10 years, 40% of those in new destinations did. New destinations also have greater mobility overall; 9% of new destination residents (all race/ethnic groups) lived in a different state 5 years prior, compared to 6% in traditional destinations.

The models in Table 5 examine the contribution of these differences to the new and minor destination advantages. All models retain the sociodemographic characteristics from Model 3 in Table 3. Model 1 adds county-level social and economic characteristics and Hispanic community characteristics. Of socioeconomic characteristics, only the median household income has any association with individual mortality. Each of the Hispanic community characteristics is associated with mortality. A greater fraction of newly arrived immigrants and a greater fraction of English-only speakers are associated with increased mortality, while a higher Hispanic Exposure Index and greater overall mobility are associated with reduced mortality. The inclusion of these covariates does little to reduce the new and minor destination advantages.

Models 2–5 include interactions between Hispanic community characteristics and race/ethnic subgroups in order to examine how these characteristics differentially impact mortality for Mexican subgroups: the fraction of immigrants who have lived in the US fewer than 10 years (Model 2); the Hispanic Exposure Index (Model 3), the fraction of the population speaking only English at home (Model 4), and the percent of the population living in a different state 5 years ago (Model 5). Each interaction is significant only for foreign-born Mexicans, and the direction of the relationship often contrasts with that for non-Hispanic whites. Foreign-born Mexicans living in counties with a recently-arrived immigrant population, a greater Hispanic/non-Hispanic white exposure index, a greater fraction of English-only speakers, and greater overall mobility tend to have lower mortality risk. This suggests that the mortality experience of Mexican immigrants responds to the extant Hispanic community characteristics in ways that differ from US-born Mexicans and non-Hispanic whites. Each interaction also explains a portion of the new and minor destination advantages for foreign-born Mexicans relative to those in traditional destinations. Model 6 includes all interactions. Each remains significant except the fraction of English-only speakers. The Hispanic community characteristics explain 53% of the new destination advantage and 46% of the minor destination advantage relative to foreign-born Mexicans in traditional destinations, but are not associated with mortality for US-born Mexicans. Neither the new nor minor destination advantage remains statistically significant after the inclusion of these measures.

Duration of Residence

One limitation is that the analysis is unable to specify how long individuals have lived in the counties in which they are interviewed. The data also cannot specify whether individuals move during follow-up. One way to determine whether this weakness has noticeable effects on the findings is to consider the role of duration of residence among Mexican immigrants, which the models in Table 6 attempt to do. The first Model includes all immigrants categorized by duration of residence. Consistent with prior literature, more recent arrivals experience lower mortality than those who have lived in the US for longer periods. However,

adjusting for duration of residence does little to change the new and minor destination advantages. The second and third models reproduce the analysis with the Mexican immigrant sample restricted separately to “new immigrants”—those who have lived in the US fewer than 15 years—and “established immigrants”—those who have lived in the US at least 15 years. These models indicate that the advantage exists both for new and established immigrants, and thus is less likely to reflect unobserved moves between destination types, nor to be biased by destination-type differences in age at entry for Mexican immigrants.

Discussion

Research on the Hispanic mortality advantage has shown that although Mexican immigrants in the United States experience lower adult mortality than non-Hispanic whites, they also exhibit worsening health over time with greater exposure to the US (Riosmena et al., 2014). This pattern is notable both because Mexican immigrants have lower socioeconomic status than the native-born white majority and because new economic opportunities in the United States do not translate into improved health over time for immigrant arrivals (Acevedo-Garcia et al., 2010). The Hispanic health advantage itself has often been attributed to the protective effects of immigrant enclaves, noting that co-ethnic individuals and institutions may provide social support to ease the transition to the United States (Eschbach et al., 2004). The contribution of this analysis is to provide a re-examination of this suggested pattern as Mexican immigrants have spread to increasingly varied destinations in the United States. The results demonstrate that Mexican immigrants living outside *traditional immigrant gateways* experience an additional mortality advantage; those living in *new and minor destinations* experience nearly 30% lower mortality risk than those in traditional destinations, and 49% lower than non-Hispanic whites. This finding adds a conceptual layer to research on the Hispanic mortality advantage (Cagney et al., 2007), since new destinations lack the large and established Mexican communities found in traditional gateways. Although cultural explanations for the Hispanic adult mortality advantage have largely focused on co-ethnic concentration as a proxy for the level of community and social support (Markides and Eschbach, 2011), future studies may have to expand the analytical conceptions of “culture”, “social ties”, and “community composition” as they relate to the health and mortality experience of Mexican immigrants.

The analysis uses immigrant destination as a lens through which to understand community, social support, and health assimilation among immigrants from Mexico and their descendants. Nearly two-thirds of Hispanics in the United States identify as Mexican origin, and Mexican populations have now spread to most areas of the country (Hall, 2013, US Census Bureau, 2011). Research on health assimilation has largely focused on the characteristics of the individual migrants over time rather than their destinations, and largely ignored the interplay between the two (Waters and Jiménez, 2005). The current analysis considers both, and reveals that Mexican immigrants have the most favorable mortality outcomes when they live in small and less-established ethnic communities. This study joins other recent research suggesting that new destinations may provide benefits to new arrivals (Alba et al., 2014). Indeed, contrary to the expectations of the relationship between assimilation and health (Lara et al., 2005), residential exposure to non-Hispanic white populations is associated with lower mortality for Mexicans. Although the established

community and its adjoining institutions in traditional gateway cities may provide some support and protection, it may also facilitate more rapid integration into the cultural and behavioral orientations of the native-born majority (Viruell-Fuentes et al., 2013). Gateway cities tend to have large populations of immigrants at varying levels of acculturation, along with large established US-born communities that are generally more acculturated (Singer, 2004). In this way, the large Mexican social networks in Los Angeles, Houston, and Chicago may function as cultural integrating forces, even if integration has negative impacts on immigrants' health (Waters and Jiménez, 2005). Hispanics tend to have higher fertility rates in new destinations than in traditional gateways, indicating that their convergence to native-born norms may be somewhat delayed in more isolated regions (Lichter et al., 2012). As Mexicans leave traditional gateways for new destinations, areas which may have less established or largely non-existent Hispanic communities, they may become more isolated from some of the deleterious behaviors typical of the native born (Lichter, 2012).

Although part of the destination-type difference can be explained by selective migration, it is not the primary factor. Beneficial socioeconomic characteristics of Mexicans in new destinations explain just 13% of their advantage relative to those in traditional destinations. They explain 31% of the minor destination advantage. This finding is consistent with that of Lichter and Johnson (2009), who demonstrated that Mexican-origin individuals who moved from traditional destinations to new destinations during the 1990s were better educated than those who remained in traditional destinations. Palloni and Arias (2004) also found that foreign-born Mexicans living outside California and Texas during the late 1980s and early 1990s had significantly lower mortality, which they attributed to modest amount of selective migration. Although it is often an attractive explanation, we should not attribute too much of the new and minor destination advantages to selective migration since the advantage occurs only for foreign-born Mexicans. US-born Mexicans, who presumably experience similar selection mechanisms in migrating to new destinations (Lichter and Johnson, 2009), do not exhibit an advantage.

That selective migration is only a small part of the story is not surprising, especially given that Mexican immigrants are among the least socioeconomically select foreign-born groups in the US (Akresh and Frank, 2008). It is somewhat unexpected that the socioeconomic characteristics of destinations contribute very little to the new and minor destination advantages. The results provide no evidence for the hypothesis that new destinations reduce mortality among Mexican immigrants because of increased economic opportunities in emerging regional economic sectors (Zúñiga and Hernández-León, 2006). Instead, it is the characteristics of the Hispanic communities in new and minor destinations that largely explain the advantages. The models suggest that the small size and relative isolation of Hispanic communities in new destinations appear to be important factors responsible for the mortality advantage for Mexican immigrants in these areas, which has implications for understanding the role of social support in the Mexican mortality advantage.

The Role of Social Support

The results of the current study appear to contradict previous work documenting that Hispanics benefit from living in areas with greater concentration of other Hispanics. In

addition, the new destinations literature has suggested that migrants in non-traditional destinations may be isolated from the social and economic benefits of enclaves in traditional gateways (Hall 2013). A closer analysis of the literature suggests that this pattern is complex and more nuanced than often claimed (Markides and Eschbach, 2005), and the results here do not necessarily preclude the importance of social support in the Mexican mortality advantage. Eschbach et al. (2004) showed that Mexican-Americans who live in areas with greater co-ethnic concentration experience reduced mortality and functional disability. However, this analysis was restricted to five Southwestern states with large concentrations of Mexicans— mainly traditional gateways. Analyses at the census tract level found a more modest benefit to neighborhood co-ethnic concentration (LeClere et al., 1997), but did not consider the role of nativity. Furthermore, Bond-Huie et al. (2002) found using neighborhood-level covariates that high concentrations of Hispanics were not associated with lower mortality, stressing that place of birth is a key factor for understanding contextual contributions. In addition, residential segregation of Mexican-Americans in Chicago appears to be associated with poorer mental health (Lee, 2009). More recent work has cast doubt on whether immigrant social ties can explain their advantage, especially given that ties tend to strengthen with greater acculturation, while health diminishes (Viruell-Fuentes et al., 2013, Brown, 2006).

Is there no role for social support in the Hispanic mortality advantage? Not necessarily, but perhaps researchers must rethink how social support manifests in different immigrant destinations. Conflating social ties with community characteristics may be inappropriate for understanding the advantage of Mexican immigrants in new destinations. The current study has been devoted to the level of the destination, the metropolitan (or non-metropolitan) area of residence, while many previous studies have used much finer geographic units in their analyses (Cagney et al., 2007). Perhaps social ties are protective for health among families and neighbors, but not at the level of the city-wide community (Viruell-Fuentes et al., 2013). For instance, migrants to new destinations may require smaller networks of stronger social ties in order to overcome the lack of an established Mexican community, and thus may benefit from close relationships (Pfeffer and Parra, 2009). But the scale discrepancy problem alone questions the standard narrative of the contribution of social support to the favorable health outcomes of Mexican immigrants. The process of immigrant integration is often conceptualized at the level of the community, with the expectation that immigrants benefit from immigrant-oriented infrastructure and institutions (Zúñiga and Hernández-León, 2006). The mortality advantage in new and minor destinations contradicts this expectation. This conceptual chasm exposes a substantial gap in our understanding of the contribution of social support and community ties to immigrant health, and suggests that future research must work to clarify these complex processes.

Limitations

The analysis is somewhat limited in that the NHIS does not collect data on the length of time that individuals have spent in the counties in which they are interviewed, or whether or not they move during follow-up. Cross sectional surveys are unable to capture the length of time that individuals are exposed to specific geographic locations, and thus the current analysis has difficulty establishing how long respondents have lived in their current residences at the

time of the survey. However, the restricted-use Linked-Mortality files provide information about the place of residence of decedents linked to the NHIS in the National Death Index. These data can be used to determine whether deceased respondents move between interview and death. Overall, these data demonstrate that the vast majority of respondents remain in their place of residence during follow-up, with 92% of decedents residing in the same state at both the time of interview and death. Foreign-born Mexicans are more likely to move between places than other groups: 14% of decedents resided in a different state at death than at interview, compared with 8% of non-Hispanic whites and 5% of US-born Mexicans. Of foreign-born Mexicans interviewed in new or minor destinations, fewer than one-third resided in a traditional gateway destination at the time of death. The results appear robust to changes in place of residence during follow-up, and may even represent a conservative estimate of the mortality advantage of new and minor destinations.

The analysis is also limited by two well-known data quality issues. First, some recent evidence suggests linkage quality between NHIS and NDI differs across race/ethnic groups, with foreign-born Hispanics experiencing lower matching quality than non-Hispanic whites (Lariscy, 2011). Establishing the true impact of linkage differences on calculated mortality differences in NHIS is difficult because linkage rates combine both differences in linkage given death and differences in death risks. The impact of this weakness on the current analysis is minor, because record linkage quality is unlikely to differ significantly by destination type. Second, the current data cannot completely address the issue of health-selective return migration or salmon bias. Mexican immigrants may return to Mexico prior to death both leaving their death unobserved in US vital statistics and leaving a relatively healthy population remaining in the US. As with linkage differentials, this weakness will only impact the current analysis if we expect return-migration rates to differ significantly by destination type. Although it is possible that immigrants in new destinations have stronger social ties to Mexico given less established communities in the US, the magnitude of return migration would need to be very large to explain the mortality differential with traditional destinations (Turra and Elo, 2008).

Finally, the analysis covers a relatively long time series, with interviews stretching across a 19-year period and mortality covering 21 years. This is actually less of a worry than one might think since, by definition, the growth of new destinations was relatively recent, and thus very few individuals were interviewed in new destinations prior to the early 1990s. Furthermore, the mortality analysis is concentrated towards the end of the 20-year period, since more deaths occur during this period than earlier. Finally, the inclusion of a control for year of interview suggests that these differences do not reflect secular trends in mortality over time.

Conclusion

Despite identifying gaps in our knowledge regarding the mechanisms responsible, this study joins recent accumulating evidence for the adult mortality advantage of Hispanics in the United States (Elo et al., 2004, Lariscy et al., In Press, Riosmena et al., 2014). The process of assimilation to the cultural and behavioral norms of the United States has long been known to be associated with deteriorating health among immigrants (Antecol and Bedard,

2006). This process does not merely reflect the characteristics of individual migrants. Instead, it reflects a bidirectional relationship between the migrants and their surrounding communities. Although the immigration and health literature has often focused on the contribution of social context to immigrant health, the recent expansion of immigrant populations, including Mexicans, to a large number of new destinations has reinvigorated scholarly interest in the response of immigrants to their destinations (Waters and Jiménez, 2005). These processes have been fruitful for research on health and immigration, since they provide increasingly varied contexts in which to examine the health and mortality advantage of immigrants. The fact that Mexican immigrants do better in destinations with small co-ethnic populations and less-established communities arguably adds an additional layer to the Hispanic Paradox – strong ethnic communities in traditional gateways do not appear to improve the health of new immigrants. In some ways, it appears that as destinations themselves become "Americanized" the health benefit they confer to immigrants may deteriorate.

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Table 1:

Destination Type Classification of 100 Largest US Metro Areas for Mexican Immigrants in the United States

Traditional	New		Minor	
Chicago, IL	Albuquerque, NM	Nashville, TN	Allentown, PA	Little Rock, AR
Dallas, TX	Atlanta, GA	New York, NY	Ann Arbor, MI	Louisville, KY
Fresno, CA	Austin, TX	Oakland, CA	Baltimore, MD	Middlesex, NJ
Houston, TX	Bakersfield, CA	Oklahoma City, OK	Birmingham, AL	Milwaukee, WI
Los Angeles, CA	Baton Rouge, LA	Orange County, CA	Cincinnati, OH	Mobile, AL
McAllen, TX	Bergen-Passaic, NJ	Orlando, FL	Cleveland, OH	Monmouth, NJ
Phoenix, AZ	Boston, MA	Portland, OR	Dayton, OH	Nassau, NY
Riverside, CA	Charleston, SC	Raleigh, NC	Detroit, MI	New Haven, CT
San Antonio, TX	Charlotte, NC	Richmond, VA	Gary, IN	New Orleans, LA
San Diego, CA	Columbia, SC	Sacramento, CA	Grand Rapids, MI	Omaha, NE
San Francisco, CA	Columbus, OH	St. Louis, MO	Greenville, SC	Philadelphia, PA
San Jose, CA	Denver, CO	Salt Lake City, UT	Harrisburg, PA	Pittsburgh, PA
Tucson, AZ	Fort Lauderdale, FL	Sarasota, FL	Hartford, CT	Providence RI
Vallejo, CA	Fort Worth, TX	Scranton, PA	Honolulu, HI	Rochester, NY
	Greensboro, NC	Springfield, MA	Jacksonville, FL	Syracuse, NY
	Indianapolis, IN	Tacoma, WA	Jersey City, NJ	Tampa, FL
	Las Vegas, NV	Tulsa, OK	Kansas City, MO-KS	Toledo, OH
	Memphis, TN	Ventura, CA	Knoxville, TN	West Palm Beach, FL
	Miami, FL	Washington, DC		
	Minneapolis, MN	Wichita, KS		

Notes: Classification of destination types based on Hall's (2013) typology using 1970–2000 Census PUMS

Table 2:

Characteristics of Mexican Immigrants in the United States by Destination Type, NHIS 1990–2009

	Foreign-born Mexicans			US-born Mexicans		
	Traditional	**New**	**Minor**	**Traditional**	**New**	**Minor**
n	46,237 (74%)	8,641 (14%)	7,520 (12%)	32,796 (73%)	5,917 (13%)	6,022 (13%)
Percent Men	49.8%	55.5% *	54.2% *	46.0%	46.7%	46.9%
Mean Age	41.6	38.0 *	40.8 *	43.8	42.8 *	44.0
Mean Family Size	4.5	4.2 *	4.1 *	3.6	3.3 *	3.4 *
Marital Status						
Married	74.2%	73.0% *	76.8% *	60.9%	62.2% *	65.2% *
Divorced/Separated	8.8	8.8	8.1 *	15.8	16.5	15.6
Widowed	4.0	2.0 *	3.4 *	5.2	3.9 *	5.3
Never Married	13.0	16.3 *	11.7 *	18.1	17.3	13.9 *
Education						
Less than High School	67.4%	64.9% *	70.1% *	28.2%	23.7% *	34.0% *
High School	19.5	23.6 *	18.5 *	36.0	38.8 *	36.0 *
Some College	9.4	7.3 *	7.4 *	26.0	24.3 *	22.0 *
College Degree	3.7	4.2 *	4.0	9.8	13.2 *	8.0 *
Employment Status						
Employed	64.2%	70.8% *	65.2% *	66.4%	70.6% *	66.7%
Unemployed	3.5	4.1 *	3.7	3.3	3.2	3.7
Not in Labor Force	32.3	25.1 *	31.2 *	30.2	26.2 *	29.6
Family Income						
Below Poverty Line	33.2%	32.8%	36.4% *	17.9%	14.8% *	22.0% *
100%–199% of Poverty Line	35.1	33.1 *	34.8	24.0	22.0 *	27.0 *
200%–399% of Poverty Line	24.5	27.4 *	23.3	35.5	39.6 *	35.0 *
400%+ of Poverty Line	7.1	6.7	5.5 *	22.6	23.6 *	16.1 *
Duration of Residence in US						
<5 years	8.9%	16.8% *	14.0% *	N/A	N/A	N/A
5–10 years	14.7	21.7 *	18.0 *			
10–15 years	16.1	19.3 *	15.9			
15+ years	54.2	38.2 *	48.5 *			
Unknown duration	6.1	4.0 *	3.6 *			

Notes: Destination type classified according to Hall's (2013) scheme based on 1970–2000 PUMS

* Different from Traditional destinations at p<0.05 level.

Source: 1990–2009 pooled restricted-use NHIS

Table 3:

Hazard Model of Mortality by Hispanic Origin Using NHIS-Linked Mortality Files 1990–2009

	Model 1	Model 2[a]	Model 3[b]
Race/Ethnicity/Nativity			
US-born NH White	1.00	1.00	1.00
US-born Mexican	0.95**	0.97	0.75***
Foreign-born Mexican	0.94***	1.00	0.69***
Destination Type × Race/Ethnicity			
New Destination × US-Born Mexican		1.02	1.09
Minor Destination × US-Born Mexican		0.90*	0.96
New Destination × Foreign-Born Mexican		0.70***	0.74***
Minor Destination × Foreign-Born Mexican		0.74***	0.82***
Sociodemographic Characteristics			
Education			
Less Than High School			1.00
High School			0.82***
Some College			0.74***
College			0.60***
Employment Status			
Employed			1.00
Unemployed			1.38***
Not in Labor Force			1.68***
Family Income			
Family Income Below Poverty Line			1.00
Family Income 100%-199% of Poverty Line			0.92***
Family Income 200%-399% of Poverty Line			0.78***
Family Income 400%+ of Poverty Line			0.68***
Controls for Sociodemographic Characteristics	no	no	yes
Number of Observations	825,107	825,107	825,107

Notes: All models control for age, sex and interview year.

*p<0.05

**p<0.01

***p<0.001

[a]Model 2 adds an interaction between destination type and race/ethnicity/nativity. The main effect of destination type is included in the model although the coefficients are not reported.

[b]Model 3 adds sociodemographic covariates: education, family income, employment status, marital status, household size

Table 4:

Contextual Characteristics of Traditional, New, and Minor Destinations using Census 2000 Summary File 3

	Traditional Destinations	New Destinations	Minor Destinations
Mean total population	431,632	207,333	51,850
Social/Economic Characteristics			
Median Household Income	40,995	43,803	33,683
Employment Status			
Employed	57.2%	61.5%	56.5%
Unemployed	3.8	3.2	3.5
Not in Labor Force	38.3	34.7	39.8
Percent employed in Manufacturing occupations	15%	17%	19%
Education			
Percent High School Graduates	76.0	79.8	77.1
Percent College Graduates	19.5	21.1	15.6
Hispanic Community Characteristics			
Percent non-Hispanic white	63%	76%	83%
Percent Foreign Born	11%	5%	3%
Percent Mexican	20%	3%	3%
Mean Mexican Population	101,750	8,076	1,195
Hispanic Exposure index	0.29	0.49	0.53
Percent Speaking English Only at home	75%	90%	93%
Percent of Hispanics US-born	64%	59%	68%
Percent of immigrants recently arrived[a]	25%	40%	34%
Percent of population living in a different state 5 years ago	6%	9%	8%

Notes: Destination type classified according to Hall–s (2013) scheme based on 1970–2000 PUMS

Source: US Census 2000 Summary File 3 (SF-3)

[a]Entered the United States within the previous 10 years.

Table 5:

Hazard Ratios of Mortality by Mexican Origin and Destination Type including Contextual Characteristics

	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 5[e]	Model 6[f]
Race/Ethnicity/Nativity						
US-born NH White	1.00	1.00	1.00	1.00	1.00	1.00
US-born Mexican	0.74***	0.67***	0.77***	0.77***	0.74***	0.68***
Foreign-born Mexican	0.68***	0.99	0.82***	0.86*	0.79***	0.98
Destination Type × Race/Ethnicity						
New Destination × US-Born Mexican	1.07	1.04	1.10	1.08	1.08	1.07
Minor Destination × US-Born Mexican	0.96	0.95	0.99	0.97	0.96	1.00
New Destination × Foreign-Born Mexican	0.74***	0.81**	0.83*	0.80**	0.82*	0.90
Minor Destination × Foreign-Born Mexican	0.81***	0.82**	0.91	0.84**	0.85**	0.93
Contextual Characteristics (county level)						
Median Household Income	0.99***	0.99***	0.99***	0.99***	0.99***	0.99***
Percent in Poverty	1.12	1.11	1.08	1.06	1.11	1.10
Percent Employed	1.00	1.00	1.00	1.00	1.00	1.00
Percent in Manufacturing Occupations	1.00	1.00	1.00	1.00	1.00	1.00
Percent with High School Diploma	1.07	1.07	1.08	1.07	1.08	1.08
Percent College Educated	1.01	1.01	1.00	1.01	1.01	1.01
Percent Foreign Born	0.95	0.97	1.00	1.01	0.93	0.95
Hispanic Community Characteristics						
Percent of FB entering <10 Years ago	1.10**	1.10***	1.10***	1.10***	1.10***	1.11***
Hispanic Exposure Index	0.83***	0.83***	0.82***	0.82***	0.83***	0.82***
Percent Speaking only English at Home	1.17*	1.19*	1.26***	1.27**	1.17*	1.21**
Percent Living in Different State 5 years ago	0.83**	0.83**	0.82**	0.82**	0.85*	0.84*
Community Interactions with FB Mexican						
% FB Entering <10 Years × FB Mexican		0.38***				0.54*
Hisp. Exposure Index × FB Mexican			0.53***			0.52*
% Speaking only English at home × FB Mexican				0.66***		1.36
% Different State × FB Mexican					0.08***	0.17**
Controls for Contextual Characteristics	yes	yes	yes	yes	yes	yes
Number of Observations	825,107	825,107	825,107	825,107	825,107	825,107

*p<0.05

**p<0.01

***p<0.001

[a]Model 1 adds county characteristics to the variables in Model 3, Table 3.

[b] Model 2 interacts the fraction of immigrants who have lived in the US fewer than 10 years and race/ethnicity

[c] Model 3 interacts the Hispanic Exposure Index and race/ethnicity

[d] Model 4 interacts the fraction of the population speaking only English at home and race/ethnicity

[e] Model 5 interacts the percent of the population living in a different state 5 years ago and race/ethnicity

[f] Model 6 includes all interactions from Models 2–5

Table 6:

Hazard Model of Mortality by Hispanic Origin Using NHIS-Linked Mortality Files 1990–2009

	All immigrants	New immigrants (<15 years)	Established Immigrants (15+ years)
Race/Ethnicity/Nativity			
US-born NH White	1.00	1.00	1.00
US-born Mexican	0.98	0.98	0.98
Foreign-born Mexican		1.02	0.96
Arrived <5 years ago	0.80**		
Arrived 5–10 years ago	0.94		
Arrived 10–15 years ago	1.17*		
Arrived 15+ years ago	0.97		
Unknown Duration	1.04		
Destination Type × Mexican			
New Destination × US-Born Mexican	0.99	0.99	0.99
Minor Destination × US-Born Mexican	0.91	0.91	0.91
New Destination × Foreign-Born Mexican	0.72***	0.67***	0.74***
Minor Destination × Foreign-Born Mexican	0.73***	0.66***	0.74***
Controls for Sociodemographic Characteristics	no	no	no
Number of Observations	825,107	804,220	809,022

Notes: All models control for age, sex, and interview year.

* p<0.05

** p<0.0

*** p<0.001