

The health of parents who remain behind

Socioeconomic and community differentials in the health of parents in Mexico whose children migrated to the United States

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Acknowledgements:

We are grateful to David Lindstrom and to the participants of the Social Inequality Group at the Centre for Demographic Studies (CED) for their insightful feedback on earlier versions of this manuscript.

Declaration of Interest Statement:

We have nothing to declare

Abstract

While international migration can bring economic benefits to sending societies through remittances, it also reshapes family structures and intergenerational support systems in profound ways. The migration of adult children has important implications for parents who remain behind, particularly in countries with rapidly ageing populations and limited institutional care. This study examines the mental and physical health of parents in Mexico whose offspring have migrated to the United States. Using data from the Mexican Migration Project (2007–2019), we compare parents with migrant children to those whose children have not migrated across three health dimensions: chronic conditions, psychiatric problems, and self-rated health. Results show a consistent health penalty for parents with migrant children, especially with regard to mental health. Importantly, this negative association is moderated by factors such as socioeconomic status and community characteristics. Parents with limited economic resources and those living in areas with low US migration prevalence or urban areas or are disproportionately affected by their children migration. Overall, the findings underscore the emotional and health-related costs of migration borne by non-migrant family members.

Keywords: international migration, mental health, Mexico, transnational families, intergenerational relationships

Introduction

Migration affects not only those who settle in the receiving country but also the family members who remain behind. In particular, the migration of a parent, partner, or child can have significant and lasting effects on multiple aspects of an individual's life - effects that go beyond the economic benefits of remittances. Yet, little is known about the health and well-being consequences for families who stay in sending communities. This is especially relevant in countries with rapidly ageing populations, where the migration of adult children carries important implications. In contexts with limited institutional care systems and weak welfare states, ageing parents depend heavily on their children for daily support. Migration, therefore, reshapes family roles and intergenerational support systems in profound ways.

Existing research has produced mixed evidence on how parental well-being is affected by children's migration. Several studies suggest that parents whose children migrate experience worse health than those whose children remain nearby. This has been documented, for example, in the case of internal migration in China (Scheffel & Zhang, 2019; Cheng et al., 2015) and international migration in India (Miltiades, 2002). However, other studies have reported contrasting results, finding either no differences in the health and well-being of parents with migrant children compared to those whose children remain in the home country, or even better outcomes for the former on certain health indicators (Waidler et al., 2017; Böhme, Persian & Stöhr, 2015). Studies reporting no differences in parental health often emphasize income-related factors, suggesting that the greater economic resources provided by remittances compensate for the absence of migrant children. In the case of Mexico, however, results indicate that parents with children who have migrated to the United States experience poorer well-

being than those whose children remain in Mexico, particularly with respect to measures such as depression and loneliness (Yahirun & Arenas, 2018; Silver, 2011; Antman, 2008).

Despite the growing body of literature, little is known about the heterogeneity in the health of parents who remain behind, either at the individual or community level. Shedding light on the conditions under which children's migration is detrimental to parental health may help reconcile the contradictory findings in the literature. The differing results may be explained by the subpopulations studied, the context considered or the health measures used. Addressing this gap, the present study examines potential moderating factors to identify which groups of parents are most vulnerable to poor physical and mental health outcomes. We focus on three domains that constitute social determinants of health and may also act as potential moderators between offspring migration and parental well-being: socioeconomic status, social support, and community characteristics. More specifically, we assess how the health outcomes of Mexican parents with children in the United States vary according to parents' socioeconomic resources, whether they receive remittances, and the prevalence of migration to the United States within their community of origin.

Focusing on Mexico is particularly relevant, as family support and assistance play a central role in shaping health outcomes. Children are typically the primary caregivers of their ageing parents, often cohabiting with them or residing nearby (Aguila, Diaz et al., 2012; Angel et al., 2016). Moreover, strong intergenerational economic transfers are common (Lee, 2013). Therefore, the large-scale emigration of adults to the United States poses a significant challenge for sending communities. Studying the well-being of parents who remain behind is thus important to fully understand the broad social consequences of migration in Mexico.

This article addresses two research questions: (1) How does the health of parents in Mexico whose children have migrated to the United States compare with that of parents whose children remain in Mexico? In our analysis, we consider not only offspring's migration but also the presence of children - particularly daughters - who stay in the country of origin and can therefore provide support to their aging parents. This consideration leads to the second question: (2) Which groups of parents with migrant children are particularly at risk of poor health? To answer these questions, we draw on data from the Mexican Migration Project (2007–2019).

A strength of the analysis is that it considers three dimensions of health: self-rated health, physical health, and mental health. Physical health is assessed through the presence of several chronic conditions, while mental health is measured by the presence of psychiatric problems. Self-rated health, widely used in the literature, captures individuals' overall health status and has been shown to correlate closely with biological indicators, including mortality (Jylhä, 2009). By incorporating multiple, complementary measures of health, this study provides a more comprehensive picture of parental health than previous research.

Literature review

The Social Determinants of Health

The following sections provide a summary of the rich literature on the social determinants of health, highlighting three key factors - socioeconomic status, social support, and community characteristics - which may also serve as mechanisms linking children's migration to parental health. Each factor is first discussed at a general level and then in the context of children's migration.

The social determinants of health are defined as factors unrelated to medical care but shaped by the conditions in which people live (Braveman, Egerter & Williams, 2011; Marmot, 2005). International research has consistently shown that greater social disadvantage - for example, in terms of income, education, and employment - is associated with poorer health outcomes (Braveman, Egerter & Williams, 2011; Mackenbach & Howden-Chapman, 2003). Moreover, the underlying factors shaping physical and mental health conditions are largely similar (Michael et al., 2015). Just as physical health varies systematically along a social gradient, mental health also correlates strongly with individuals' positions in society. The pathways through which economic and social advantage translate into better health are multiple, including access to higher-quality housing and more nutritious diets. More broadly, greater economic and material resources reduce the stress of coping with daily challenges and therefore act as protective factors for health (Uchino, 2006; McEwen & Gianaros, 2010).

Another important source of stress is the lack of social connectedness (Holt-Lunstad, 2022). Social relationships and support help individuals cope with stress and protect against negative health outcomes. This is particularly relevant in a global context where a growing share of the population - especially older adults - experiences social isolation

and loneliness (Perissinotto, Cenzer & Covinsky, 2012; Holt-Lunstad, 2021). Proximity to others, particularly trusted ones, is consistently shown to benefit health, as evidenced by numerous international studies and meta-analyses (Leigh-Hunt et al., 2017; Holt-Lunstad, Robles & Sbarra, 2017; Holt-Lunstad, 2022). Although the literature employs a range of terms and concepts - such as social support, social networks, and social isolation - there is strong convergence in the evidence showing that social connectedness is linked to mortality as well as physical, mental, and cognitive health outcomes. With respect to mental health, low social connectedness has been associated with anxiety, depression, and suicide risk (Holt-Lunstad, 2022; Erzen & Çikrikci, 2018).

Finally, community characteristics also influence health. Even after accounting for individual characteristics, community-level factors remain important determinants of health. Neighborhoods, for example, can affect health through the availability of services and their physical environment (Braveman, Egerter & Williams, 2011). In addition, feeling safe, and experiencing social reciprocity and trust, are associated with lower psychological distress and improved mental health (Braveman, Egerter & Williams, 2011; Phongsavan et al., 2006).

The Health of Parents Who Remain Behind

Evidence from Mexico suggests that parents whose children migrated to the United States have poorer well-being than those who live in physical proximity to their offspring (Yahirun & Arenas, 2018; Silver, 2011; Antman, 2008). Similar findings have been reported in other contexts, including internal migration in China (Scheffel & Zhang, 2019; Cheng et al., 2015) and international migration in India (Miltiades, 2002). Feelings of depression, guilt, anxiety, and stress when children leave home are well-documented as “empty nest syndrome” (Mount & Moas, 2015; Thapa et al., 2018). For

parents of international migrants, such distress may be compounded by increased physical distance and sense of separation. Moreover, when children face particularly vulnerable situations abroad, such as undocumented status in the US, parents may be especially concerned about their safety and well-being.

In countries such as Mexico, family support and assistance play a central role in shaping health outcomes. The migration of adult children disrupts this key system of intergenerational care. As a result, beyond feelings of loneliness and depression, older parents may also face the risk of not receiving the care they need (Foner & Dreby, 2011; Yahirun & Arenas, 2018). Migration can also mean that parents must care for grandchildren who remain in the country of origin (Van Hook & Glick, 2020), a household arrangement that adds further responsibilities for ageing individuals.

Other international studies have reached different conclusions, finding either no significant differences in the health and well-being of parents with migrant children compared to those whose children remain in the home country, or, conversely, that the former are better off on several health indicators (Waidler, Vanore et al., 2017; Böhme, Persian & Stöhr, 2015). Studies reporting no health differences often argue that the greater economic security and financial resources provided by remittances compensate parents for the absence of their offspring. Remittances, for instance, can improve access to health care. Adhikari et al. (2011) found that parents of migrant children in Thailand were more likely to seek treatment when ill. They can also enhance living conditions, by allowing for a more diverse diet, more time for leisure and sleep, and less time devoted to farming (Böhme, Persian & Stöhr, 2015). Finally, since migration is often a family-level strategy in response to economic uncertainty, parents may also derive satisfaction and pride from having a child successfully settled abroad (Massey et al., 1993; Ivlevs et al., 2019).

In summary, for a parent, separation from a child due to migration may result in reduced informal care, lower social support, increased loneliness, and greater relationship conflict. These factors are likely to contribute to poorer physical and mental health (Holt-Lunstad, 2022). On the other hand, the greater economic resources associated with remittances may enhance the social position of parents, potentially translating into better health outcomes (Braveman, Egerter, & Williams, 2011; Mackenbach & Howden-Chapman, 2003). This economic support may or may not fully compensate for the absence of children. However, based on the evidence from Mexico presented above (Yahirun & Arenas, 2018; Silver, 2011; Antman, 2008), the first hypothesis of this study is:

Hypothesis 1: Having at least one child in the US has a detrimental effect on both mental and physical health of parents who remain in Mexico.

Before presenting the following hypotheses, it is important to note that studying the health of parents with migrant children raises concerns related to endogeneity (Ivlevs et al., 2019; Antman, 2013). First, there is the issue of reverse causality: children may migrate precisely to provide economic support and health care to ill parents. Conversely, it is also reasonable to expect that children may be less likely to leave home if their parents' health is declining, so that they can provide care more easily (Démurger, 2015). Furthermore, since migrants tend to be positively selected on health—and health has a genetic component—the parents of migrant children may also be healthier than the general population. In addition, migrants and their families may be positively selected on education, socioeconomic status, and social capital - factors strongly associated with health and well-being. Studies using approaches such as fixed effects or instrumental variables suggest that the negative impact of offspring migration on parental health is robust to selection and reverse causality (e.g., Scheffel & Zhang,

2019). In this study, we use health status at age 14 and family socioeconomic resources to account for some of the factors that influence selection into migration.

Potential Moderators Between Children Migration and Parental Health

In the following sections, we examine three potential moderators of the relationship between offspring migration and parental health: parents' need for social support, remittances, and the prevalence of US migration in the communities where parents live. As we will explain, these factors are closely linked to the social determinants of health discussed above - namely, social support, socioeconomic factors, and community-level characteristics.

Parents' need for social support

According to Mexico's official poverty measure, around 20% of the population was estimated to be living in poverty at the beginning of the 21st century, rising to about a third among those aged 65 and over. People in rural areas are particularly vulnerable, as they are more likely to lack labor income and social security, which are more common in urban areas (Aguila et al., 2012). In addition, access to pensions and health insurance depends on the type of work previously undertaken. Many Mexicans - especially those working in the informal sector - have little or no access to these benefits (Aguila et al., 2012; Villarreal & Blanchard, 2013). The vulnerability of the elderly is relevant to this study because many parents whose children migrated to the United States are likely to be relatively old. In the absence of economic resources and social security, in-person help and support from children become especially important for aging parents (Thapa et al., 2018; Aguila et al., 2012).

Individuals with higher socioeconomic status tend to have richer social networks and are less likely to experience social isolation or social exclusion compared to poorer

individuals (Michael et al., 2015; Braveman, Egerter & Williams, 2011). As discussed earlier, social connectedness is closely linked to both physical and mental health. Consequently, while parents with greater economic resources may have better access to social support and formal care, disadvantaged parents are less able to compensate for the absence of their children and, therefore, are more likely to suffer when their offspring migrate. These considerations lead to the second hypothesis:

Hypothesis 2: Having a migrant child in the US has a stronger negative effect if the parent has a low socioeconomic status than if the parent has a high socioeconomic status.

Remittances

Physical distance does not prevent migrant children from continuing to support their parents in the country of origin. The mental and physical health of parents in Mexico with children in the United States is likely influenced not only by the characteristics of the parents but also by the relationship they maintain with their children. Remittances are probably the most important form of support for families remaining in the country of origin. In general, receiving remittances from a family member is associated with higher well-being and life satisfaction (Cárdenas et al., 2009; Ivlevs et al., 2019). This appears particularly pronounced in countries with low income and high inequality, and among poorer individuals (Ivlevs et al., 2019).

First, remittances are a form of economic support, providing access to better formal care, health services, and an improved quality of life (Rindfuss et al., 2012; Waidler, J., Vanore et al., 2017; Böhme, Persian & Stöhr, 2015). However, remittances also reflect migrants' affect, concern, and care for their family of origin (Stark, 2013). For example, among women who remain at home while their partner migrates, remittances serve to

maintain emotional intimacy and symbolize the couple's love and unity (McKenzie & Menjivar, 2011). Thus, the physical and mental health outcomes of parents in the country of origin are likely influenced not only by the economic support provided through remittances but also by the social support that often accompanies them. The third hypothesis is therefore as follows:

Hypothesis 3: Having a migrant child in the US has a stronger negative effect if the parent does not receive remittances than if the parent does receive remittances.

US-migration prevalence

The characteristics of the community in which a person lives influences their health and well-being, even after individual characteristics are taken into account (Braveman, Egerter & Williams, 2011; Phongsavan, Chey et al., 2006). In many Mexican communities with long-standing and high rates of international migration to the United States, a so-called 'culture of migration' has emerged (Massey et al., 1993; Kandel & Massey, 2002). International migration, especially of young people, becomes the norm in these communities, and people come to see migration as something positive, as it provides access to upward social mobility and a better lifestyle. Consistent with this, empirical evidence seems to show that the migration of family members is associated with less stress and depression in communities with high prevalence of emigration (Ivlevs et al., 2019). Children are also likely to be better off if they have a strong community abroad. Parents may be less worried as the child is more likely to be employed and able to remit. In general, in a context where a social phenomenon is more common, its consequences seem to be less severe (e.g. Berger & Luckmann, 2016). This has been observed, for example, in the case of the impact of father absence on children's well-being (Kalmijn, 2017).

Migration prevalence is only one of several contextual factors that can influence the health outcomes of parents who remain behind. For instance, the quantity and quality of social relationships often depend on the size of the community in which individuals live, with those in smaller communities typically enjoying greater social support (Henning-Smith et al., 2019; Putnam, 2000). Being less socially isolated may make it easier for parents to compensate for the absence of their migrant children. While acknowledging the importance of community-level factors, our analysis primarily focuses on migration prevalence as a moderator. It is reasonable to expect that in communities where migration to the United States is highly prevalent, the consequences of offspring migration will be weaker than in communities where migration is less common. The fourth hypothesis is as follows:

Hypothesis 4: Having a migrant child in the US has a stronger negative effect if the parent lives in an area with a low prevalence of US migration than if the parent lives in an area with a high prevalence of US migration.

Data and Methods

Sample

This study draws on data from the Mexican Migration Project (MMP), using survey waves from 2007 to 2019. The MMP is particularly well suited not only for examining Mexican migration to the United States, but also for analysing its consequences for households and communities in the country of origin. The project combines ethnographic fieldwork techniques with representative survey sampling to collect cross-sectional data in both Mexican communities of origin and U.S. destinations (Massey & Zenteno, 2000). The MMP provides detailed information on Mexican households and family members' migration journeys to the US, including type of documentation, remittances, duration of migration, and more. Since 2007, the MMP has also gathered information on the health of household heads and their spouses, including a retrospective measure of health at age 14.

For the analysis, we selected only parents residing in Mexico at the time of the survey and excluded childless individuals. We also removed observations collected before 2007 and those corresponding to non-household heads or spouses, since health questions were only asked to these two groups. The original sample contained 16,622 observations. From this, we constructed a subsample including only cases with complete information on the variables of interest, resulting in a final sample of 10,708 individuals. The variable with the most missing values was income: 5,913 individuals were excluded for not responding to this question. Unfortunately, the survey did not specify the reason for nonresponse. As a robustness check, we reran all models using the full sample with multiple imputation by chained equations for missing values.

Measures

Outcome variables

We used three health measures as outcome variables. The first is mental health: in the survey, individuals were asked whether they had ever suffered from emotional or psychiatric problems. The exact wording of the question was “*Have you ever had or currently had emotional, nerves, or psychiatric problems?*”. The answer options (yes/no) were recoded into a dummy variable. The second is physical health: the dataset includes information on several chronic conditions - hypertension, diabetes, heart problems, stroke, chronic lung disease, and cancer. The questions were formulated in the same way as the mental health one. For the analysis, we classified respondents into three categories: having none of these conditions, having one condition, or having two or more conditions. The third measure is self-rated health, based on the question: “*How do you consider your health?*”. Responses are reported in four categories: excellent, good, regular, or poor.

Before introducing the explanatory variables, we note a limitation of the health measures used. If the household head was unavailable to answer the survey, another member of the household provided information about them, including their health. In our sample, this occurred in 49.2% of cases. In most instances, the person providing information about the household head was the spouse. In the MMP, the household head is defined as the main provider, and in couples, the man is often identified as the head. Using nationally representative longitudinal data on married couples, Ayalon and Covinsky (2010) found that spouse-rated health is an equally strong a predictor of mortality as self-rated health. Still, a spouse may not be aware of all their partner’s health conditions, especially if the relationship is relatively recent. To account for this, we included a control variable indicating whether the survey respondent was the

household head or another family member. In the conclusion, we will discuss the limitations of the health measures used in this paper further.

Explanatory variables

The main independent variable is having at least one child in the United States compared to having all children in Mexico. There are 1,082 parents with at least one child in the US, accounting for 10.1% of the sample. In the Appendix, we ran an equivalent model in which we differentiated between parents who have at least one child in the US and those who have all their children in the US. We did not include this model in the main analysis because the number of parents who have all their children in the US is low (130 observations). In addition, we ran a model including a dummy variable indicating whether parents have at least one daughter in Mexico. We focused on daughters because they provide more care than sons for their ageing parents (Grigoryeva, 2017). Therefore, their absence could have a significant impact on their parents' health and well-being. These models aim to further improve our understanding of the potential mechanisms underlying differences in health between parents with all children in Mexico and parents whose children have migrated.

As far as the moderators are concerned, we considered several factors. First, we examined the socio-economic status of parents. We used two variables: the monthly wage of the household head in their last job in Mexico and whether the family owns the house in which they live. These measures capture two different dimensions of socioeconomic status: labour income and home ownership, the latter being an important contributor to individual wealth. We recoded the income variable into two categories based on whether an individual was in the lowest quartile of the wage distribution. Similarly, we created a dummy variable for home ownership: owner or non-owner. We also considered whether the household where the parents live receives remittances. This

variable was recoded as a dummy indicating whether the household receives remittances or not. The question does not specify whether the remittances are sent by children in the US or by someone else, nor whether they are intended for the parents or for other household members. Finally, the last moderator was the prevalence of US migration in the community where parents live. This variable, calculated by the MMP, was recoded as a dummy: living in an area in the highest quartile of US migration prevalence, or not. As a robustness check, we present additional models that used community size (urban/rural) and educational deprivation in the community as moderators.

We included several controls in the analysis. All models included the following variables: age, gender, survey year, years of education, informant status (whether the household head or another family member was the informant), and health status at age 14 (excellent, good, or regular/poor). In a second step, we performed additional models that considered individuals' socioeconomic status, household structure, and community characteristics, both as mediators and later as moderators. These models controlled for income quartile, home ownership, living with a partner, number of children in the household, urban or rural residence, prevalence of US migration, and educational deprivation in the community (measured by the percentage of illiterate individuals). Knowing parents' health status at 14 and the household's socioeconomic situation enables us to account for some of the selection of children into migration. It is important to note that parents' health at 14 is a retrospective measure and is therefore subject to memory-related biases. Furthermore, current health conditions may influence perceptions of past health.

Table 1 shows the characteristics of parents who have all their children in Mexico compared to those who have at least one child in the United States. Parents with at least

one child in the US tend to be older, have fewer years of education, more often come from rural areas, and are more socioeconomically disadvantaged than parents who have all their children in Mexico. However, on average, parents with at least one child in the US were healthier at age 14 than those without migrant children. This suggests that parents in better health are more likely to have children who migrate, confirming that health plays an important role in migration decisions (Feliciano, 2020). In addition, parents of migrant children were much more likely to receive remittances than parents whose children all remain in Mexico (almost 70% versus less than 5%). This indicates that adult children's migration to the US and household remittances are closely interconnected.

Table 1. Characteristics of parents who have all their children in Mexico vs characteristics of parents who have at least one child in the US.

	All children in Mexico	At least one child in the US
Variables		
Age	44.43	61.32
Female (ref. Male)	0.54	0.57
Years of education	7.45	4.12
Lowest income quartile (ref. No)	0.21	0.30
Not home owner (ref. Home owner)	0.32	0.13
Living with a partner (ref. No)	0.91	0.82
Number of children	3.05	5.33
<i>Size of community</i>		
Metropolitan area	0.14	0.06
Smaller urban area	0.22	0.18
Town	0.46	0.50
Rural area	0.18	0.30
Highest US migration prevalence rate (ref. No)	0.21	0.44
Educational deprivation in community	11.27	13.45
Household receives remittances (Ref. No)	0.04	0.67
<i>Health status at 14</i>		
Excellent	0.29	0.39
Good	0.67	0.57
Regular/Poor	0.04	0.03
Emotional problems (ref. No)	0.04	0.10
<i>Physical health</i>		
No chronic conditions	0.78	0.56
1 chronic condition	0.17	0.30
+2 chronic conditions	0.05	0.14
<i>Health status</i>		
Excellent	0.06	0.04
Good	0.62	0.41
Regular	0.28	0.45
Poor	0.04	0.10

N	9,626	1,082
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Source: Mexican Migration Project (2007-2019).

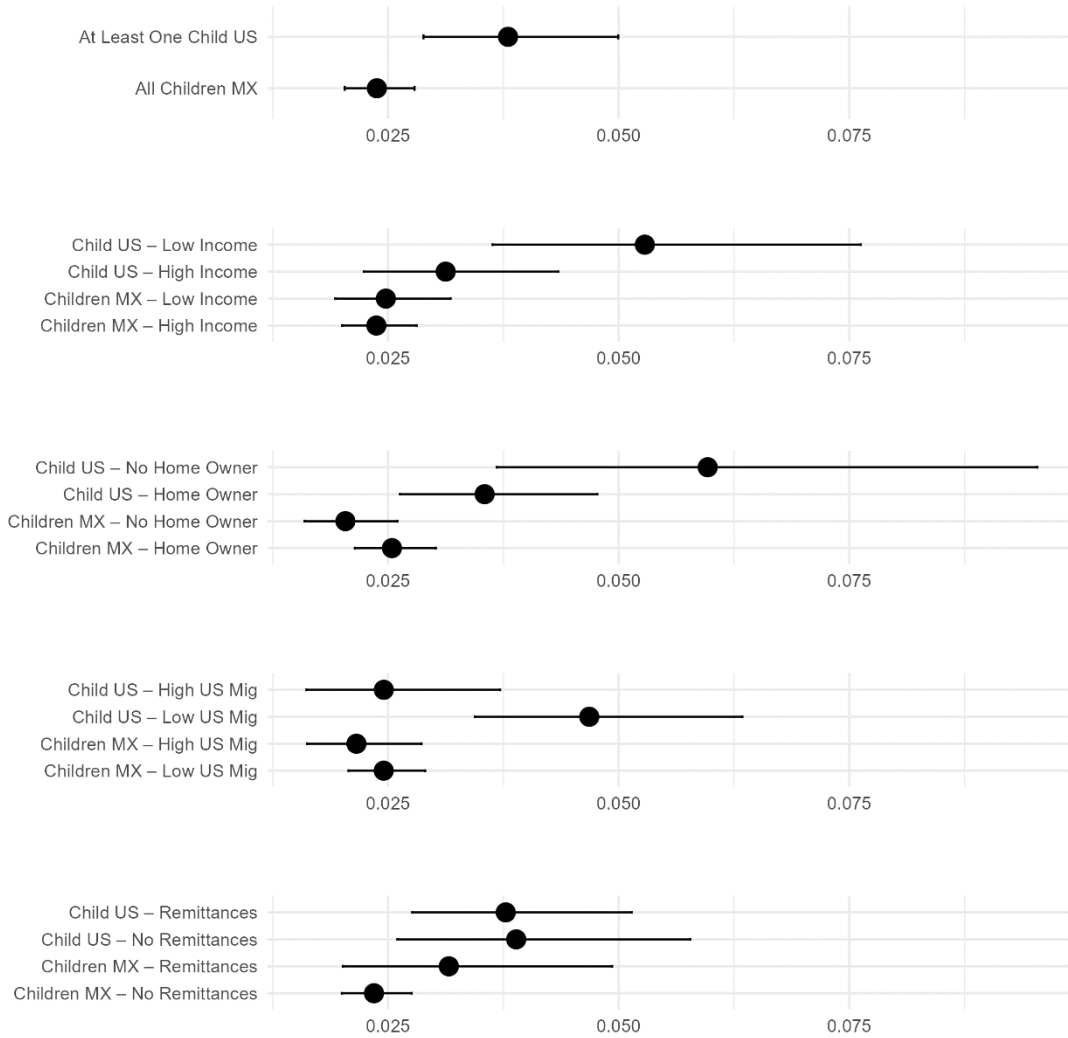
Analysis

As a first step, we ran a logistic regression model for mental health, where the outcome variable took the value of 1 in cases of poor mental health. The explanatory variable was family structure - having at least one child in the US versus all children in Mexico. In the second step, we re-estimated the model using a restricted sample that excluded cases with missing information. Third, we added controls for socioeconomic status, household structure, and community characteristics. In subsequent models, we also examined interactions between family structure and moderators (income quartile, home ownership, US migration prevalence, and remittances). Finally, we computed predicted probabilities of poor mental health for different groups of parents. This approach was repeated for chronic conditions and self-rated health, using ordinal logistic regression models.

In the Appendix, we present models based on coarsened exact matching (CEM). These models allowed us to more effectively compare groups of parents with different demographic characteristics, as shown in Table 1. The matching criteria included age (categorized into five groups: 14–35, 36–45, 46–55, 56–65, 65+), gender, years of education (categorized into four groups: 0–6, 7–9, 10–12, 12+), and health at 14. Other characteristics not used in the matching process were included in the models as controls. On average, parents with at least one child in the US were matched with three parents with all children in Mexico. All parents with migrant children received at least one match.

Findings

Figure 1. Predicted probabilities of poor mental health according to family structure.



All controls applied. Source: Mexican Migration Project (2007-2019). Predicted probabilities with 95% confidence intervals.

Table 2. Odds ratios from ordinal logistic regression predicting presence of chronic conditions according to family structure.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Family structure (ref. All children in Mexico)</i>							
At least one child in the US	1.32***(0.07)	1.24**(0.09)	1.21*(0.09)	1.16+(0.10)	1.25(0.30)	1.35**(0.13)	1.12(0.13)
Low income (ref. High income)			0.91(0.06)	0.89+(0.06)	0.91(0.06)	0.91(0.06)	0.91(0.06)
Not home owner (ref. Home owner)			0.98(0.06)	0.98(0.06)	0.98(0.06)	0.98(0.06)	0.98(0.06)
High prevalence US mig. (ref. Low prevalence US mig.)			1.00(0.07)	1.00(0.07)	1.00(0.07)	1.07(0.08)	1.01(0.07)
At least one child in the US*low income				1.14(0.17)			
At least one child in the US*not home-owner					0.97(0.19)		
At least one child in the US*high prevalence US mig.						0.75*(0.11)	
At least one child in the US*remittances							1.11(0.22)
General controls included?	YES	YES	YES	YES	YES	YES	YES
Sample reduced?	NO	YES	YES	YES	YES	YES	YES
Control for SES and household structure?	NO	NO	YES	YES	YES	YES	YES
Observations	16,622	10,708	10,708	10,708	10,708	10,708	10,708

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table 3. Odds ratios from ordinal logistic regression predicting poor self-rated health status according to family structure.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
<i>Family structure (ref. All children in Mexico)</i>							
At least one child in the US	1.22***(0.06)	1.19*(0.08)	1.14+(0.08)	1.17+(0.10)	0.72(0.16)	1.06(0.07)	1.05(0.12)
Low income (<i>ref. High income</i>)			1.04(0.05)	1.05(0.06)	1.04(0.05)	1.04(0.05)	1.04(0.05)
Not home owner (<i>ref. Home owner</i>)			1.09+(0.05)	1.09+(0.05)	1.06(0.05)	1.09+(0.05)	1.09+(0.05)
High prevalence US mig. (<i>ref. Low prevalence US mig.</i>)			1.08(0.06)	1.08(0.06)	1.08(0.07)	1.05(0.07)	1.08(0.07)
At least one child in the US*low income				0.90(0.13)			
At least one child in the US*not home-owner					1.50*(0.29)		
At least one child in the US*high prevalence US mig.						1.18(0.16)	
At least one child in the US*remittances							1.16(0.20)
General controls included?	YES	YES	YES	YES	YES	YES	YES
Sample reduced?	NO	YES	YES	YES	YES	YES	YES
Control for SES and household structure?	NO	NO	YES	YES	YES	YES	YES
Observations	16,622	10,708	10,708	10,708	10,708	10,708	10,708

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

The Health of Parents in Mexico

Figure 1 shows the predicted probabilities of poor mental health by family structure. Parents with at least one child in the US were more likely to have psychiatric problems than parents with all their children in Mexico. The difference in probability was substantial and statistically significant: for parents with at least one child in the US, the probability of having psychiatric problems was more than 50% higher than for parents with no migrant children. This result was confirmed by the models in Table A1 (Appendix). In Table A1, the coefficient for having at least one child in Mexico decreased from Model 2 to Model 3 when controls were included for socioeconomic status, household characteristics, and community characteristic, but remained statistically significant (p-value <0.001).

With regard to physical health, Table 2 shows that parents with at least one child in the US were more likely to have chronic conditions than parents with all children in Mexico. Table 3 confirms this health penalty in terms of self-rated health; however, the coefficient for having at least one child in the US had low statistical and substantial significance once including socioeconomic control variables (p-value <0.10). See Appendix (Figures A1 and A2) for predicted probabilities of chronic conditions and poor self-rated health.

Overall, the first hypothesis was confirmed: parents with at least one child in the United States were more likely to report poor mental and physical health than parents with all children in Mexico. The association was particularly strong for mental health.

Socioeconomic Status of Parents

Figure 1 shows that the predicted probabilities of poor mental health was higher for parents with at least one child in the US and low income compared to those with at least

one child in the US but high income. Similarly, the effect of having a migrant child was stronger for parents who were not homeowners than for those who were. As shown in Table A1, these interactions were significant. The results were also confirmed by likelihood ratio tests – which were performed for all interactions. Tables 2 and 3 indicate that the interaction between socioeconomic status and having a child in the US was not significant when chronic conditions and self-rated health were used as outcome variables. However, parents with at least one child in the US who were not homeowners were more likely to report poor health than those with at least one child in the US who were homeowners.

The second hypothesis was confirmed, but only for mental health: having a migrant child in the US had a stronger negative effect on mental health if the parent had a low socioeconomic status than if the parent had a high socioeconomic status.

Remittances

Figure 1 shows the predicted probabilities of poor mental health by family structure and receipt of remittances. Although the results were not statistically significant, parents with at least one child in the United States whose household did not receive remittances were more likely to experience poor mental health than parents with all children in Mexico or those with at least one child in the United States whose household received remittances. The results in Tables A1, 2, and 3 confirm that there were no statistically significant differences in health or mental health among parents with migrant children, regardless of whether they received remittances. The third hypothesis was therefore rejected. Our results do not allow us to draw conclusions about the association between remittances and parental health.

Prevalence of US Migration in the Community

Figure 1 shows that having a child in the US and living in a community where migration to the US was uncommon had a stronger negative effect on mental health than having a child in the US and living in a community where migration to the US was common. Table A1 confirmed this, revealing a significant interaction between family structure and prevalence of US migration. Regarding physical health, the same mechanism applied. There were no significant differences in the self-rated health of parents with migrant children according to the prevalence of migration to the US. Additional models that consider community size and educational deprivation as moderating factors are presented in the following section.

Overall, the fourth hypothesis was confirmed for mental health and chronic conditions. Our findings showed that the negative association between child migration and health was stronger if the parent lived in a community with a low prevalence of US migration than if they lived in a community with a high prevalence of US migration.

Table 4. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure and presence of at least one daughter in Mexico.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	1.14(0.32)	1.53**(0.23)	1.46*(0.21)
Having a daughter in Mexico	0.76*(0.10)	1.23**(0.09)	1.05(0.06)
At least one child in the US*Having a daughter in Mexico	1.50(0.45)	0.77+(0.13)	0.73*(0.12)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Robustness Checks and Additional Models

Table 4 presents results on the interaction between having at least one child in the US and having a daughter in Mexico. For chronic conditions and self-rated health, the negative effect of having a child in the US was smaller for parents with a daughter in Mexico than for those with at least one child in the US and no daughters in Mexico. In an additional analysis (available upon request), we also looked at having a son in Mexico but the results were not statistically significant. Table A2 in the Appendix further differentiates parents with migrant children according to whether they had all children in the US. While the results were not significant, for chronic conditions and poor self-rated health, the coefficient for parents with all children in the US was

stronger than that for parents with at least one child in the US (but at least one in Mexico). This suggests that the effect of having children in the US may be underestimated to some extent, as remaining children in Mexico can compensate or provide help. For mental health, however, the coefficient for parents with all children in the US was not significant, likely due to the small number of observations in this category. Overall, these models suggest that living in close proximity to at least one child - particularly a daughter - is key to parents' physical health. Conversely, the most distressing situation is likely that of parents who have no children in Mexico able to provide reliable support.

In the Appendix, we tested an interaction between having a child in the US and the size of the municipality where parents live (Table A3). The results were statistically significant and indicated that having a migrant child had a weaker effect on mental health for parents living in rural areas compared to those living in metropolitan areas. For physical health, the findings were similar: having a child in the US had a stronger effect on parents living in metropolitan areas than on those in smaller urban areas. The results of the two models using migration prevalence and municipality size are not contradictory: in smaller communities, it may be easier to receive support from one's social network (Henning-Smith et al, 2019) that compensates for the absence of a child. In Table A4, we present a model including interactions between having a child in the US and migration prevalence, as well as between having a child in the US and municipality size. Finally, we used educational deprivation in the community as a moderator (Table A5), and the results were significant: parents who remained behind suffered the most when they lived in areas with low educational deprivation - likely urban and socioeconomically developed areas.

The findings of our main analysis were confirmed by the models in the Appendix that used coarsened exact matching and multiple imputation by chained equations (Table A6 – A11). Furthermore, we tested for differences in the health of parents with migrant children according to the parents' gender, but found no significant differences (Table A12). Additionally, Table A13 shows that having a migrant child was especially linked to poor mental health if at least one of the children in the US was under 24 years old. Feelings of separation may be particularly intense if children abroad are young. Conversely, Table A14 shows that offspring migration was only associated with poor physical health and low self-rated health if all the children had been away for at least two years. This suggests that an extended absence of support could have a particularly detrimental effect on parental health. Finally, we ran a model using a restricted sample that included only parents whose children were 13 or older at the time of the survey (Table A15). Focusing on parents whose children were old enough to have emigrated made the categories of the explanatory variable more comparable.

Conclusions

Adult emigration poses a serious challenge to families and communities that remain in the country of origin. Using data from the MMP (2007–2019), this paper examined the health and well-being of parents in Mexico whose children migrated to the United States. We make several contributions to the literature. First, parents with at least one child in the US are more likely to experience poor physical and mental health than those with all children in Mexico. Second, parents who are most in need of social support suffer most when children migrate. Third, parents whose children migrated and who live in communities where migration to the US is uncommon or urban areas are particularly at risk for poor mental and physical health outcomes. Remittances do not appear to significantly improve parental health.

Our results confirm our first research hypothesis: parents with at least one child in the US are more likely to suffer from psychiatric problems than parents with all children living in Mexico. This finding is consistent across all models. It extends previous research showing that parents in Mexico whose children have migrated often experience loneliness and depressive symptoms (Yahirun & Arenas, 2018; Silver, 2011). Contrary to what other studies have suggested (Waidler et al., 2017; Böhme et al., 2015; Adhikari, 2011), the potential economic security associated with having a child in the US does not offset the loss of social support. Beyond this mental health penalty, parents with at least one child in the US are also more likely to report chronic conditions and poor self-rated health than parents with all their children in Mexico. These associations are particularly strong for parents with no children - and especially no daughters - living in Mexico, underscoring the importance of the informal care that children provide when they live in close proximity. One interpretation of these findings is that lack of social

support, reduced caregiving, and social isolation may have a negative impact on parents' mental health, which in turn can lead to worse self-rated health and more chronic conditions (Leigh-Hunt et al., 2017; Holt-Lunstad, Robles & Sbarra, 2017; Holt-Lunstad, 2022).

The second hypothesis, concerning the interaction between parental socioeconomic status and having a migrant child, is only confirmed for mental health. This finding is consistent with the idea that parents who are more in need of social support suffer the most when their children migrate. Why is this difference particularly evident in mental health? One explanation is that lower social status is associated with more social exclusion (Michael et al., 2015; Braveman, Egerter & Williams, 2011). Also, individuals with higher socioeconomic status tend to have a greater sense of control and resilience in their lives (Niemeyer, Bieda et al., 2019). As a result, they possess stronger social networks and more psychological resources to cope with their children's absence, which translates into better mental health compared to parents with migrant children who have fewer resources. This finding provides further evidence that an important mechanism linking child migration with parental health is the reliability of social support.

We found no evidence to support the third hypothesis regarding the impact of remittances on parental health. The use of household remittances, rather than remittances specifically sent from migrant children to parents, may help explain the lack of observed effect. Furthermore, the analysis of remittances and health is complicated by issues of reverse causality - for example, children may send remittances to support parents who are already ill.

The fourth and final hypothesis is confirmed and is arguably one of the most significant contributions of the paper. To our knowledge, this is one of the first times that

community level variables have been related to differences in the health and well-being of non-migrant family members. Our results show that offspring migration is only associated with poor parental health and mental health when migration is relatively uncommon. Furthermore, parents with migrant children experience the greatest health disadvantages when residing in urban areas or in areas with high socioeconomic development. This could be explained by the fact that individuals in smaller communities often benefit from larger and stronger social networks, experiencing less social isolation (Henning-Smith et al., 2019; Putnam, 2000). Overall these findings suggest that other forms of social support and assistance, such as those provided by the community, can be beneficial for parents' health. However, our analysis does not clarify which specific characteristics of high-migration, small, low socioeconomic development areas contribute to better health outcomes for parents who remain behind.

Our work has several limitations. First, although we take health at age 14 into account, we cannot rule out the possibility that children whose parents are in poor health are less likely to migrate (Démurger, 2015). In this case, our sample of parents with migrant children may have been healthier initially than parents with all children in Mexico. Similarly, while we consider family socioeconomic status and other relevant characteristics, we cannot rule out selection mechanisms in migration. Another related point, discussed earlier, is reverse causation. These issues could be better addressed in future studies using longitudinal datasets with repeated measures of parental health before and after children migrate. A second limitation of our work concerns the health measures used. In terms of mental health, a scale consisting of several questions covering different aspects of well-being would provide a more comprehensive picture than is possible here. Focusing only on the presence of psychiatric problems highlights the most severe cases and ignores more nuanced situations. In addition, this study

groups together very different mental and physical health conditions. Ideally, we would examine in separate models how family structure is associated with different chronic diseases, but this is not possible given the relatively small sample size. For mental health, the dataset does not allow us to distinguish between specific conditions. Finally, the health of parents in Mexico may be affected by the type of experience their children have in the US. A third limitation of our study is that it does not consider children's legal status or occupation. Parents with children in precarious or undocumented situations in the US may have particularly poor health and high levels of psychological distress. These are important questions for future research.

In conclusion, this paper has drawn attention to the many health challenges faced by parents who remain behind. In this regard, migration can be considered a social determinant of health, affecting not only individuals who settle in another country but also their family members who stay at home (Castañeda et al., 2015). Placing migration within the theoretical framework of the social determinants of health improves our understanding of the processes underlying it, in a way that previous empirical research has lacked. One possible explanation for the poor health and mental health of parents with children in the United States, which this paper supports, is the weakening of family ties and the social isolation that international migration entails. However, our study also revealed heterogeneity in the health of parents with children in the United States. In some contexts, parents may demonstrate particular resilience. A key insight from our findings is that, in certain instances, social networks and communities can compensate for the loss of social support due to the migration of children. In this regard, strengthening alternative forms of informal help and care for parents whose offspring have migrated could be an important takeaway for policymakers, local organizations, and national institutions.

Data availability

Data are publicly available (<https://mmp.research.brown.edu/mmp>).

Ethics approval

We hereby confirm that our study did not require any Ethics Approval as it was entirely based on secondary data gathered by the Mexican Migration Project.

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Online Appendix

Table A1. Odds ratios from logistic regression predicting poor mental health according to family structure.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Family structure (ref. All children in Mexico)							
At least one child in the US	1.43***(0.13)	1.69***(0.23)	1.62***(0.23)	1.33(0.23)	0.65*(0.25)	1.95***(0.32)	1.68*(0.35)
Low income (ref. High income)			1.18(0.14)	1.05(0.14)	1.17(0.14)	1.17(0.14)	1.17(0.14)
Not home owner (ref. Home owner)			0.90(0.11)	0.90(0.11)	0.80+(0.11)	0.90(0.11)	0.91(0.11)
High prevalence US mig. (ref. Low prevalence US mig.)			0.76*(0.11)	0.76*(0.11)	0.76*(0.11)	0.88(0.13)	0.75*(0.10)
At least one child in the US*low income				1.66*(0.42)			
At least one child in the US*not home-owner					2.16**(0.64)		
At least one child in the US*high prevalence US mig.						0.58*(0.15)	
At least one child in the US*remittances							0.72(0.23)
General controls included?	YES	YES	YES	YES	YES	YES	YES
Sample reduced?	NO	YES	YES	YES	YES	YES	YES
Control for SES and household structure?	NO	NO	YES	YES	YES	YES	YES
Constant	0.08***(0.02)	0.09***(0.03)	0.10***(0.04)	0.10***(0.04)	0.10***(0.05)	0.10***(0.04)	0.11***(0.05)
Observations	16,622	10,708	10,708	10,708	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health

status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A2. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure and presence of children in Mexico.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	1.66**(0.24)	1.19*(0.10)	1.12(0.09)
All children in the US	1.37(0.46)	1.37+(0.25)	1.26(0.23)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A3. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering size of community as a moderator.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	3.03**(1.24)	1.80*(0.49)	1.08(0.29)
<i>Size of community (ref. Metropolitan area)</i>			
Smaller urban area	1.04(0.24)	0.94(0.10)	0.88(0.08)
Town	0.94(0.19)	0.88(0.09)	1.07(0.09)
Rural area	0.76(0.19)	0.80*(0.09)	1.11(0.11)
At least one child in the US*Smaller urban area	0.51(0.25)	0.52*(0.16)	0.96(0.30)
At least one child in the US*Town	0.57(0.25)	0.73(0.21)	1.24(0.36)
At least one child in the US*Rural area	0.36*(0.18)	0.62(0.19)	0.85(0.26)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A4. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering size of community and US migration prevalence as a moderators.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	3.03**(1.24)	1.80*(0.49)	1.08(0.29)
<i>Size of community (ref. Metropolitan area)</i>			
Smaller urban area	1.01(0.23)	0.93(0.10)	0.88(0.08)
Town	0.92(0.19)	0.88(0.08)	1.07(0.09)
Rural area	0.73(0.19)	0.79*(0.09)	1.12(0.11)
<i>High prevalence US mig. (ref. Low prevalence US mig.)</i>			
At least one child in the US*Smaller urban area	0.62(0.31)	0.58*(0.18)	0.87(0.28)
At least one child in the US*Town	0.65(0.29)	0.80(0.23)	1.15(0.33)
At least one child in the US*Rural area	0.44(0.23)	0.70(0.22)	0.75(0.23)
At least one child in the US*high prevalence US mig.	0.64+(0.17)	0.79(0.12)	1.26+(0.18)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A5. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering educational deprivation in the community as a moderator.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	4.28***(1.43)	1.64*(0.28)	1.21(0.20)
Educational deprivation in community	1.09***(0.02)	1.01(0.01)	1.01(0.01)
At least one child in the US* Educational deprivation in community	0.76**(0.10)	0.98*(0.01)	1.00(0.01)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A6. Odds ratios from logistic regression predicting poor mental health according to family structure using a matched sample.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref. All children in Mexico)					
At least one child in the US	1.75***(0.25)	1.48*(0.27)	1.52**(0.24)	2.03***(0.34)	1.83**(0.39)
Low income (ref. High income)	1.29*(0.16)	1.16(0.17)	1.29*(0.16)	1.28*(0.16)	1.28*(0.16)
Not home owner (ref. Home owner)	0.93(0.13)	0.93(0.13)	0.79(0.13)	0.92(0.13)	0.93(0.13)
High prevalence US mig. (ref. Low prevalence US mig.)	0.69*(0.11)	0.69*(0.11)	0.76*(0.11)	0.80(0.14)	0.68*(0.11)
At least one child in the US*low income		1.51(0.39)			
At least one child in the US*not home-owner			2.16*(0.64)		
At least one child in the US*high prevalence US mig.				0.64+(0.17)	
At least one child in the US*remittances					0.070(0.25)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	YES	YES	YES	YES	YES
Control for SES and household structure?	YES	YES	YES	YES	YES
Observations	7,756	7,756	7,756	7,756	7,756

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A7. Odds ratios from ordinal logistic regression predicting presence of chronic conditions according to family structure using a matched sample.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Family structure (ref. All children in Mexico)</i>					
At least one child in the US	1.24**(0.09)	1.20*(0.11)	1.22*(0.10)	1.35**(0.13)	1.14(0.14)
Low income (<i>ref. High income</i>)	0.94(0.06)	0.92(0.06)	0.91(0.06)	0.94(0.06)	0.94(0.06)
Not home owner (<i>ref. Home owner</i>)	0.96(0.07)	0.93(0.13)	0.98(0.06)	0.96(0.07)	0.96(0.07)
High prevalence US mig. (<i>ref. Low prevalence US mig.</i>)	0.94(0.07)	0.94(0.07)	1.00(0.07)	1.00(0.09)	0.94(0.07)
At least one child in the US*low income		1.13(0.17)			
At least one child in the US*not home-owner			0.97(0.20)		
At least one child in the US*high prevalence US mig.				0.80(0.12)	
At least one child in the US*remittances					1.19(0.25)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	YES	YES	YES	YES	YES
Control for SES and household structure?	YES	YES	YES	YES	YES
Observations	7,756	7,756	7,756	7,756	7,756

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A8. Odds ratios from ordinal logistic regression predicting poor self-rated health according to family structure using a matched sample.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref. All children in Mexico)					
At least one child in the US	1.12(0.08)	1.16+(0.10)	1.06(0.08)	1.04(0.09)	1.04(0.12)
Low income (ref. High income)	1.05(0.06)	1.08(0.07)	1.05(0.06)	1.06(0.06)	1.05(0.05)
Not home owner (ref. Home owner)	1.07(0.06)	1.07(0.06)	1.03(0.07)	1.08(0.06)	1.08(0.04)
High prevalence US mig. (ref. Low prevalence US mig.)	1.02(0.07)	1.02(0.07)	1.02(0.07)	0.98(0.07)	1.02(0.07)
At least one child in the US*low income		0.87(0.13)			
At least one child in the US*not home-owner			1.51*(0.29)		
At least one child in the US*high prevalence US mig.				1.22(0.17)	
At least one child in the US*remittances					1.21(0.23)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	YES	YES	YES	YES	YES
Control for SES and household structure?	YES	YES	YES	YES	YES
Observations	7,756	7,756	7,756	7,756	7,756

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A9. Odds ratios from logistic regression predicting poor mental health according to family structure using multiple imputation by chained equations.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref. All children in Mexico)					
At least one child in the US	1.40***(0.13)	1.24+(0.15)	0.91(0.24)	1.67***(0.19)	1.32+(0.19)
Low income (ref. High income)	1.28+(0.18)	1.18(0.18)	1.28+(0.18)	1.27+(0.18)	1.27+(0.18)
Not home owner (ref. Home owner)	0.97(0.08)	0.97(0.08)	0.90(0.09)	0.96(0.08)	0.97(0.08)
High prevalence US mig. (ref. Low prevalence US mig.)	0.79*(0.08)	0.79*(0.08)	0.79*(0.08)	0.91(0.10)	0.78*(0.08)
At least one child in the US*low income		1.38+(0.24)			
At least one child in the US*not home-owner			1.44+(0.30)		
At least one child in the US*high prevalence US mig.				0.61**(0.11)	
At least one child in the US*remittances					0.87(0.20)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	NO	NO	NO	NO	NO
Control for SES and household structure?	YES	YES	YES	YES	YES
Constant	0.12***(0.04)	0.12***(0.04)	0.14***(0.05)	0.12***(0.04)	0.12***(0.04)
Observations	17,505	17,505	17,505	17,505	17,505

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A10. Odds ratios from ordinal logistic regression predicting presence of chronic conditions according to family structure using multiple imputation by chained equations.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Family structure (ref. All children in Mexico)</i>					
At least one child in the US	1.30***(0.07)	1.29***(0.08)	1.15(0.18)	1.40***(0.09)	1.19*(0.10)
Low income (<i>ref. High income</i>)	0.98(0.06)	0.97(0.06)	0.98(0.06)	0.98(0.06)	0.98(0.06)
Not home owner (<i>ref. Home owner</i>)	0.95(0.05)	0.95(0.05)	0.93(0.05)	0.95(0.05)	0.95(0.05)
High prevalence US mig. (<i>ref. Low prevalence US mig.</i>)	0.99(0.06)	1.00(0.06)	1.00(0.06)	1.05(0.06)	1.00(0.06)
At least one child in the US*low income		1.04(0.13)			
At least one child in the US*not home-owner			1.12(0.15)		
At least one child in the US*high prevalence US mig.				0.82+(0.08)	
At least one child in the US*remittances					1.22(0.17)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	NO	NO	NO	NO	NO
Control for SES and household structure?	YES	YES	YES	YES	YES
Observations	17,505	17,505	17,505	17,505	17,505

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A11. Odds ratios from ordinal logistic regression predicting poor self-rated health according to family structure using multiple imputation by chained equations.

	Model 1	Model 2	Model 3	Model 4	Model 5
Family structure (ref. All children in Mexico)					
At least one child in the US	1.16**(0.06)	1.18*(0.08)	0.97(0.15)	1.12+(0.07)	1.15+(0.09)
Low income (ref. High income)	1.05(0.04)	1.06(0.05)	1.05(0.04)	1.06(0.06)	1.05(0.04)
Not home owner (ref. Home owner)	1.06(0.04)	1.06(0.04)	1.04(0.04)	1.05(0.04)	1.06(0.04)
High prevalence US mig. (ref. Low prevalence US mig.)	1.09+(0.05)	1.09+(0.05)	1.09+(0.05)	1.06(0.04)	1.09+(0.05)
At least one child in the US*low income		0.93(0.11)			
At least one child in the US*not home-owner			1.16(0.15)		
At least one child in the US*high prevalence US mig.				1.08(0.02)	
At least one child in the US*remittances					0.99(0.12)
General controls included?	YES	YES	YES	YES	YES
Sample reduced?	NO	NO	NO	NO	NO
Control for SES and household structure?	YES	YES	YES	YES	YES
Observations	17,505	17,505	17,505	17,505	17,505

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A12. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering the gender of parent.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
At least one child in the US	1.36(0.33)	1.06(0.12)	1.01(0.11)
Female	2.08***(0.26)	1.68**(0.09)	1.27***(0.06)
At least one child in the US*Female	1.27(0.35)	1.25(0.17)	1.24(0.16)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A13. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering the age of children in the US.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
Child(ren) in the US, all 24+	1.44***(0.23)	1.26***(0.10)	1.12(0.09)
At least one child in the US who is under 24	2.19*(0.50)	1.01(0.17)	1.20(0.18)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A14. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering the duration of US migration of children.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
Child(ren) in the US, all for more than 2 years	1.54**(0.23)	1.27***(0.10)	1.19*(0.09)
At least one child in the US for less than 2 years	2.31**(0.70)	0.80(0.17)	0.77(0.15)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	10,708	10,708	10,708

General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Table A15. Odds ratios predicting poor mental health, presence of chronic conditions, and poor self-rated health according to family structure, considering a sample with only parents with children of 13+ years old.

	Mental health	Chronic conditions	Self-rated health
	Model 1	Model 2	Model 3
<i>Family structure (ref. All children in Mexico)</i>			
Child(ren) in the US	1.87**(0.29)	1.25**(0.10)	1.07(0.08)
General controls included?	YES	YES	YES
Sample reduced?	YES	YES	YES
Control for SES and household structure?	YES	YES	YES
Observations	5,157	5,157	5,157

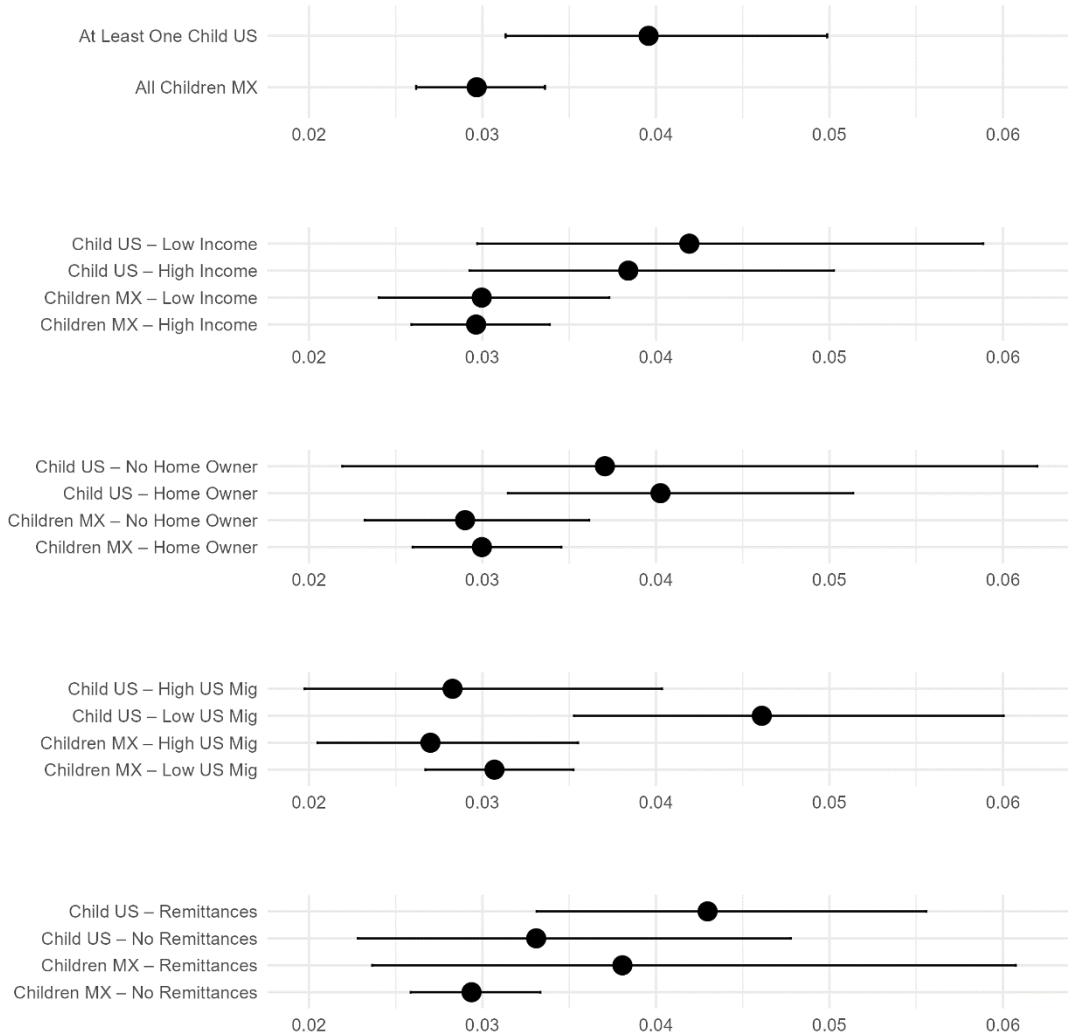
General controls: age, gender, survey year, years of education, informant status, health status at 14 years old. SES and household structure controls: income quartile, home owner, living with partner, number of children, urban/rural area, prevalence of US migration, educational deprivation in community.

Source: Mexican Migration Project (2007-2019).

Results in odds ratios. Standard errors are reported in parenthesis.

***p < 0.001; **p < 0.01; *p < 0.05; +p < 0.1.

Figure A1. Predicted probabilities of presence of two chronic conditions or more according to family structure.

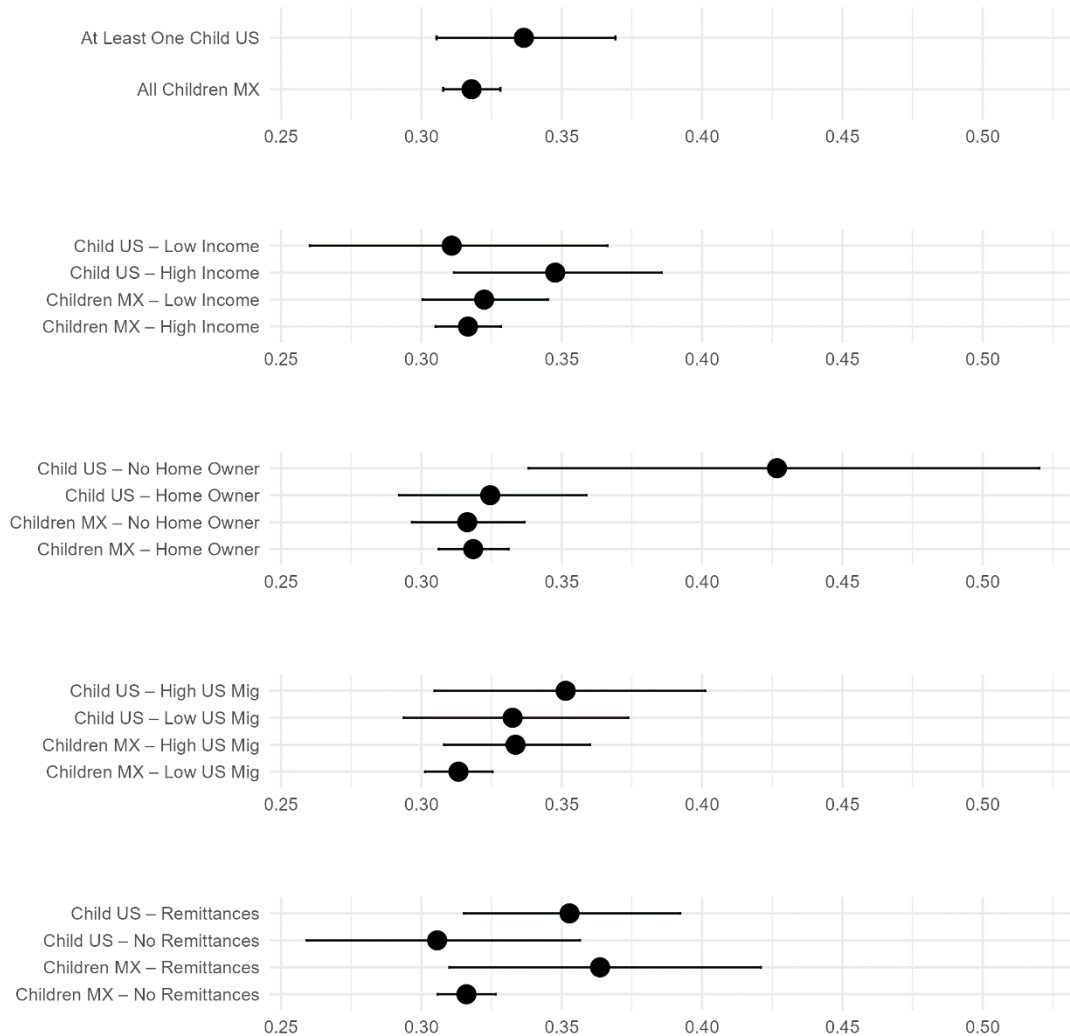


All controls applied. Source: Mexican Migration Project (2007-2019).

Predicted probabilities with 95% confidence intervals.

Although the models in the tables used ordinal logistic regression, predicted probabilities were computed from logistic models to make results easier to understand.

Figure A2. Predicted probabilities of poor self-rated health according to family structure.



All controls applied. Source: Mexican Migration Project (2007-2019).

Predicted probabilities with 95% confidence intervals.

Although the models in the tables used ordinal logistic regression, predicted probabilities were computed from logistic models to make results easier to understand.