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**Major depression among immigrants: Findings from the NIS-2003**

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## Abstract

Lawful permanent residents (LPRs) are immigrants who come to the US through a variety of countries and circumstances. Most studies focus on subsets of immigrant populations, however, this study utilized data from the 2003 New Immigrant Survey, a nationally representative, cross-sectional survey of LPRs ( $n = 8,573$ ). Participants were grouped into three main visa categories (i.e. Refugees/Asylees/Parolees, Legalization, Family/Employment/Diversity) and the objective was to examine the association between visa status and depression outcomes among adult survey respondents. We used bivariate analyses to measure the relationship between sociodemographic variables and visa status. Approximately 98% of the Legalization category originated from Latin America & the Caribbean ( $P < .0001$ ) and about 68% had less than high school education ( $P < .0001$ ). Almost half of Refugees/Asylees/Parolees (46%) and a significant portion of the Legalization group (15%) experienced pre-migration harm ( $P < .0001$ ). Prevalence of depression in the overall sample was 3.6%. Adjusted and unadjusted logistic regression was performed to examine the relationship between study variables and depression. After controlling for all variables, females were still more likely to have depression than men (adjusted OR [AOR] = 2.01, 95% CI = 1.565, 2.591), and unmarried individuals more likely to be depressed than those who were married (AOR = 1.53, 95% CI = 1.193, 1.950). Refugees/Asylees/Parolees (AOR = 1.65, 95% CI = 1.076, 2.530) and the Legalization group (AOR = 1.78, 95% CI = 1.229, 2.565) maintained higher odds of depression than the Family/Employment/Diversity group and participants who reported pre-migration harm (AOR = 1.97, 95% CI = 1.330, 2.930) had higher odds of depression than those who experienced no harm. The difference in depression rates by visa status highlights the vulnerability to adverse mental health outcomes of certain groups (i.e.

Refugees/Asylees/Parolees and Legalization) and reveals the need for more resources and attention towards immigrant sub-populations.

Key words: Yale School of Public Health, Social and Behavioral Sciences, Immigrants, lawful permanent residents (LPRs), Major Depression, New Immigrant Survey

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Table 1. Description of Sample by Visa Status

	Visa Status				
	All (N= 8573)	Refugees, Asylees, Parolees (N= 554)	Legalization (N= 661)	Family, Employment, Diversity (N= 7358)	<i>P</i>
<b>Age (years), mean ± SD</b>	40.1 ± 13.5	41.2 ± 11.8	39.3 ± 9.8	40.1 ± 13.9	0.049
<b>Age Categories</b>					<.0001
<b>19-34</b>	3559 (41.7)	181 (32.8)	186 (28.4)	3192 (43.6)	
<b>35-64</b>	4375 (51.3)	342 (62.0)	461 (70.4)	3572 (48.8)	
<b>65+</b>	599 (7.0)	29 (5.3)	8 (1.2)	562 (7.7)	
<b>Gender</b>					0.157
<b>Male</b>	4133 (48.2)	286 (51.6)	329 (49.8)	3518 (47.8)	
<b>Female</b>	4440 (51.8)	268 (48.4)	332 (50.2)	3840 (52.2)	
<b>Region Born</b>					<.0001
<b>Latin America &amp; Caribbean</b>	3153 (36.9)	156 (28.3)	642 (97.7)	2355 (32.1)	
<b>East and Southeast Asia, Pacific</b>	2707 (31.7)	66 (12.0)	5 (0.8)	2636 (36.0)	

<b>Europe &amp; Central Asia</b>	1380 (16.2)	195 (35.4)	4 (0.6)	1181 (16.1)
<b>Sub-Saharan Africa</b>	763 (8.9)	85 (15.4)	6 (0.9)	672 (9.2)
<b>Middle East &amp; North Africa</b>	393 (4.6)	49 (8.9)	--	344 (4.7)
<b>Other</b>	139 (1.6)	--	--	139 (1.9)
<b>Education</b>				<.0001
<b>Less than High School</b>	2745 (32.1)	171 (31.0)	447 (67.8)	2127 (29.0)
<b>High School</b>	1308 (15.3)	129 (23.4)	93 (14.1)	1086 (14.8)
<b>Some College</b>	3205 (37.5)	193 (35.0)	104 (15.8)	2908 (39.7)
<b>Postgraduate</b>	1286 (15.1)	59 (10.7)	15 (2.3)	1212 (16.5)
<b>Marital Status</b>				<.0001
<b>Married</b>	5856 (68.4)	363 (65.6)	380 (57.5)	5113 (69.5)
<b>Not Married</b>	2711 (31.6)	190 (34.4)	281 (42.5)	2240 (30.5)
<b>Any Harm</b>				<.0001
<b>No</b>	7940 (93.3)	295 (53.9)	560 (85.4)	7085 (96.9)
<b>Yes</b>	572 (6.7)	252 (46.1)	96 (14.6)	224 (3.1)

Table 2. Unadjusted and adjusted associations between study variables and Major Depression

	Major Depression N (%)	P	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*
<b>Overall (N= 8228)</b>	296 (3.6)	--	--	--
<b>Age (years)</b>		0.527		
<b>19-34 (N= 3484)</b>	133 (3.8)		Reference	Reference
<b>35-64 (N= 4156)</b>	147 (3.5)		0.92 (0.727, 1.173)	0.90 (0.697, 1.154)
<b>65+ (N= 551)</b>	16 (2.9)		0.75 (0.445, 1.276)	0.69 (0.395, 1.186)
<b>Gender</b>		<.0001		
<b>Male (N= 3988)</b>	96 (2.4)		Reference	Reference
<b>Female (N= 4240)</b>	200 (4.7)		<b>2.01 (1.567, 2.570)**</b>	<b>2.01 (1.565, 2.591)</b>
<b>Region Born</b>		<.0001		
<b>East and Southeast Asia, Pacific (N= 2605)</b>	50 (1.9)		Reference	Reference
<b>Sub-Saharan Africa (N= 371)</b>	19 (2.6)		1.35 (0.788, 2.295)	1.07 (0.618, 1.859)
<b>Europe &amp; Central Asia (N= 1323)</b>	42 (3.2)		<b>1.68 (1.106, 2.539)</b>	1.37 (0.887, 2.109)
<b>Latin America &amp; Caribbean (N= 3014)</b>	157 (5.2)		<b>2.81 (2.033, 3.877)</b>	<b>1.97 (1.383, 2.808)</b>

<b>Middle East &amp; North Africa (N= 741)</b>	21 (5.7)	<b>3.07 (1.820, 5.166)</b>	<b>2.65 (1.554, 4.530)</b>
<b>Other (N= 136)</b>	5 (3.7)	1.95 (0.765, 4.972)	2.20 (0.856, 5.667)
<b>Education</b>		.0002	
<b>Less than High School (N= 2629)</b>	120 (4.6)	Reference	Reference
<b>High School (N= 1265)</b>	54 (4.3)	0.93 (0.671, 1.295)	0.98 (0.693, 1.387)
<b>Some College (N= 3077)</b>	98 (3.2)	<b>0.69 (0.524, 0.903)</b>	0.90 (0.665, 1.222)
<b>Postgraduate (N= 1231)</b>	24 (2.0)	<b>0.42 (0.267, 0.648)</b>	0.63 (0.390, 1.012)
<b>Marital Status</b>		<.0001	
<b>Married (N= 5604)</b>	164 (2.9)	Reference	Reference
<b>Not Married (N= 2618)</b>	132 (5.0)	<b>1.76 (1.394, 2.226)</b>	<b>1.53 (1.193, 1.950)</b>
<b>Visa Status</b>		<.0001	
<b>Family, Employment, Diversity (N= 7024)</b>	208 (3.0)	Reference	Reference
<b>Refugees, Asylees, Parolees (N= 546)</b>	36 (6.6)	<b>2.31 (1.606, 3.332)</b>	<b>1.65 (1.076, 2.530)</b>
<b>Legalization (N= 658)</b>	52 (7.9)	<b>2.81 (2.052, 3.853)</b>	<b>1.78 (1.229, 2.565)</b>
<b>Any Harm</b>		<.0001	

<b>No (N= 7613)</b>	253 (3.3)	Reference	Reference
<b>Yes (N= 565)</b>	43 (7.6)	<b>2.40 (1.714, 3.351)</b>	<b>1.97 (1.330, 2.930)</b>

\*Adjusted for age, gender, region born, education, marital status, visa status, and pre-migration harm.

\*\* Values in bold are statistically significant ( $p < .05$ ).

## Introduction

America is widely considered a melting pot, with 13.7% of the United States (US) population being foreign born as of 2017 (US Census Bureau). Of those foreign born, 50.4% and 31.2% individuals originated from Latin America and Asia, respectively (US Census Bureau). Immigrants obtain visas to enter the US through a variety of categories, including but not limited to family, employment, diversity, refugee/asylee, and other (“Immigrant Classes of Admission”, 2017). According to the US Department of Homeland Security, lawful permanent residents (LPRs), known colloquially as green card holders, are defined as “non-citizens who are lawfully authorized to live permanently within the United States” (“Lawful Permanent Residents”, 2016). In fiscal year 2019, approximately 1 million individuals obtained LPR status, 50% of whom were immediate relatives of US citizens, 14% through employment, 10% were refugees and asylees, and 4% through diversity visas (“Legal Immigration and Adjustment,” 2017). The top countries of origin for LPRs in 2019 were Mexico, China, India, the Dominican Republic, the Philippines, and Cuba (“Legal Immigration and Adjustment,” 2017). Since immigrants constitute a significant portion of the population and considering the continued growth of diversity in America, the health and well-being of this subset of US residents has widespread implications for population health.

According to James *et al.* (2018), mental health is a global burden and depressive disorders have prevailed as one of the top three leading causes of years lived with disability (YLDs) as of 2017. Several studies have estimated depression rates among different groups of immigrants to be between 5.5-30% (Bernstein *et al.*, 2015; Caplan & Buyske, 2015; Kim, Seo & Cain, 2010; Lau *et al.*, 2013). A systematic review on depression prevalence performed by Foo *et al.* (2018) estimates the overall average rate of depression among US migrants to be 14.8%. An initial analysis of depression among immigrants in New York City using the NIS baseline survey found that stress

associated with the visa process is correlated to depression, with pre-migration harm being a mediator (Jasso *et al.*, 2005). Relatedly, multiple studies have linked the experience of prior trauma and depressive symptoms among migrants (Mollica *et al.*, 1998; Steel *et al.*, 2009). Another study on Central American asylum seekers at the US border reported 83% of participants fleeing their home countries due to violence with 17% reporting symptoms of post traumatic stress disorder (PTSD) and depression (Keller *et al.*, 2017). Exposure to pre-migration harm is a predictor of subsequent psychiatric symptoms which highlights the importance of mental health screenings and proper access to treatment for immigrant populations.

Mental health can be a neglected topic with varying perceptions of mental illness in immigrant communities (Curtin *et al.*, 2018), therefore, it is important to study depression as it pertains to subsets of immigrant populations and take a tailored approach to limit disparities in treatment. Although previous research has explored health outcomes of immigrants in subsets of populations, the NIS provides insight into a wide range of immigrant populations from a variety of countries and backgrounds. The relationship between pre-migration harm and depression has been previously studied in a paper using NIS baseline data which found that pre-migration harm is a risk factor for depression (Montgomery, Jackson & Kelvin, 2013). However, the distinction in depression prevalence among different groups based on visa status has not been explored in depth. Therefore, the primary objective of this paper was to examine the association between legalization pathways (i.e. visa status) and major depression in the context of new LPRs.

## **Methods**

### *Data Source*

The data was taken from the New Immigrant Survey (NIS), a nationally representative, cross-sectional survey of new legal permanent residents (LPRs) and their children. The dataset is publicly available through Princeton University. A secondary analysis was conducted using the first NIS full cohort (NIS-2003-1) Adult Sample, conducted from May to November 2003, which includes 8,573 completed interviews (“NIS-2003-1 Handouts”). The overall response rate of the NIS-2003-1 Adult Sample was 68.6%. The sampling frame was obtained from electronic administrative records held by the US government and the Adult Sample includes individuals who recently obtained legal permanent resident (LPR) status. Survey instruments were translated into seven languages (Chinese, Korean, Polish, Russian, Spanish and Tagalog), key concepts and consent forms were translated into seven additional languages (Arabic, Farsi, French, Gujarati, Hindi/Urdu, Serbo-Croatian, and Ukrainian), and interviews were conducted in the respondent’s language of choice (“NIS-2003-1 Handouts”).

### *Study Sample*

For this analysis, we used the entire Adult Sample in the NIS-2003-1 dataset (n = 8,573) which included individuals who were 19 years of age or older. Respondents were categorized by visa status, or immigrant class of admission, as defined by the Department of Homeland Security into three main groups: Refugees/Asylees/Parolees (n = 554), Legalization (n = 661), and Family/Employment/Diversity (n = 7,358).

## *Measures*

The sections of the NIS survey used for this analysis included Preload, Demographics, Health, Social Variables and Migration History. The Visa Status variable was created based on the “visacatmo” variable in the Preload section of the NIS dataset which consisted of 10 categories (Other, Spouse of U.S. Citizen, Spouse of Legal Permanent Resident, Parent of U.S. Citizen, Child of U.S. Citizen, Family Fourth Preference, Employment Preferences, Diversity Immigrants, Refugee/Asylee/Parolee, and Legalization). The original 10 categories were condensed into three main categories: Refugees/Asylees/Parolees, Legalization, and Family/Employment/Diversity. Refugees and asylees are defined as individuals who experience persecution and therefore cannot return to their countries of origin, with the difference being that an asylee typically requests admission while on US soil (“Refugees and Asylees”, 2016). Parolees are granted admission to the US under certain legal provisions, such as urgent humanitarian need (“The Use of Parole,” 2018). The Legalization category of the NIS encompasses individuals admitted under the Nicaraguan and Central American Relief Act (NACARA) Section 202, Cancellation of Removal Principle, Immigration Reform and Control Act (IRCA), and Registry Provision Principle (“NIS-2003-1 Picklists”). Additional information on different immigrant classes of admission can be found on the DHS website.

Depression scale questions were taken from the World Health Organization’s Composite International Diagnostic Interview-Short Form (CIDI-SF), which is widely considered a reliable and internally consistent tool for evaluating mental disorders based on definitions from the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (Gigantesco & Morosini, 2008). Respondents were asked several stem questions in the NIS Health survey which then led to a series of symptom questions. Stem questions were: 1) “During the past 12 months,

was there ever a time when you felt sad, blue, or depressed for two weeks or more in a row?”, 2) “During that time did the feelings of being sad, blue, or depressed usually last all day long, most of the day, about half the day, or less than half the day?” and 3) “During those two weeks, did you feel this way every day, almost every day, or less often than that?”. If participants answered “yes” to question 1, “all day long” or “most of day” to question 2, and “every day” or “almost every day” to question 3, they would advance to the seven symptom questions. A series of seven questions assessed anhedonia, tiredness, change in appetite, insomnia, trouble concentrating, feelings of worthlessness, and thoughts of suicide. A depression summary score ranging from 0-7 was assigned to respondents based on their answers. Following measures outlined in the Health and Retirement Study by Steffick (2000), individuals with three or more symptoms were categorized as having major depression.

Age was calculated by using year of birth and subtracting from 2004 and viewed as a continuous variable. Three additional categorical variables were created for age (19-34, 35-64, 65+). The Any Harm variable was derived from a single question asking participants “Did you or your immediate family ever suffer any harm outside of the United States because of your political or religious beliefs, or your race, ethnicity or gender?” in which they responded yes/no. Other sociodemographic variables included in the analysis were: gender, region born (Latin America & Caribbean; East and Southeast Asia, Pacific; Europe and Central Asia; Sub-Saharan Africa; Middle East & North Africa; Other), education (less than high school, high school, college, postgraduate), and marital status (married/not married). We will refer to East and Southeast Asia, Pacific just as East and Southeast Asia throughout this paper.

## *Data Analysis*

All data analysis was performed using the statistical software SAS Version 9.4. For table 1, bivariate analyses were used for determining the relationship between sociodemographic characteristics and visa status using chi-square test for categorical variables and ANOVA for the continuous age variable. For table 2, bivariate analyses were performed to examine the association between study variables and major depression. Dummy variables were created before running unadjusted logistic regression models for the outcome of interest, major depression, and independent variables individually. Finally, we ran an adjusted multivariable logistic regression model for major depression controlling for all independent variables.

## **Results**

Table 1 presents a description of the NIS-2003-1 sample's sociodemographic characteristics by visa status (n= 8,753). The average age of the entire sample was 40.1 with standard deviation (SD) of 13.5 ( $P = 0.049$ ). Among age categories, 93% of the sample was between the ages of 19-64 ( $P < .0001$ ). The 35-64 age group accounted for 70.4% of the Legalization category and 62% of Refugees/Asylees/Parolees. There was no statistical significance for gender. Out of all LPRs in the sample, 36.9% and 31.7% are from Latin America & the Caribbean and East and Southeast Asia, respectively ( $P < .0001$ ). Latin America & the Caribbean accounted for 97.7% of the Legalization category. A majority of Refugees/Asylees/Parolees are from Europe & Central Asia (35.4%), Latin America & the Caribbean (28.3%) and Sub-Saharan Africa (15.4%). Within the Family/Employment/Diversity category, a majority come from East and Southeast Asia (36%) and Latin America & the Caribbean (32.1%). Educational attainment varied by visa status ( $P < .0001$ ). Among all LPRs, 37.5% and 32.1% attended some college and less than high school, respectively.

Refugees/Asylees/Parolees and Family/Employment/Diversity were also similarly split with some college and less than high school attainment comprising a majority of the two groups (35% vs 31% for Refugees/Asylees/Parolees and 39.7% vs 29% for Family/Employment/Diversity). The Legalization group had 67.8% of respondents who achieved less than high school. Across all visa groups, an overwhelming majority reported being married (68.4%), a pattern that was observed in each individual group ( $P < .0001$ ). Of all respondents, 6.7% reported experiencing pre-migration harm ( $P < .0001$ ). Almost half of Refugees/Asylees/Parolees experienced pre-migration harm (46.1%). Among the Legalization group, 14.6% reported pre-migration harm. Most Family/Employment/Diversity LPRs reported no pre-migration harm (97%).

Table 2 presents an analysis of sociodemographic variables and major depression. The overall prevalence of major depression in the sample was 3.6% out of 8,228 participants who answered yes/no to the lead in question. Unadjusted and adjusted results for depression by age category were not statistically significant. Females reported double the odds of having depression compared to males at 4.7% and 2.4%, respectively (odds ratio [OR] = 2.01, 95% confidence interval [CI] = 1.567, 2.570). In comparison to immigrants from East and Southeast Asia (i.e. reference group), LPRs from Latin America & the Caribbean (OR = 2.81, 95% CI = 2.033, 3.877) and Middle East & North Africa (OR = 3.07, 95% CI = 1.820, 5.166) had approximately three times the odds of having depression. Immigrants from Europe & Central Asia had 1.68 times the odds of being depressed compared to the reference group (95% CI = 1.106, 2.539). There was a dose response relationship between educational attainment and major depression in which individuals with less than high school education reported the highest rate of depression (4.6%) and individuals with postgraduate education reported the lowest (2%) ( $P = .0002$ ). The odds of having depression among postgraduates (OR = 0.42, 95% CI = 0.267, 0.648) and those who attended some college

(OR = 0.69, 95% CI = 0.524, 0.903) was significantly lower than individuals with less than high school education. Compared to married individuals, those who reported not being married had 1.76 times the odds of depression (95% CI = 1.394, 2.226). Compared to individuals who were admitted to the US through Family/Employment/Diversity visas, Refugees/Asylees/Parolees (OR = 2.31, 95% CI = 1.606, 3.332) and the Legalization group (OR = 2.81, 95% CI = 2.052, 3.853) had more than two times the odds of being depressed. Compared to LPRs who reported no pre-migration harm, those who reported harm had 2.4 times the odds of having depression (95% CI = 1.714, 3.351). A multivariable logistic regression was performed and after adjusting for all sociodemographic variables, females remained more likely to be depressed (adjusted OR [AOR] = 2.01, 95% CI = 1.565, 2.591). Additionally, LPRs from Latin America & the Caribbean (AOR = 1.97, 95% CI = 1.383, 2.808) and the Middle East & North Africa (AOR = 2.65, 95% CI = 1.554, 4.530) were still more likely to be depressed than those from East and Southeast Asia. After controlling for all variables, there was no longer an association between educational attainment and depression. Individuals who reported not being married continued to be more likely to be depressed than married individuals (AOR = 1.53, 95% CI = 1.193, 1.950). Refugees/Asylees/Parolees (AOR = 1.65, 95% CI = 1.076, 2.530) and the Legalization group (AOR = 1.78, 95% CI = 1.229, 2.565) continued to have higher odds of depression than those in the Family/Employment/Diversity category. Similarly, those who reported experiencing pre-migration harm (AOR = 1.97, 95% CI = 1.330, 2.930) maintained higher odds of depression compared to those reporting no harm.

## **Discussion**

Our findings based on NIS-2003 data demonstrate that, overall, 3.6% of immigrants who achieved LPR status at the time of survey administration reported having depression within a 12 month

period. After controlling for all variables, gender, region born, marital status, visa status, and pre-migration harm were associated with depression ( $P < .05$ ). Females were twice as likely as males to report being depressed, and unmarried individuals were more likely to be depressed than married individuals. Immigrants from Latin America & the Caribbean and the Middle East & North Africa had higher likelihoods of depression than those from East and Southeast Asia. Based on visa status, Refugees/Asylees/Parolees and the Legalization group were significantly more likely to have depression than the Family/Employment/Diversity group. It is also interesting to note that 98% of the Legalization group originated from Latin America & the Caribbean, 82% had high school or less than high school education, and 15% reported pre-migration harm. Additionally, almost half of Refugees/Asylees/Parolees reported pre-migration harm (46%). However, depression prevalence among Refugees/Asylees/Parolees was 6.6% versus 7.9% in the Legalization group. This was surprising considering the prevalence of pre-migration harm among Refugees/Asylees/Parolees, which we would expect to have a negative impact on mental health and depression. Refugees/Asylees/Parolees and the Family/Employment/Diversity group had lower rates of depression than the Legalization group, which may be attributable to level of available social support. The idea of social support as a protective factor for depression has been well-documented (Mrazek & Haggerty, 1994; Kurlowicz, 1993; Barger, Messerli-Bürge & Barth, 2014), with one systematic review highlighting the importance of emotional support in adults (Gariépy, Honkaniemi & Quesnel-Vallée, 2016). The social support theory would also help explain why married individuals in this study reported lower rates of depression than unmarried respondents. The Family/Employment/Diversity group likely has social support from their sponsors (e.g. spouse, employers) and diversity immigrants are lottery winners who don't necessarily migrate from countries due to violence, poverty, persecution, etc. Moreover, refugees

and asylees benefit from services provided by organizations such as the United Nations High Commissioner for Refugees (UNHCR) and refugee resettlement agencies such as World Relief. Under US law, refugees are required to undergo a medical examination before coming to the US (“CDC - Medical Examination,” 2019). Conversely, the Legalization group includes individuals who obtain visas through NACARA, Cancellation of Removal Principle, IRCA, and Registry Provision Principle categories and may receive limited to no social support. The aforementioned categories include individuals who have been displaced and flee their countries due to violence and persecution (“Immigrant Classes of Admission”, 2017). Lack of social support is a disadvantage that would inevitably lead to higher rates of depression compared to other visa categories.

### *Limitations*

The sample population of the NIS only included new LPRs which excludes immigrant populations that have yet to be approved for visas or receive their green cards. Theoretically, visa stress ends upon admission to LPR status, a milestone that most immigrants strive for (Jasso *et al.*, 2005). Having a green card can alleviate stress load for immigrants, which may have affected depression rates and subsequent results of this paper. Additionally, the publicly available NIS data did not include undocumented immigrants as a category. According to a DHS report, there were an estimated 12 million undocumented immigrants living in the US as of 2015 (“Estimates of the Unauthorized,” 2017). Undocumented individuals may have different depression outcomes and are not properly represented in the sample despite making up a significant portion of the population.

### *Future Direction*

Future research on immigrants should focus on mental health outcomes among immigrant subgroups, particularly those in more disparate categories such as the Legalization group of this study and undocumented immigrants. Immigrants come from a multitude of backgrounds and experiences, so in order to address complex barriers to immigrant health, it is important to understand that health outcomes are dependent on a multitude of social, environmental, structural and individual level factors. Interventions should be explored to help the most disadvantaged immigrants and promote social, economic and health equity.

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