Self-Rated Health and US-Mexico Migration: Differences by Stage of the Migration Process among Men and Women

ABSTRACT

Research on the Hispanic health paradox has been based on U.S. samples and rarely evaluates how selective migration shapes migrant health profiles. We examine how self-rated health (SRH) differs by migration stage among 489 non-migrants and return migrants in Mexico and current migrants in the U.S. using bi-national data from the 2010 Network Survey of Immigrant Transnationalism (NSIT). A series of logistic models were estimated predicting poor health and adjusted for acculturation, stress, and SES. We find little evidence of positive health selection or salmon bias. Gender differences in SRH do not vary across migration categories.

KEYWORDS

Mexico, U.S., Bi-national, Self-rated health, Gender, Selection, Hispanic Paradox

INTRODUCTION

Of the 33 million Hispanics of Mexican-origin living in the U.S., many are socioeconomically disadvantaged: over one-half are uninsured, more than one-quarter live in poverty, over 60% lack a high school degree, and over six million are unauthorized immigrants (Gonzalez-Barrera and Lopez 2013). Notwithstanding the fundamental importance of socioeconomic status for health (Link and Phelan 1995), studies of U.S.-based survey data consistently find evidence of a health paradox wherein Mexican immigrants, despite generally poor socioeconomic standing, experience more favorable health outcomes and behaviors than the native-born (e.g., (Akresh 2008, Antecol and Bedard 2006)). Various explanations have been posited to explain this pattern, including protective immigrant culture and lifestyle, methodological/data bias, and migrant selectivity (Saenz 2010); however, many questions remain.

Research to date is limited in that it rarely evaluates health status across the entire migrant-settlement trajectory, since studies typically examine Mexican migrant health with U.S.-based samples. As a result, we know little about how factors related to selective migration—including positive health selection (i.e. the idea that healthier Mexicans are selected into migration) into the U.S. and negative selection out of the U.S.(i.e. the idea that sick Mexican immigrants leave the U.S.)—shape migrant health profiles (Markides and Eschbach 2005). Scant research to date has examined these selection processes, finding sparse evidence of positive health selection for Mexicans immigrants (Akresh and Frank 2008, Rubalcava et al. 2008) and negative health selection for Mexican emigrants (Bostean 2013, Palloni and Arias 2004, Ullmann, Goldman and Massey 2011). And while research suggests that physical health and the

migration process are gendered for Mexican adults (reference removed), scholars have yet to investigate how selection operates to shape health outcomes among women versus men migrants.

Our study examines how health differs by migration stage within a network of migrants from one community in Guanajuato, Mexico. Specifically, we draw on bi-national social network data from the 2010 Network Survey of Immigrant Transnationalism (NSIT), which includes a sample of non-migrants and return migrants in Mexico as well as current migrants living in two U.S. states. We examine self-rated health (SRH), one of the most widely-used, validated, and highly predictive indicators of global, physical health (DeSalvo et al. 2006, Franks, Gold and Fiscella 2003, Idler and Benyamini 1997). This permits an examination of how the SRH of Mexican residents with no U.S. migration experience compares to peers currently living in the U.S. (including both short- and long-term migrants), and peers with U.S. migration experience who are currently living in Mexico (return migrants, divided by duration of U.S. residence). We also examine whether these patterns vary by gender. This information will be of value to U.S. and Mexican researchers and policy-makers looking for assessments of the health of Mexicans who migrate to the U.S. and whether positive and negative selective migration skew U.S.-based assessments of immigrant health patterns.

MIGRATION AND SELF-RATED HEALTH

A large body of U.S.-based research documents health patterns among immigrants relative to the native-born (Kandula, Kersey and Lurie 2004, Singh and Siahpush 2002). Much of this work focuses on Mexican-origin migrants, given their status as the largest single-origin U.S. immigrant group (Lara et al. 2005, Saenz 2010). Using U.S.-collected data, this work compares the health status of Mexican (or Hispanic) immigrants to that of U.S.-born whites and Hispanics, to examine how health status differs by duration of U.S. residence. In general,

Mexican migrants experience lower mortality rates (Markides and Eschbach 2005), but that the health of migrants, across a variety of medical conditions, declines with U.S. duration (Cho et al. 2004, Finch and Vega 2003).

We focus on SRH among a network of Mexican adults, both non-migrants living in Mexico and current and return U.S. migrants from one origin community. This is appropriate since studies show that SRH is best examined within a single ethnic group or asked in one language because of differences in comparability across groups and in the language of the SRH question (Bzostek, Goldman and Pebley 2007, Finch et al. 2002, Su, Wen and Markides 2013). As a subjective assessment of health status, SRH independently predicts morbidity and mortality (Idler and Benyamini 1997, Jylha 2009), as individuals primarily draw upon dimensions of physical health and functioning to assess their health (Singh-Manoux et al. 2006). This measure does not rely on a diagnostic evaluation from medical personnel, a benefit to this study since many Mexican migrants lack medical insurance and report low levels of medical care use (Holmes 2012)(reference removed).

Despite the evidence in support of health and mortality advantages among Mexican migrants, multiple studies find that immigrant Hispanics report higher rates of poor or fair SRH than U.S.-born Hispanics or whites (Angel, Buckley and Finch 2001, Cho et al. 2004, Viruell-Fuentes et al. 2011). As a result, the health paradox in SRH is less consistent among Hispanics. However, these studies are limited in their ability to assess SRH across the migrant-settlement trajectory: considering how SRH differs between non-migrants, return migrants, and current migrants may provide greater clarity regarding the SRH status of Mexican migrant adults than studies that only examine SRH relative to native-born Hispanics and whites.

Selection and Acculturation

A limitation of prior research is that most examines immigrant health using data from U.S.-based samples. This is a concern due to the non-random nature of the migration process; particular individuals have a greater propensity to immigrate to the U.S. or emigrate back to Mexico than others, based on characteristics such as geography, education, wealth, migration exposure, gender, employment, and health (Bostean 2013, Massey, Durand and Malone 2002, Moraga 2011). Scholars have argued that bi-national data is needed to evaluate migrant health since it permits an evaluation of how migrant health differs relative to that of peers who never migrate (healthy migrant) and how health patterns differ among current migrants by duration of U.S. residence (negative health assimilation); and how health patterns differ for former migrants who have returned to their country of origin (salmon bias or return compared to current migrants) (references removed).

To examine the "healthy migrant" hypothesis, information on non-migrants in sending nations is needed as a baseline comparison group for recent migrants. The hypothesis argues that positive health selection occurs because of the arduous task of migrating and the physical requirements of immigrant employment in the U.S. (Abraído-Lanza et al. 1999)(reference removed). While studies that directly test positive selection among Mexican migrants are sparse, Akresh and Frank (2008) found limited evidence of positive health selection for Mexican immigrants due to their lower socioeconomic profile, but they only compared Mexican immigrants to other migrant groups, not non-migrants. Bostean (2013) also combined Mexican and U.S. data sources (collected separately) to compare SRH among current U.S. migrants and non-migrants in Mexico, and found contradictory evidence of positive health selection. This weak and conflicting evidence highlights the need for research that examines health statuses

across all stages of the migration process and compares Mexicans from the same origin community.

Comapring the health status of return and current migrants also permits examination of the "salmon bias" hypothesis, which argues that infirm Mexican immigrants may be more likely to return to Mexico, leaving healthier immigrants behind. This perspective is buttressed by evidence that increasing duration of U.S. residence is associated with increased participation in unhealthy behaviors, occupational injuries, and heightened morbidity and mortality risks (Abraído-Lanza et al. 1999, Cho et al. 2004, Loh and Richardson 2004) (reference removed). Some sick and injured immigrants eventually return to Mexico with physical health problems leaving healthier migrants in the U.S. (Holmes 2013). Yet other evidence disputes the salmon bias hypothesis, finding that return migrant SRH does not significantly differ from that of non-migrants and current migrants report worse SRH than return migrants (Bostean 2013, Ullmann, Goldman and Massey 2011).

Another critical subgroup is current migrants of different durations of U.S. residence. In migrant health studies, scholars have documented how factors relating to acculturation, or "the acquisition of the cultural elements of the dominant society" (Lara et al. 2005): 369), relate to physical health declines and mortality among migrants. Bostean (2013) found that non-migrant Mexican adults had significantly better SRH compared to Mexican migrants (with a difference between longer and shorter duration migrants). Beyond the health declines associated with duration in the U.S., language use and ability is a commonly used acculturation measure (Lara et al. 2005). Among Hispanics, SRH reports are positively associated with English proficiency and use (Kandula, Lauderdale and Baker 2007, Shetterly et al. 1996)(reference removed). After controlling for educational attainment and socioeconomic status, a strong grasp of English

confers a protective effect that makes more proficient speakers less susceptible to health risks commonly faced by immigrants (Angel, Buckley and Finch 2001), suggesting that English ability may explain part of the relationship between migration experience and SRH.

In establishing relationships between selection, acculturation, and migrant health, prior research has also shown the importance of stress. Finch and Vega (2003) find that acculturative stress is negatively associated with SRH reports among Hispanic immigrants in the U.S. and that the presence of peers and family members in the U.S. is associated with better SRH (as a result of social support). Some scholars have argued that poorer SRH among migrant Hispanics may occur because of a heightened tendency to somatize, wherein feelings of distress are reflected in more negative self-assessments of health (Angel and Guarnaccia 1989, Hulme 1996, Su, Wen and Markides 2013). Somatization may take many forms such as unhappiness, but may only play a small role in poor SRH among Hispanics (Bzostek, Goldman and Pebley 2007). In addition, socioeconomic status (SES) has been shown to have a flatter relationship with health status among Hispanic foreign-born than native-born (see (Acevedo-Garcia et al. 2012, Angel, Buckley and Finch 2001), but the relationship still exists, and SES likely contributes to how SRH differs by migration stage among Mexican migrants.

Gender, Migration, and Self-Rated Health

In evaluating the relationship between migration stage and SRH, it is important to consider how this process might operate differently by gender. Despite wide-scale changes in the composition and motivations for Mexican migration to the U.S., the migration process remains gendered (Cerrutti and Massey 2001, Donato 2010, Fry 2006). Therefore, women may be less positively selected on health and health behaviors. Studies also show that, on average, women report poorer SRH than men (Franks, Gold and Fiscella 2003, McCullough and Laurenceau

2004), a pattern confirmed among foreign-born Hispanics (Angel, Buckley and Finch 2001), and Mexican adults (Rubalcava et al. 2008).

Gender differences may also appear in how SRH changes with acculturation and duration in the U.S., although the expected relationship is unclear. On the one hand, studies show that U.S. immigrants adopt more unhealthy behaviors (e.g., smoking, drinking) with increasing acculturation, but that these relationships are stronger among women (Antecol and Bedard 2006, Lopez-Gonzalez, Aravena and Hummer 2005), likely reflecting the shifting status of Mexican women (diminishing female conservatism and increasing independence) relative to men (Donato et al. 2006, Parrado and Flippen 2005). On the other hand, Mexican men may perform more physically dangerous work in the U.S. (Loh and Richardson 2004, Smith et al. 2005).

Finally, the status changes accompanying migration (whereby women make modest gains in independence and decision-making relative to gender relations in Mexico, whereas men lose status and power) may drive both women's desire to settle permanently in the U.S. and men's interest to return (Hirsch 2003, Hondagneu-Sotelo 1994). Taken together, existing research suggests that acculturation, occupation, and settlement desires may have implications for whether men or women return to Mexico, and their health status upon returning. Despite some research suggesting that the relationship between acculturation and health differs for women and men migrants (reference removed), research to date has not examined how SRH differs between by gender across the migration process. We examine these differences using a bi-national sample of current, return, and non-migrant Mexican men and women.

DATA AND METHODS

We employ data from the 2010 Network Survey of Immigrant Transnationalism (NSIT). This innovative, bi-national survey sampled Mexican-origin persons living in two locations:

never and return migrants living in a medium sized city in the state of Guanajuato, Mexico, and migrants from the same origin community living in Houston, Texas and Raleigh/Durham, North Carolina. The state of Guanajuato and this small city in particular has an established history of U.S. migration. In total, 607 adults (ages 12 to 91) were interviewed: 410 in the origin town in Guanajuato, 51 in Houston, and 146 in North Carolina. A link-tracing design was implemented to collect data beginning with current migrants living in the U.S. and then with their friends and family members in Guanajuato (Felix-Medina and Thompson 2004)(reference removed). The small size of the desired target population residing in the U.S. made a random sample design unfeasible and beyond the scope of the network focus. Instead, U.S. respondents were asked to provide referrals, which were used to obtain the next wave of potential respondents. The nominations gathered from U.S. respondents were used to locate friends and family members living in the U.S. and in Mexico.

To ensure sufficient referrals, information on legal status was not collected (however, extensive fieldwork in Mexico and the U.S. and knowledge of the community's migration patterns suggests that the North Carolina sample is largely unauthorized while the Houston sample is largely authorized). All surveys were conducted in person and in Spanish. Regarding item non-response, we compared a baseline model predicting SRH (using multiple imputation) with migration categories, gender, and age against the full sample of 607 adults to a comparable model using the listwise deleted sample. The coefficients did not substantially differ, so we excluded 118 respondents with missing information on at least one covariate and present results from a final analytical sample of 489 adults living in Mexico and the U.S.

These data allow us to examine the association between SRH and migration status, overcoming common shortcomings of most Mexican migrant health studies (research examining

immigrant health typically relies on U.S.-based survey data, although sometimes this is paired with survey data separately collected in Mexico (see (Abraído-Lanza et al. 1999, Bostean 2013, Palloni and Arias 2004, Turra and Elo 2008)). By using the 2010 NSIT, we are able to identify and compare individuals who have never migrated to the U.S., those who migrated and returned to Mexico, and current migrants (regardless of how many trips they have made to the U.S.) from the same origin community. This allows for comparisons across multiple types of migration experience and an assessment of how SRH is associated with various stages of the migration process. By comparing non-migrants to current migrants, we are able to test whether migrants report better health than non-migrants (evidence of positive health selection), and by comparing return migrants to current migrants (and non-migrants) we are able to test whether return migrants report worse health (evidence of negative health selection/salmon bias).

Measures

The dependent variable, poor health, was constructed from the question asking respondents to rate their overall health status as excellent, very good, good, fair, or poor. The measure was dichotomized to indicate fair or poor (=1) versus excellent, very good, or good health. All respondents (irrespective of interview location) were asked the question in Spanish, reducing concerns of misclassifying health status due to the language of the interview (Bzostek, Goldman and Pebley 2007, Jerant, Arellanes and Franks 2008, Kandula, Lauderdale and Baker 2007, Viruell-Fuentes et al. 2011) .

The primary independent variable, migration experience, combines information on the respondent's current location of residence and the number of years spent in the United States. Three groups were constructed: non-migrants who have never lived in the U.S., return migrants currently residing in Mexico, and current migrants living in the U.S. Using data on duration of

residence in the U.S., return migrants were then classified as having lived in the U.S. for less than four or four or more years and current migrants were classified as having lived in the U.S. for less than eleven or eleven or more years. Duration cut-points were chosen based on the distribution of the data and to ensure adequate sample sizes for each category.

Following the previous literature, English language ability is used as an indicator of the respondent's level of acculturation. Respondents were asked to rate their ability to speak English as very good, good, not good, or not at all. The variable is dichotomized so that 1 = very good or good English-language ability.

We include multiple indicators of stress. First, a scale was constructed to summarize a respondent's perceived attachment to Mexico. This scale sums three dichotomized variables including: the respondent reports feeling happier in Mexico than the U.S., dislike for U.S. culture, and a disinclination to live in the U.S. permanently (range: 1 to 3, with higher values indicating a stronger Mexico preference). We also constructed a dichotomous indicator of whether or not the respondent has family and/or friends across the U.S.-Mexico border relative to their current location (i.e. family in Mexico if respondent is currently in the U.S. and vice versa). As another indicator of stress we control for the respondent's self-rated unhappiness (1=very unhappy or unhappy).

Respondent SES was measured using four variables. First, the highest level of education completed was categorized into four groups: less than secondary, secondary, high school, and college or graduate school. Second, an earnings variable was constructed by dividing weekly earnings for respondents working at survey date into quartiles (earnings were harmonized into pesos regardless of interview location), then categorized into five groups: no earnings because not currently working, and earnings quartiles 1-4. The reference group is the highest earnings

group. Third, economic optimism assessed how positively a respondent imagined his/her economic situation in five years (range: 1 to 5, with higher values indicating a more positive economic outlook). The final SES measure represents a respondent's relative economic standing compared to those in their current location. For example, if a respondent resides in Mexico, they are asked to compare their economic situation to others in Mexico (range: 1 to 9, with higher scores indicating that the respondent rates himself/herself higher than peers). Demographic measures include gender (1 = male) and the respondent's age.

Analysis

We begin by presenting sample characteristics (mean values) for all measures across categories of migration experience (Table 1), including mean difference tests between never migrants and return and current migrants. We then turn to multivariate logistic regression to estimate the relationship between poor health and migration experience categories. Seeking to explain this relationship, we then examined a series of nested models that first adjusted for acculturation, then social stress, and finally SES. All models are unweighted and estimated using robust standard errors to account for geographic clustering of the sample respondents. (In sensitivity analyses, standard errors clustered by location of residence—Mexico, Houston, or North Carolina—produced results with smaller standard errors than the unclustered standard errors indicating more variability within the cluster than between them. To minimize bias, robust rather than clustered standard errors are estimated). Finally, we explored gender differences in the relationship between migration experience and SRH and assessed differences in the average predicted probabilities using the margins command in Stata 13.0.

RESULTS

Table 1 presents the descriptive results for the entire sample and stratified by migration experience. Overall, one-third of the sample (34%) rates their health status as poor. SRH also varies by migration experience; return migrants who spent at least four years in the U.S. are the most likely of any group to report poor health (45%), and substantially more likely than never migrants (35%). Conversely, return migrants with the shortest duration of U.S. residence are the least likely to report poor health (30%). Current migrants are comparable to the overall sample in their SRH and neither category of current migrants differs significantly in their health assessment from never migrants (35 and 32% for current migrants with less than 11 years and more than 11 years, respectively).

Table 1 about Here

The overall sample is split almost evenly by gender (49 percent of the sample is male); yet this gender balance is not reflected across migration categories as over 34 percent of the never migrant sample is male, and 48 percent of current migrants with less than eleven years of U.S. residence, and 65 percent of current migrants with the longest durations are male. Males also make up the majority of return migrants in both categories (67% for those with less than 4 years and 87% for those with at least 4 years). The sample is also relatively young with a mean age of 38. As is commonly found in other studies of Mexican immigration, current migrants are younger than return migrants (early 30s versus around 40, respectively).

In terms of acculturation status, over 12 percent of the sample reports being able to speak English well. Only 4 percent of never migrants are able to speak English; return and current migrants are significantly more likely to speak English. More than one-quarter of current migrants with the longest durations report speaking English well, followed by 23 percent of return migrants with the longest stays, and about 15 percent of return and current migrants with

the shortest stays. Turning to the indicators of social stress, never migrants have a significantly stronger preference for residing in Mexico compared to all types of migrants. Current migrants, regardless of duration, have the weakest attachment to Mexico (around 1 out of 3). A majority of respondents report having family and/or friends across the respective border, though never migrants are the least likely at 60 percent (compared to 84 to 100 percent of return and current migrants, respectively). In the overall sample, almost 14 percent of respondents self-reported as unhappy. Though there are no significant differences, one-fifth of return migrants with four or more years and current migrants with less than eleven years are unhappy.

As suggested in prior migration research, educational attainment varies by migration experience. More than 40 percent of return migrants have less than a secondary education compared to over 52 percent of current migrants with the longest durations in the U.S. Over one-half of non-migrants also report not working while the majority of return and current migrants work (almost 70% or greater). Despite the fact that current migrants report high employment rates, they are the most likely to report the lowest earnings. Return migrants, in contrast, are concentrated in the mid- and high-earnings categories. In light of their low wages, it is surprising that current migrants express the most optimism for their economic future. Finally, and likely as a result of their high earnings, return migrants rate their economic standing comparably higher than current migrants.

Table 2 about Here

The results from the descriptive analysis indicate differences across migration categories on SRH and the other key independent variables. We turn next to multivariate analysis to test the health selection hypotheses. Table 2 presents the results of logistic regression models predicting poor health with never migrants as the reference group. The baseline model (first column)

includes the migration categories, adjusted for gender and age. Generally, compared to adults who have never migrated from Mexico, return migrants have significantly higher log-odds of reporting poor health—but only among those with greater U.S. experience (4+ years). Specifically, in the baseline model, return migrants who spent four or more years in the U.S. are 2.6 times more likely than never migrants to self-report poor health (exp(0.96)=OR=2.6). Similarly, current migrants with the shortest duration in the U.S. (less than 11) are about 88 percent more likely to report poor health (b=0.63), while the contrast with longer-duration current migrants is not significant. The baseline model also shows that men have lower log-odds of reporting poor health than women. With increasing age, the log-odds of reporting poor health increase.

We also hypothesized that acculturation, measured via English language ability, mediates the relationship between migration experience and SRH. Shown in column 2 of Table 2, the acculturation model suggests that English ability is marginally significant in predicting poor health status for this population of Mexicans from Guanajuato. Adults who speak English have lower odds of reporting poor health compared to non-English speakers (1-exp(-0.73)=0.48). Nevertheless, adjusting for English ability does not explain the relationship between migration experience and SRH; rather, adjusting for English ability actually strengthens differences in SRH between never migrants and return migrants with more than four years in the U.S., as well as current shorter-term U.S. migrants. Social stress was also hypothesized to explain part of the migration-SRH relationship. The results are shown in the third column of Table 2. The presence of family or friends across the border is not predictive of poor health, but being unhappy is significantly associated with an increase in the log-odds of reporting poor health, and adjusting

for stress attenuates the relationship between migration experience and SRH for current but not for return migrants.

The final model of Table 2 (the full additive model) adds socioeconomic variables. As expected, adults with low educational attainment (less than secondary schooling) have greater log-odds of reporting poor health compared to adults with a college education. Similarly, adults with low earnings have significantly higher log-odds of poor health compared to their high-earning peers. For example, low earners are more than 3 times more likely to report poor health compared to high earners (exp(1.2)=3.4). Finally, a respondent's economic outlook and relative economic standing are not associated with SRH. Adjusting for economic variables reduces the relationship between current U.S. migrants with eleven or more years in the U.S. and SRH to non-significance. However, the SES variables are unable to fully explain the relationship between return migrants with four or more U.S. years and SRH as it remains significant (at the $p < 0.10$ level).

To fully test the salmon bias hypothesis, we ran an analogous model (shown in Appendix Table 1) comparing the migration categories to return migrants with more than 4 years of U.S. residence. In the full model (which includes controls for acculturation, stress, and SES), never migrants have marginally significantly lower log-odds of reporting poor health, but neither group of current migrants differs significantly from return migrants with 4 or more years of U.S experience.

We next explored gender differences in the relationship between migration experience and SRH to produce average predicted probabilities of poor SRH by gender and migration experience category (presented in Figure 1). Overall, women have higher probabilities of reporting poor health compared to men (see Table 2), confirming prior literature on SRH and

gender among Mexican adults (see (Angel, Buckley and Finch 2001, Rubalcava et al. 2008). This gender gap is significant for never migrants and return migrants with less than four years in the United States. However, for migrants with more U.S. experience, the probability of reporting poor health does not differ significantly by gender. Overall, both men and women return migrants who spent more than four years living in the U.S. have the highest probabilities of poor health.

Figure 1 about Here

To test whether the average predicted probability of poor health by migration experience differed by gender difference-in-difference tests were estimated. The non-significant results reveal that the effect of gender is constant across migration experience categories. In other words, there are gender differences in SRH at the $p<0.05$ significance level (indicated by an asterisk in the figure), but not gender differences in SRH across migration categories.

In supplementary analyses, gender stratified models were estimated to evaluate the predictors of poor health (results not shown, but available from authors). Because of limited sample sizes, return and current migrants were not subdivided by duration of residence. For men, return migrants have more than twice the odds of reporting poor health compared to never migrants ($\exp(0.8)=2.2$). Furthermore, for men only English proficiency significantly reduces their odds of poor health. For women, models showed each additional year of age is significantly associated with increased log-odds of poor health ($b=0.06$), and having low educational attainment and low earnings are significantly associated with increased odds of reporting poor health. Unhappiness, for women but not men, is a strong and significant predictor of poor health ($b=1.9$).

CONCLUSION

The puzzling finding that Hispanic immigrants, relative to the native-born, experience favorable health despite their low socioeconomic status has generated a large body of research and received validation in a seminal review article (Markides and Eschbach 2005). This scholarship usually employs U.S.-based samples to test mechanisms driving the paradox, typically via acculturation-related changes and occasionally for aspects of selective immigration and emigration. We contribute to this research by assessing SRH across the migration-settlement trajectory, including whether it varies by gender, using new, network-based bi-national data. We began by comparing non-migrant Mexican residents with both short- and long-term current migrants, as well as return migrants with different levels of U.S. experience.

Regarding the hypothesis that Mexican migrants are positively selected on health status (i.e., the "healthy migrant" hypothesis), we find little evidence in these data. Unadjusted prevalence rates of poor SRH are quite similar between non-migrants and current migrants in Table 1, and the baseline regression model (adjusted for age and gender) finds higher log-odds of poor health among current migrants. While this contrast is not significant for longer term migrants (over 11 years), it is significant for those in the U.S. less than eleven (although adjusting for stress explains this difference). These findings for current migrants with less than eleven years U.S. experience suggests that positive health selection may not be operating among immigrants originating from Guanajuato. Prior work has shown that migration becomes less selective as migrant networks become more established in the community (Lindstrom and Ramírez 2010), which is the case for the Guanajuato community and may contribute to our results. This result also parallels the findings of Akresh and Frank (2008) who found that Mexican migrants were less selected on health when compared to other migrant groups. The non-significant findings for current migrants who have been in the U.S. for more than eleven

years fails to support past studies demonstrating health declines with increasing U.S. duration (or acculturation) (Bostean 2013, Finch and Vega 2003).

Regarding the "salmon bias" hypothesis (return migrants are negatively selected on health status), we found evidence to suggest that immigrants who return to Mexico have less favorable health than non-migrants—but only for return migrants who spent four or more years in the United States. Additional tests (shown in the Appendix) indicated that return migrants who were in the U.S. for a shorter stay have lower odds of reporting poor health compared to return migrants with the longest duration in the U.S., but the association is mediated by stress and SES. Return migrants with four or more years in the U.S. significantly differ from current migrants with the longest duration, but the relationship again is mediated by stress and SES. As a result, we only find tentative evidence in support of the salmon bias hypothesis and confirm the overall pattern found in prior research that Mexican migrants return home unhealthier than non-migrants (Palloni and Arias 2004, Turra and Elo 2008). Yet our finding of salmon bias for SRH contradicts prior research by Ullman and colleagues (2011) as well as Bostean (2013); both find that return migrants differ from non-migrants on activity limitations and chronic conditions, but not SRH.

These contradictory findings may be attributable to the fact that health is a multi-dimensional construct that is shaped by a number of factors, including health behaviors, health conditions, and functional limitations. Different groups tend to think about different components when rating their own health. For example, older people are more likely to think about health problems and functional limitations, while younger adults are more likely to emphasize health behaviors and obesity (Krause and Jay 1994). However, SRH does capture something real (e.g., mortality, health conditions, etc.; see (Franks, Gold and Fiscella 2003, McGee et al. 1998). Like

Ullman and colleagues (2011) and Bostean (2013), we focused on Mexican immigrants; however, it is possible that the respondents in our network sample are considering different factors when assessing their health. Additional research is needed to clarify whether and how differences in the samples examined contribute to these disparate results across studies.

Finally, we contribute to literature on gender, health, and migration by examining whether the relationship between migration experience and SRH differs for Mexican men and women. Confirming prior research, women across all migration categories assess their health less favorably than men (Angel, Buckley and Finch 2001). Among never migrants and return migrants with less than four years in the U.S., men and women significantly differ in their probability of reporting poor health. Yet the gender difference in SRH does not vary across migration categories, tentatively suggesting that the process is not highly gendered. Nevertheless, gender stratified models imply that the predictors of health are gendered. Only English proficiency was a significant predictor of men's SRH, while age, unhappiness, and SES predict women's SRH. These findings are tentative given the small number of women in both the current and return migrant categories; as such, additional work with larger samples of men and women across all stages of the migrant-settlement trajectory is needed to confirm and expand upon these findings.

Despite the strengths of this study, it is not without limitations. Studies of SRH often control for physical and mental health conditions to account for the complex set of components that comprise SRH. Due to the limited information on health status in the 2010 NSIT, our focus is restricted to SRH and a single control for self-reported happiness. Still, we find a pattern of less favorable health for return migrants, net of controls. Moreover, while the NSIT is a novel network-based data collection, it is not a probability sample. As a result, the findings may only

apply to those originating from the origin community in Guanajuato. Additionally, like the majority of work on SRH, we are unable to assess whether the differences in SRH across migration categories are attributable to changing perceptions of health as a consequence of U.S. migration experience. In other words, because the NSIT did not collect data on health perceptions or the comparison group for SRH, it is possible that return migrants self-assess their health differently because their idea of what constitutes a healthy state or their reference group has changed.

Finally, we are unable to distinguish authorized immigrants from unauthorized—a shortcoming that plagues the majority of the migrant health literature. Prior ethnographic research in our sample community revealed that the Texas sample is largely authorized while the North Carolina sample is unauthorized; in sensitivity analyses, a categorical variable for geographic location was included and non-significant in all models. While it is a modest test, it reduces concerns of bias. However, it is possible that the migration-health relationship may be misrepresented to an unknown extent, especially related to questions of health selection among U.S.-Mexico migrants. Research documents stress, danger, and physical/mental damage associated with unauthorized border crossing and poor living and working conditions among migrants (Holmes 2013, Slack et al. 2013). Yet unauthorized immigrants from Mexico, who often come to the U.S. in search of work, are blocked from medical care after arrival by their legal and financial status (Holmes 2013), experience poor health outcomes, and may return to Mexico unhealthy. To permit more extensive assessments of immigrant health, future data collections should gather information on legal status.

In conclusion, our findings indicate the importance of immigrant health research that compares their health status across the migrant-settlement trajectory using bi-national data. Our

focus was on adults from a community in the state of Guanajuato, Mexico, including current migrants in the U.S. and return migrants and their non-migrant peers in Mexico. While data restrictions limited our attention to SRH, our findings begin to fill an important gap in our understanding of the migration-health relationship more generally—and critically, how that relationship relates to health and medical service use among a population at significant risk of injury and generally poor health. This research suggests that selection patterns alone (i.e., positive health selection and salmon bias) do not explain the Hispanic health paradox, but that acculturation-related changes among current migrants do influence SRH assessments among Mexican migrants, suggesting that studies utilizing only U.S.-based samples may be relatively reliable sources of information on the SRH of Mexican migrants living in the United States.

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Table 1: Means and Percentages of Sample Variables by Migration Experience

	Overall Sample	Migration Experience in U.S.									
		Never	Return <4 years		Return 4+ years		Current <11 years		Current 11+ years	
Poor Health	34.4	34.5	30.4		45.2		35.2		32.0	
Male	48.5	34.1	67.4	*	87.1	*	48.1		65.0	*
Age	37.6	37.7	40.4		39.3		30.7	*	33.9	
Residence[1]										
Mexico	68.5	100.0	100.0		100.0		--		--	
Houston	7.6	--	--		--		9.3		32.0	
North Carolina	23.9	--	--		--		90.7		68.0	
English ability	12.1	3.9	15.2	*	22.6	*	14.8	*	27.0	*
Prefer Mexico	2.0	2.5	2.1	*	1.4	*	1.2	*	1.0	*
Cross-border family/friends[1]	76.3	60.1	84.8		83.9		100.0		99.0	
Unhappy	13.7	12.0	10.9		22.6		20.4		13.0	
Education										
Less than secondary	41.5	38.4	41.3		45.2		35.2		52.0	*
Secondary	28.0	26.7	28.3		32.3		38.9		24.0	
High School	8.8	12.8	15.2		6.5		--		1.0	*
College	21.7	22.1	15.2		16.1		25.9		23.0	
Earnings Categories										
Not working, 0 earnings	36.4	54.3	28.3	*	32.3	*	14.8	*	7.0	*
Very low	19.4	5.4	2.2		3.2		48.1	*	53.0	*
Low	13.3	11.2	8.7		3.2		18.5		21.0	*
Mid	17.0	16.3	28.3		41.9	*	9.3		9.0	
High	13.9	12.8	32.6	*	19.4		9.3		9.0	
Economic Outlook	3.6	3.5	3.7		3.4		3.9	*	3.8	*
Relative Economic Standing	5.0	3.5	5.3		5.2		4.2	*	4.3	*
Sample Size	489	258	46		31		54		100	

Source: 2010 NSIT in Mexico and the U.S.

[1] Differences across migration experience not tested.

* Indicates significantly different from Never Migrants at p<0.10 level; robust standard errors

Table 2. Logistic Regression Predicting Fair Health (N=489)

	Baseline			Acculturation			Stress			SES		
	B		SE(B)	B		SE(B)	B		SE(B)	B		SE(B)
Migration Experience in U.S. (REF.=Never Migrate)												
Return migrant <4 years	-0.06		0.37	0.02		0.37	0.08		0.39	0.19		0.41
Return migrant 4+ years	0.96	*	0.43	1.09	**	0.43	1.00	*	0.50	1.00	+	0.52
Current US migrant <11 years	0.63	+	0.38	0.68	+	0.38	0.56		0.42	0.48		0.46
Current US migrant 11+ years	0.17		0.29	0.31		0.30	0.31		0.37	0.15		0.45
				-			-			-		
Male	-0.87	***	0.24	0.86	***	0.24	0.87	***	0.25	0.80	**	0.29
Age	0.06	***	0.01	0.05	***	0.01	0.05	***	0.01	0.04	***	0.01
				-			-			-		
English ability				0.73	+	0.40	0.71	+	0.42	0.53		0.41
							-			-		
Prefer Mexico							0.02		0.13	0.04		0.14
							-			-		
Cross-border family/friends							0.15		0.29	0.22		0.30
Unhappy							1.20	***	0.30	1.17	***	0.32
Education (REF.=College)												
Less than secondary										0.73	*	0.34
Secondary										0.28		0.34
High School										0.23		0.49
Earnings Categories (REF.=High)												
Not working, 0 earnings										0.64		0.41
Very low										0.61		0.49
Low										1.16	*	0.46
Mid										0.57		0.44
										-		
Economic Outlook										0.14		0.13
										-		
Relative Economic Standing										0.03		0.07
				-			-			-		
Constant	-2.62	***	0.36	2.52	***	0.36	2.48	***	0.51	2.41	**	0.88

Source: 2010 NSIT in Mexico and the

U.S.

†p<0.10; *p<0.05; **p<0.01; ***p<0.001

Robust Standard Errors

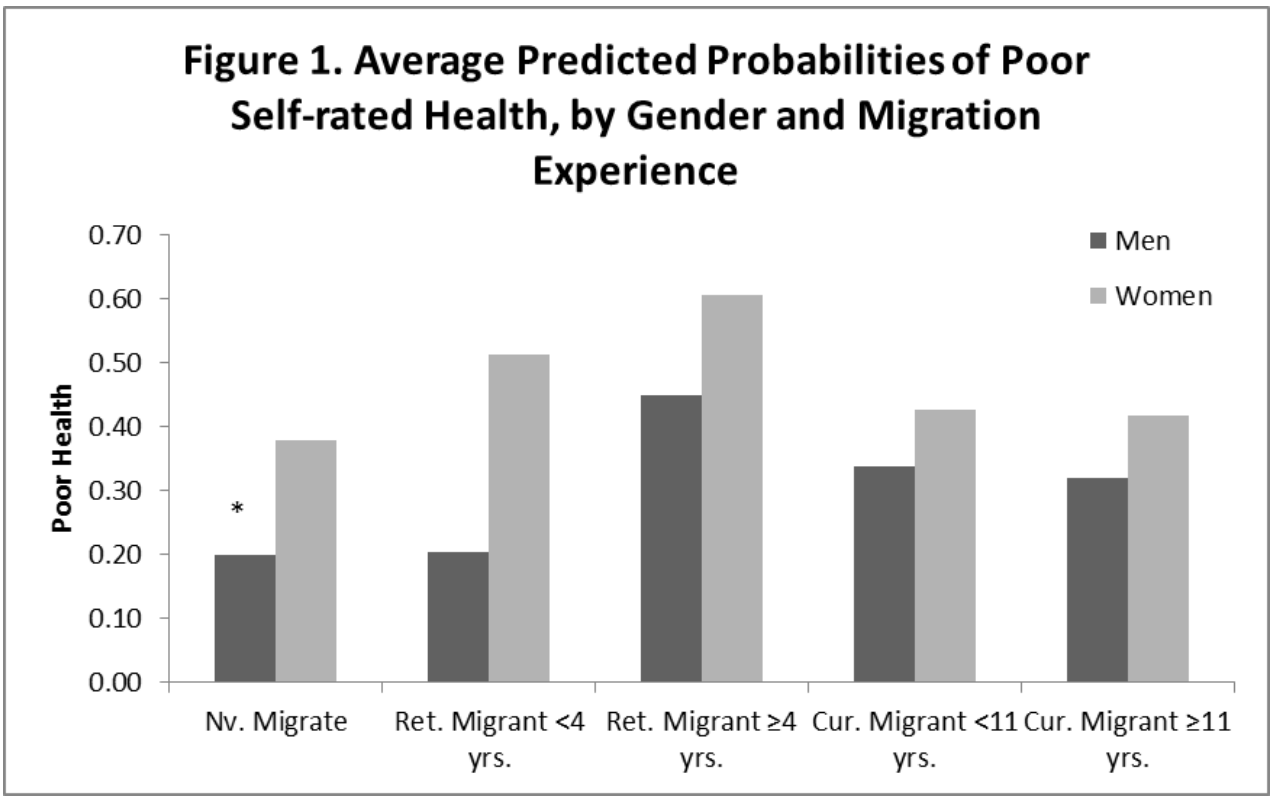
Appendix 1. Logistic Regression Predicting Fair Health (N=489)

	Baseline			Acculturation			Stress			SES		
	B		SE(B)	B		SE(B)	B		SE(B)	B		SE(B)
Migration Experience in U.S. (REF.=Return migrant 4+ years)												
Never Migrate	-0.96	*	0.43	-1.09	**	0.43	-1.00	*	0.50	-1.00	+	0.52
Return migrant <4 years	-1.01	*	0.50	-1.07	*	0.49	-0.92	+	0.54	-0.81		0.56
Current US migrant <11 years	-0.33		0.52	-0.41		0.52	-0.44		0.54	-0.52		0.58
Current US migrant 11+ years	-0.79	+	0.45	-0.78	+	0.44	-0.70		0.47	-0.85		0.55
Male	-0.87	***	0.24	-0.86	***	0.24	-0.87	***	0.25	-0.80	**	0.29
Age 50+	0.06	***	0.01	0.05	***	0.01	0.05	***	0.01	0.04	***	0.01
English ability				-0.73	+	0.40	-0.71	+	0.42	-0.53		0.41
Prefer Mexico							-0.02		0.13	-0.04		0.14
Cross-border family/friends							-0.15		0.29	-0.22		0.30
Unhappy							1.20	***	0.30	1.17	***	0.32
Education (REF.=College)												
Less than secondary										0.73	*	0.34
Secondary										0.28		0.34
High School										0.23		0.49
Earnings Categories (REF.=High)												
Not working, 0 earnings										0.64		0.41
Very low										0.61		0.49
Low										1.16	*	0.46
Mid										0.57		0.44
Economic Outlook										-0.14		0.13
Relative Economic Standing										-0.03		0.07
Constant	-1.67	**	0.53	-1.43	**	0.54	-1.48	*	0.63	-1.41		0.92

Source: 2010 NSIT in Mexico and the U.S.

†p<0.10; *p<0.05; **p<0.01; ***p<0.001

Robust Standard Errors



Note: *p<0.05; Indicates a significant difference between men and women within migration category