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A Cross-National Study on Mexico-US Migration, Substance Use and Substance Use Disorders

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Abstract

Background—Epidemiologic research has consistently found lower prevalence of alcohol and drug use disorders among Hispanic immigrants to the US than among US-born Hispanics. Recent research has begun to examine how this change occurs in the process of assimilation in the US. We aimed to study immigration, US nativity, and return migration as risk factors for alcohol and drug use among people of Mexican origin in both the US and Mexico.

Methods—Data come from nationally representative surveys in the United States (2001–2003; n= 1208) and Mexico (2001–2002; n=5782). We used discrete time event history models to account for time-varying and time-invariant characteristics.

Results—We found no evidence that current Mexican immigrants in the US have higher risk for alcohol or alcohol use disorders than Mexicans living in Mexico, but current immigrants were at higher risk for drug use and drug use disorders. Current Mexican immigrants were at lower risk for drug use and drug disorders than US-born Mexican-Americans. US nativity, regardless of parent nativity, is the main factor associated with increasing use of alcohol and drugs. Among families of migrants and among return migrants we found increased risk for alcohol use, drug use and alcohol and drug use disorders. Evidence of selective migration and return of immigrants with disorders was found regarding alcohol use disorders only.

Conclusions—Research efforts that combine populations from sending and receiving countries are needed. This effort will require much more complex research designs that will call for true international collaboration.

Keywords

alcohol use disorders; drug use disorders; substance use disorders; immigration; Mexico; Mexican-American

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1. Introduction

Epidemiologic studies over the past 20 years have consistently found lower prevalence of alcohol and drug use disorders among Hispanic immigrants to the US than among US-born Hispanics, a difference presumed to reflect intergenerational change that occurs as immigrant groups are incorporated into American society (Alegria et al., 2006; Breslau et al., 2007; Burnam et al., 1987; Grant et al., 2004; Ortega et al., 2000; Vega et al., 1998a). There is evidence to suggest that the transition to high risk for substance use disorder begins quickly; among immigrants, those who arrive as children, sometimes called the 1.5 generation (Rumbaut 2004), have *higher* risk for substance use disorder than immigrants who arrive in the US as adolescents or adults and *lower* risk for substance use disorder than US-born Hispanics (Breslau et al., 2007). However, while US-born Hispanics as a group have levels of risk similar to the general US-population it is not known whether changes in risk continue across generations, from the 2nd generation, i.e. those with two immigrant parents, to the 3rd and higher generations, i.e. those with one or more US-born parent (Alegria et al., 2007a; Alegria et al., 2007b; Ortega et al., 2000).

Previous studies have also been limited in specifying associations between migration, substance use, and substance use disorders because they have relied on studies conducted in US populations (Vega et al., 1998b) and have not addressed the transnational nature of contemporary migration (Roberts et al., 1999). Ongoing connections between immigrants and the families that they left behind provide an additional potential mechanism for migration to influence substance use disorders in the *migrant sending populations* (Borges et al., 2007; Borges et al., 2009). This study uses a unique transnational dataset, which includes assessments of timing of migration, substance use, substance use disorders and a broad range of psychiatric conditions in population samples of the Mexican general population and the Mexican origin population of the US. This information allowed us to examine the pattern of change in risk across time and generation and to address 2 possible sources of bias, selective migration and selective return. First, migrants may differ from the general population in their country of origin. Some have argued that a 'healthy migrant effect' might explain the low risk among immigrants relative to the US-born (Borges et al., 2006; Grant et al., 2004). In addition it is also possible that return migration is selective with respect to mental health problems, i.e. that sick immigrants are more likely to return to their home countries for treatment, social support or death, the so called 'salmon bias' (Abraido-Lanza 1999). This bias would artificially lower the apparent rates of disorder among migrants in the US. We tested two main study hypotheses: (1) after immigration, Mexican-born respondents in the US are more likely to initiate use of alcohol and drugs and to develop substance use disorders than Mexicans who never migrated and (2) Mexican-born respondents in the US are at lower risk for of alcohol and drug use and substance use disorders than US-born Mexican Americans. Other comparisons of interest, i.e., age at immigration, generation, return migrants and family of migrants, are also addressed here.

2. Methods

2.1 Samples

We combined data on the Mexican population from the Mexican National Comorbidity Survey (MNCS) (Medina-Mora et al., 2003) with data on the Mexican-origin population in the United States from the Collaborative Psychiatric Epidemiology Surveys (CPES) (Heeringa et al., 2004). The MNCS, conducted as part of the World Health Organization's World Mental Health Survey Initiative (Kessler et al., 2006), is based on a stratified, multistage area probability sample of household residents in Mexico aged 18 to 65 years who lived in communities with a population of at least 2500 people. Approximately 75% of

the Mexican population is urban, so defined. 5782 respondents were interviewed between September 2001 and May 2002. The response rate was 76.6%.

Two component surveys of the CPES include respondents of Mexican descent, the National Comorbidity Survey Replication (NCSR) (Kessler and Merikangas 2004) and the National Latino and Asian American Survey (NLAAS) (Alegría et al., 2004). The NCSR was based on a stratified multistage area probability sample of the English-speaking household population of the continental United States. The NLAAS was deliberately designed to be in harmony with the NCSR for combined analysis and is based on the same sampling frame, with special supplements to increase representation of the survey's target ethnic groups. The combined sample is weighted to represent the US Mexican-American population using weights developed for this purpose (Heeringa and Berglund 2007; Heeringa et al., 2004). Spanish language interviews in the NLAAS used the same translation of the diagnostic interview modules as were used in the MNCS. The NCSR was conducted from 2001 through 2003 and had a 70.9% response rate; the NLAAS was conducted from 2002 through 2003 and had a 75.5% response rate for the Latino sample. The combined sample of Mexican Americans comprised 1442 respondents. Full data on nativity and age at immigration are available for a total of 1208 respondents.

Study procedures were approved by the Institutional Review Boards of Harvard Medical School, the University of Michigan, and the National Institute of Psychiatry Ramon de la Fuente.

2.2 Migration Groups

We define 7 mutually exclusive groups representing a range of exposure to the US across this transnational population: 1) Non-migrants in Mexico with no migrant in their family; 2) Non-migrants in Mexico with a migrant among their immediate family members; 3) Return migrants living in Mexico after having spent at least 3 months in the US for work or study; 4) Mexican-born immigrants in the US who arrived at age 13 or older (1st generation); 5) Mexican-born immigrants in the US who arrived at age 12 or younger (1.5 generation); 6) US-born Mexican-American respondents with no US-born parents (2nd generation), and 7) US-born Mexican-American respondents with at least one US-born parent (3rd or higher generation). The first three groups are from the MNCS and the next four groups from the CPES population. The decision to use this cutoff for age at migration was made based on previous research we had performed on immigration and risk for psychiatric and substance use disorders (Breslau et al., 2007), where the statistical significance of the difference between early- and late-arriving immigrants was maximized with this cutoff.

2.2 Measures

2.2.1 Measures of substance use—Lifetime alcohol use refers to ever drinking any alcoholic beverage. Lifetime drug use includes use of marijuana or hashish, cocaine in any form, heroin, opium, glue, LSD, tranquilizers, stimulants, pain killers, or other prescription drugs either without the recommendation of a health professional, or used for any reason other than prescribed by a health professional. In the CPES and the MNCS, substance use disorders were defined by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association 1994) and were assessed with version 3.0 of the World Health Organization Composite International Diagnostic Interview (CIDI) (Kessler and Üstün, 2004), a structured lay-administered diagnostic questionnaire used in face-to-face interviews. Substance use disorders included 4 diagnoses: alcohol abuse, alcohol dependence with abuse, drug abuse, and drug dependence with abuse. The DSM-IV criteria for alcohol dependence consist of three positive responses across seven domains (tolerance, withdrawal, drinking more than intended, unsuccessful efforts to control, giving

up pleasures or interests to drink, spending a great deal of time in drinking activities, continued alcohol use despite physical/psychological problems). A diagnosis for DSM-IV alcohol abuse was based on any one of four items: consequences related to role performance, hazardous use, legal problems and social problems. Parallel criteria were used for drug abuse and dependence. As described elsewhere (Haro et al., 2006) blinded clinical second interviews with the Structured Clinical Interview for DSM-IV (First et al., 2002) found generally good concordance with CIDI diagnoses of these disorders, including in Mexico (Caraveo-Anduaga et al., 1991; Caraveo-Anduaga et al., 1998) and other Spanish-speaking countries (Wittchen 1994). The prevalence and demographic factors associated with substance use disorders in Mexico were presented previously (Medina-Mora et al., 2006), and the general results are in accordance with other surveys in Mexico (Medina-Mora et al., 2002).

2.2.2 Other Covariates—Analyses also used sociodemographic information collected in the WMH-CIDI on gender, age, educational attainment, and DSM-IV psychiatric disorders categorized as any mood disorder (Major Depressive Disorder and Dysthymia) and any anxiety disorder (Panic Disorder, Agoraphobia without Panic Disorder, Social Phobia, Generalized Anxiety Disorder and Posttraumatic Stress Disorder). Statistical control of psychiatric disorders is important given the high level of comorbidity between substance use and several other psychiatric disorders found in general population samples (Hasin et al., 2007; Kessler et al., 1997), and in samples of Hispanics (Vega et al., 2009).

2.3 Statistical Analysis

We used a design-based statistical analysis strategy for point and variance estimates and hypothesis testing, using standard survey data analysis procedures to account for design effects arising from the use of stratification, clustering and unequal selection probabilities in the component surveys (Korn and Graubard, 1999). Following the common design specification for the World Mental Health Surveys, the NCSR and MNCS used “long-form” and “short-form” questionnaires in order to reduce respondent burden. In our analysis, we used integrated weights and study design variables (e.g. stratum and sampling unit identifiers) that were developed by CPES biostatisticians (National Institute of Mental Health 2010) for use in design-based analyses that combine the NCSR and NLAAS. The “short-form” and the “long-form” weights were each calibrated to estimate that a total 15.76 million Mexican Americans were in the US sampling frame (National Institute of Mental Health 2010). The Mexican sampling frame does not overlap with the US sampling frame, so in the combined sample we treated each frame as separate domains for purposes of design-based variance estimation (Kish, 1999; Korn and Graubard, 1999). To protect against potential biases in design-based point estimates from the combined (CPES and MNCS) samples, we followed the preference stated by survey sampling authority Leslie Kish of having each combined sample be calibrated to a contemporary estimate of the size of its respective sampling frame population (Kish 1999). Hence, we calibrated the MNCS short and long form weights to represent 40.6 million individuals, based on the estimated number of 18 to 65 years old lived in households in towns > 2,500 inhabitants in the Mexican Census of the Populations and Households, 2000 (INEGI: Instituto Nacional de Estadística 2010).

We used a discrete-time event history analysis with time-varying covariates, implemented using pooled logistic regression with person-years as the units of analysis (Efron 1988; Willett and Singer 1993), to study variation in risk of substance use and substance use disorders across the seven migration groups defined above while statistically adjusting for covariates. The main outcomes that we studied were lifetime alcohol use, lifetime drug use, lifetime alcohol abuse or dependence and drug abuse or dependence. The key predictor is

immigration group, in seven categories. We used a discrete-time approach instead of the more traditional continuous-time approach because the MNCS and the CPES recorded the time to event (age of onset of substance use, immigration, and other time-dependent variables) at yearly intervals rather than on a continuous-time scale. The pooled logistic regression analyses allows us to take account of the temporal ordering of migration, initiation of substance use, and onset of psychiatric disorders (Willett and Singer 1993) and to use design-based estimation methods to account for survey design effects (Korn and Graubard, 1999).

Our use of discrete time event history analyses (Willett and Singer, 1993) relied on retrospective age-at-onset reports to establish a temporal order between the predictors and the outcomes. Design-based standard errors for logistic regression coefficients and for pairwise contrasts between them were estimated using the Taylor linearization method (Binder 1983) with SUDAAN version 10.01 (Research Triangle Institute 2002) and were used in Wald tests for statistical significance and for producing 95% confidence intervals (CIs) for adjusted odds ratios.

Adjusted associations between migration group and substance use disorders were estimated for the entire sample and for the sub-sample of substance users. Associations between migration group and alcohol or drug use disorders within the sub-sample of substance users are pursued in an effort to discard that differences in substance use disorders are not simply due to differences in substance use per se, but in the progression from substance use to substance use disorders. We also examined 2 potential sources of selection bias that have hampered prior studies of Hispanics in the United States: (Abraido-Lanza, 1999; Alegria et al., 2006): (1) Are Mexican-born respondents in the CPES (i.e., those who eventually migrate) at greater risk for substance use before immigration than are Mexicans who never immigrated (evidence of mental health-selective migration of persons at risk for substance use)? and (2) are migrants who return to Mexico at higher risk of substance use than migrants who remain in the United States (evidence of selection bias among return migrants, the so-called “salmon bias” hypothesis)?

3. Results

3.1 Distribution of the sample across migration groups

The sample includes 6,990 respondents divided in seven mutually exclusive groups, three interviewed in Mexico (groups 1–3) and four interviewed in the United States (groups 4–7). All demographic variables are differentially distributed across the seven groups. Larger groups of females were found in Mexico, except for returned migrants that were mainly males. The US born of Mexican origin were more likely to be very young and older and with much more educational attainment. On the other hand, the Mexican groups, either in Mexico or current immigrants in the US, tended to be married and much less likely to be divorced/separated or widowed (Table 1).

3.2 Prevalence and alcohol and drug use disorders across migration groups

The prevalence of alcohol use ranged from 77.28% (NLAAS/NCSR Mexico born migrated at 13y or older) to 94.35% (MNCS-Returned migrant) (Table 2). Drug use was much less common and varied across the groups from 7.71% (MNCS-No migrant in family) to 53.87% (NLAAS/NCSR US born at least one US born parent). Lifetime alcohol abuse or dependence ranged from a low of 4.51% (NLAAS/NCSR Mexico born migrated at 12y or younger) to a high of 20.26% (NLAAS/NCSR US born at least one US born parent). Drug use disorder ranged from a low of 0.63% (MNCS-No migrant in family) to a high of 10.94%

(NLAAS/NCSR US born at least one US born parent). Variation across migration groups is highly statistically significant for all four outcomes.

3.3 Associations between migration status, nativity and age at migration with alcohol, drug use and disorders of use

Variation across migration groups is sustained in the discrete time event history analysis (Table 3). The top panel of Table 3 shows variation in substance use and substance use disorder across the 7 migration groups, with Mexicans with no migrant in their family serving as the reference group. Compared with this group, risk of lifetime alcohol use (column 1) was higher among people in the Mexican population with a family member in the United States, among return migrants and among 2nd and 3rd or higher generation Mexican-Americans. 1st and 1.5 generation Mexican-Americans do not significantly differ from Mexicans with no migrant in their family in lifetime use of alcohol. In contrast, drug use (Column 2) show ORs increasing with extent of exposure to the US, from 1.49 among those with a migrant in their family to 13.26 among 3rd or higher generation Mexican-Americans.

The lower panels of Table 3 show contrasts estimated from the same model which test differences in risk for substance use or substance use disorder between particular migration groups. First, among Mexican-Americans, those born in Mexico (1st and 1.5 generations combined) are significantly less likely to use either alcohol (OR=0.53) or drugs (OR=0.49) than those born in the US (2nd and 3rd or higher generations combined). Second, comparison of the 1st and 1.5 generations shows that alcohol use is more common in the 1.5 generation. Third, among the US-born, drug use is significantly more common among 3rd or higher generation Mexican-Americans than among those in the 2nd generation.

Columns 3–6 of Table 3 show a similar series of contrasts for alcohol and drug use disorders among the total sample (Columns 3 and 4) and among the subsample of alcohol and drug users (Columns 5 and 6). In the total sample, high ORs for alcohol use disorders were found among people in the Mexican population with a family member in the United States, among return migrants and among US Born Mexican decent without and with US born parents when compared to people with no migration background. For drug abuse and dependence all groups showed increased ORs when compared to people with no migration background. These conclusions still hold when the analyses were performed among the subsample of those with lifetime use of alcohol (column 5), although the ORs were smaller in magnitude, particularly for drug use disorders (column 6).

Results of contrasts presented in the lower panel show that current immigrants are at lower risk for alcohol and drug use disorders than US-born Mexican-Americans, but this difference does not reach statistical significance for drug use disorder among drug users (contrast 2). Risk is lower among both groups of immigrants relative to the US-born (contrast 3), and there is no significant difference between these two groups of immigrants (contrast 4). There is no significant difference across US-born generations in risk for substance use disorder in the total sample or in the sample of users (contrast 5).

3.4 Evaluation of bias

Table 4 presents results of the analysis of selective migration and selective return. In the first comparison, there was no evidence that migrants had lower risk for alcohol or drug use in person-years prior to migration; quite the contrary migrants had higher risk of alcohol and drug use prior to migration. In the second comparison, current migrants in the US were less likely to use alcohol than return migrants, but more likely to use drugs.

Similar comparisons were estimated for alcohol and drug use disorders in the total sample and among those who used alcohol or drugs. In the first comparison, evidence of lower but non-significant ORs for alcohol abuse and dependence were found for migrants prior to migration, in the total and the subsample of alcohol users when compared to those with no migrants in the family. No such evidence was found for drug use disorders. In the second comparison, current migrants in the US that migrated at 12 years or younger were less likely to have alcohol use disorders than return migrants, in the total and the subsample of alcohol users.

4. Discussion

4.1 Main results

Results suggest that there are large differences associated with migration and alcohol, drug use and disorders of use on both sides of the Mexico-US border. While the findings are generally consistent with the hypothesized association of greater use and greater risk for disorder with more direct and intensive exposure to American norms, there are also important differences across groups of migrants and between alcohol and drugs.

4.2 Are immigrants at high risk of alcohol and drug use and disorders of use compared to non-migrant Mexicans?

Compared to non-migrants who remained in Mexico, immigrants in the US were more likely to initiate use of drugs but not alcohol. Risk for drug use disorders was also elevated among immigrants relative to non-migrants, but this effect appears to reflect differences in drug use in the total sample rather than differences in progression to disorder among users.

Our analysis of health selection for migration suggests that immigrants were at higher and not lower risk in the pre-migration period for alcohol and drug use. It is therefore possible that some of the increased risk for drug use among current migrants that we reported here is due to self-selection of people likely to use drugs into the migrant population. An earlier analysis of migrant selection in this sample suggests that this difference is partially due to family-level factors, such as region or socio-economic status in childhood (Breslau et al., 2010). In this study, we found some evidence that return migrants were more likely to be users of alcohol and less likely to be users of drugs than immigrants interviewed in the US.

How could immigration differentially affect alcohol and drug use? Other studies pointed to the limited effect of immigration on rates of alcohol use disorders (Borges et al., 2006; Vega et al., 1998a), but not on drug use disorders (Vega et al., 1998a). This could be explained by the fact that Mexican immigrants are entering in a milieu that encourages more liberal norms regarding drug use but not more liberal norms on alcohol use, *relative to their communities of origin*. There is evidence that even though per-capita alcohol consumption is higher in the US than Mexico, Mexican norms of alcohol use are more deleterious (World Health Organization, 2004). For example, public drinking (Lange et al., 2002; Rehm et al., 2004) and binge and risk drinking occasions have been reported as less frequent in the US than in Mexico (Borges et al., 2004). The opposite is true for drug use (Warner et al., 2001). Not only is the availability of drugs higher in the US compared to Mexico (United Nations Office on Drug and Crime, 2008), but the norms regarding the use of drugs such as marijuana, cocaine and even injected drug use are more liberal in the US than in Mexico (Warner et al., 2006). This difference in population norms for alcohol and drug use have been suggested as an explanation for the association between migration and substance use among women (Vega et al., 1998a; Zeng, 2007), but may also apply equally well to men. The role of differential norms and the availability of alcohol and drugs among immigrants of Mexican origin are at this point tentative explanations for our findings, as we have not

measured of these variables. In addition, other unmeasured factors, such as discrimination and poverty, may influence our results and interpretation. Unfortunately, as in any other observational epidemiological study, we can only measure a limited set of variables.

4.3 Does US nativity increase the risk of alcohol and drug use and disorders of use?

The next question was whether current Mexican immigrants are at lower risk for substance use and substance use disorders compared to US-Born Mexican-Americans, as previously reported (Alegria et al., 2006; Amaro et al., 1990; Breslau et al., 2007; Burnam et al., 1987; Grant et al., 2004; Ortega et al., 2000; Vega et al., 1998a). We replicated these findings, using only person-years after immigration, accounting for selective migration and a large list of psychiatric disorders that could confound this relationship (Warner et al., 2006).

The gap between immigrants and the US-born can be explained by two separate factors. First, the magnitude of the cross-national difference between Mexico and the US is so large (Degenhardt et al., 2008; Demyttenaere et al., 2004) that, despite the increase in use of drugs associated with migration, migrants are unlikely to increase their use to the extent that they approach levels of use common in the US population. This may be especially true for Mexican women arriving late in life (Canino et al., 2008; Vega et al., 2009). Second, the US-born are likely to develop similar patterns of substance use as their non-Mexican-American peers. Similar patterns have been found in other health behaviors (Abraido-Lanza et al., 2006; Abraido-Lanza et al., 2005).

4.4 Does age at immigration and generation in the US affect the risk?

The reduction in risk was equally evident for both groups of immigrants, those who arrived at early ages in the US (<13 years of age) and those who arrived at older ages (>12 years of age). In fact, we could not find clear evidence that these two populations differed in their protective effect regarding substance use and disorders of use, as also reported elsewhere by some (Vega et al., 2004) but not others (Alegria et al., 2007b). We also found that US Born Mexican-Americans with at least one US-born parent had higher risks than the US Born Mexican-Americans with no US-born parents only for lifetime drug use. As the few prior studies that examined this issue also gave conflicting results (Alegria et al., 2007b; Ortega et al., 2000) we tentatively conclude that US-born status, regardless of parent birth, is the main factor associated with increasing use of alcohol and drugs.

4.5 Does immigration increase the risk of alcohol and drug use and disorders of use among return migrants and family of immigrants?

Finally, Mexican migration to the US had a profound effect on alcohol use, drug use and alcohol and drug use disorders in families of migrants and among return migrants. Return of immigrants with substance use disorders to Mexico, could threaten the validity of these findings. We added to these results presented before (Borges et al., 2007) by contrasting return migrants with current migrants in the US. Return migrants had higher likelihood of alcohol use and alcohol use disorders than current immigrants, but lower likelihood for drug use. Our lack of data on the age of return migration does not allow us to be conclusive as return migrants may have higher rates than current migrants due to the return of sick migrants or increase rates after migrants return to Mexico. It is more likely that a combination of both process are operating but without additional data we cannot rule out either of these two possibilities.

4.6 Limitations

Our findings must be evaluated in the context of several limitations. First, these household surveys excluded homeless and institutionalized people, populations known to have a high

prevalence of substance use disorders. Second, these analyses used data on retrospectively reported ages of onset that are subject to recall error, which probably means that the results we report were conservative. Retrospective data on the exact ages at immigration and return migration are lacking in the MNCS, which limited our ability to more adequately model the data from this survey. Third, the Mexican sampling frame did not include the most rural parts of the country. To the extent that most Mexican immigrants to the US come from areas not represented by our sample, our ability to control for pre-migration factors was limited. Fourth, despite using the same diagnostic interview, the 2 surveys differed in several ways, including the auspices of the survey. We cannot rule out the possibility that these methodological differences contributed to the observed differences in prevalence estimates in the CPES compared with the MNCS. Finally, even when it is well accepted that the Mexican migration to the US is driven by economic reasons and the search for better standard of living, we know little about the individual reasons for migration in this sample, and whether our results could be applied to other samples of migrants, homeless and displaced persons is a matter of further studies (Bhugra, 2004).

4.7. Conclusions

We found no evidence that current Mexican immigrants in the US have increased risk for alcohol use or alcohol use disorders when compared to Mexicans living in Mexico. However, current immigrants were at higher risk for drug use and drug use disorders. Research efforts that combine populations from sending and receiving countries, and cover as many specific migratory experiences as possible are needed. The evidence that this is a single underlying population with strong bi-national ties also calls for joint public health programs that address a series of pre- and post-migration experiences and Mexicans and Mexican-Americans (Ramos et al., 2009). This effort will require much more complex research designs that will call for true international collaboration.

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Table 1
Population characteristics by migrant status. Mexican sample from the MNCS - CPES (N=6,990)

Survey/Migrant Status	Sex		Age categories (years)				Marital status			Education (years)			
	Male (%)	Female (%)	18 – 25 (%)	26 – 35 (%)	36 – 45 (%)	46+ (%)	Married/Cohabiting (%)	Div/Sep/Widowed (%)	Never Married (%)	0 – 5 (%)	6 – 8 (%)	9 – 11 (%)	12+ (%)
MNCS													
1 No migrant in family (n=2,878)	45.7	54.3	28.9	27.4	20.9	22.8	65.2	7.8	26.9	19.7	21.9	30.2	28.1
2 Migrant in family (n=2,519)	44.5	55.5	28.1	30.2	20.6	21.1	68.6	6.8	24.7	13.8	21.7	27.7	36.8
3 Returned migrants (n=385)	82.3	17.7	15.3	25.4	33.2	26.1	76.5	6.2	17.4	21.9	18.8	26.8	32.5
CPES													
4 NLAAS/NCSR Mexico born migrated at 13y or older (n=412)	57.0	43.1	15.3	40.1	25.3	19.3	78.4	8.7	12.9	17.6	32.4	20.6	29.4
5 NLAAS/NCSR Mexico born migrated at 12y or younger (n=136)	44.7	55.3	36.5	33.6	15.9	14.1	60.8	8.4	30.9	6.5	4.7	29.9	58.9
6 US Born Mexican decent, no US born parents (n=172)	54.6	45.4	40.4	20.6	7.7	31.4	50.2	17.6	32.2	9.7	11.7	18.8	59.8
7 US Born Mexican decent, at least one US born parent (n=488)	52.2	47.9	30.0	19.2	22.6	28.2	59.6	14.3	26.2	4.4	4.1	23.7	67.8
χ^2 (p-value)*	17.99 (<.0001)		5.45 (<.0001)				5.12 (<.0001)			11.98 (<.0001)			

* Chi-square is a Wald Chi-square that is adjusted for the survey design.

Table 2

Alcohol and drug use prevalences by migrant status. Mexican sample from the MNCS - CPES (N=6,990)

Survey/Migrant Status	Lifetime alcohol use (n=6,947)		Lifetime drug use (n=6,980)*		Lifetime alcohol abuse or dependence		Any lifetime drug abuse or dependence	
	N	% (SE)	n	% (SE)	n	% (SE)	n	% (SE)
MNCS								
1 No migrant in family (n=2,878)	2321	83.22 (0.97)	192	7.71 (0.65)	149	5.82 (0.66)	21	0.63 (0.15)
2 Migrant in family (n=2,519)	2167	88.27 (0.84)	235	11.00 (0.89)	158	8.08 (0.61)	39	1.96 (0.36)
3 Returned migrants (n=385)	360	94.35 (1.32)	86	22.50 (2.59)	60	17.92 (2.99)	14	3.29 (1.13)
CPES								
4 NLAAS/NCSR Mexico born migrated at 13y or older (n=412)	311	77.28 (2.38)	63	17.10 (2.17)	22	5.85 (0.97)	8	1.87 (0.63)
5 NLAAS/NCSR Mexico born migrated at 12y or younger (n=136)	113	81.87 (2.98)	31	25.85 (5.09)	9	4.51 (1.34)	5	3.49 (1.24)
6 US Born Mexican decent, no US born parents (n=172)	153	90.36 (2.26)	71	39.90 (4.32)	25	15.03 (2.55)	18	10.85 (1.99)
7 US Born Mexican decent, at least one US born parent (n=488)	454	91.57 (2.25)	280	53.87 (2.77)	110	20.26 (2.35)	65	10.94 (1.54)
X² (p-value)	9.76 (<0.001)		22.66 (<0.001)		6.43 (<0.001)		12.59 (<0.001)	

MNCS: Mexican National Comorbidity Survey

CPES: Collaborative Psychiatric Epidemiology Surveys

NLAAS: National Latino and Asian American Study

NCSR: National Comorbidity Survey Replication

Numbers are unweighted, percentages are weighted

* Includes marijuana or hashish, cocaine in any form, heroin, opium, glue, LSD, Tranquilizers, stimulants, pain killers, or other prescription drugs either without the recommendation of a health professional, or used for any reason other than a health professional said and other

Table 3
Migration status and alcohol and drug use association. Mexican sample from the MNCS/CPES.

Group of contrasts	Survey/Migrant Status	Lifetime alcohol use				Lifetime drug use*				Total sample				Among users			
		OR		95% IC		OR		95% IC		Alcohol abuse or dependence		Drug abuse or dependence		Alcohol abuse or dependence		Any drug abuse or dependence	
		OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC
Group 1. Reference: MNCS (1)	MNCS																
	1 No migrant in family	1.00	--			1.00	--			1.00	--	1.00	--	1.00	--	1.00	--
	2 Migrant in family	1.18	(1.09 – 1.29)			1.49	(1.15 – 1.92)			1.48	(1.14 – 1.92)	3.22	(1.80 – 5.78)	1.38	(1.07 – 1.78)	2.99	(1.63 – 5.49)
	3 Returned migrants	1.41	(1.20 – 1.66)			2.33	(1.59 – 3.40)			1.93	(1.19 – 3.13)	3.57	(1.38 – 9.24)	1.73	(1.09 – 2.75)	1.89	(0.68 – 5.26)
	CPES																
	4 NLAAS/NCSR Mexico born migrated at 13y or older	0.81	(0.57 – 1.17)			6.55	(3.81 – 11.26)			1.31	(0.73 – 2.36)	3.71	(1.72 – 8.03)	1.16	(0.65 – 2.05)	1.25	(0.44 – 3.56)
	5 NLAAS/NCSR Mexico born migrated at 12y or younger	1.22	(0.98 – 1.52)			5.13	(3.19 – 8.25)			0.84	(0.45 – 1.55)	4.71	(1.86 – 11.93)	0.78	(0.43 – 1.41)	1.47	(0.52 – 4.20)
Group 2. Reference: CPES (6+7)	6 US Born Mexican decent, no US born parents	1.82	(1.44 – 2.32)			8.05	(5.70 – 11.37)			2.72	(1.61 – 4.62)	13.70	(7.24 – 25.94)	2.13	(1.26 – 3.59)	2.80	(1.47 – 5.35)
	7 US Born Mexican decent, at least one US born parent	2.04	(1.66 – 2.51)			13.26	(9.55 – 18.42)			3.65	(2.49 – 5.36)	14.17	(7.94 – 25.29)	2.88	(2.00 – 4.15)	1.98	(1.15 – 3.40)
	X² (p-value)	74.07 (<0.001)		343.95 (<0.001)		57.55 (<0.001)		129.38 (<0.001)		46.99 (<0.001)		18.80 (0.005)					
		OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC
	4+5 NLAAS/NCSR Mexico born	0.53	(0.43 – 0.64)			0.49	(0.35 – 0.68)			0.34	(0.21 – 0.53)	0.29	(0.19 – 0.45)	0.38	(0.26 – 0.58)	0.63	(0.37 – 1.06)
	6+7 Any US Born Mexican decent	1.00	--			1.00	--			1.00	--	1.00	--	1.00	--	1.00	--
Group 3. Reference: CPES (6+7)	4 NLAAS/NCSR Mexico born migrated at 13y or older	0.41	(0.28 – 0.60)			0.56	(0.37 – 0.87)			0.38	(0.23 – 0.64)	0.26	(0.13 – 0.55)	0.43	(0.27 – 0.70)	0.58	(0.22 – 1.50)
	5 NLAAS/NCSR Mexico born migrated at 12y or younger	0.62	(0.49 – 0.78)			0.44	(0.28 – 0.69)			0.24	(0.13 – 0.45)	0.33	(0.17 – 0.67)	0.29	(0.17 – 0.51)	0.69	(0.27 – 1.76)

Group of contrasts	Survey/Migrant Status	Lifetime alcohol use			Lifetime drug use*			Total sample			Among users				
		Lifetime alcohol use			Lifetime drug use*			Total sample			Among users				
		OR	95% IC		OR	95% IC		Alcohol abuse or dependence	Drug abuse or dependence	Alcohol abuse or dependence	Any drug abuse or dependence				
Group 4. Reference: CPES (4)	6+7 Any US Born Mexican decent	1.00	--		1.00	--		1.00	1.00	1.00	--	1.00	--		
	4 NLAAS/NCSR Mexico born migrated at 13y or older	1.00	--		1.00	--		1.00	1.00	1.00	--	1.00	--		
	5 NLAAS/NCSR Mexico born migrated at 12y or younger	1.50	(1.02 – 2.22)		0.78	(0.43 – 1.42)		0.64	(0.32 – 1.27)	1.27	(0.41 – 3.96)	0.68	(0.34 – 1.34)	1.18	(0.25 – 5.58)
	6 US Born Mexican decent, no US born parents	1.00	--		1.00	--		1.00	1.00	1.00	--	1.00	--	1.00	--
Group 5. Reference: CPES (6)	7 US Born Mexican decent, at least one US born parent	1.12	(0.90 – 1.39)		1.65	(1.15 – 2.35)		1.34	(0.79 – 2.26)	1.03	(0.61 – 1.76)	1.35	(0.84 – 2.19)	0.71	(0.44 – 1.14)

OR estimates adjusted by sex, age (4 categories), education (Time-Varying), any mood disorder (T-V), any anxiety disorder (T-V) and person years as a categorical variable - Immigrants (Migrant Status 4 and 5) includes ONLY person-time AFTER migration

* Includes marijuana or hashish, cocaine in any form, heroin, opium, glue, LSD, Tranquilizers, stimulants, pain killers, or other prescription drugs either without the recommendation of a health professional, or used for any reason other than a health professional said and other

Any US Born Mexican descent is 6+7

Table 4
Migration status and alcohol and drug use association. Mexican sample from the MNCS/CPES.

Group of contrasts	Migrant Status	Lifetime alcohol use				Lifetime drug use				Total sample				Among users			
		OR		95% IC		OR		95% IC		OR		95% IC		OR		95% IC	
		OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC	OR	95% IC
Group 1. Reference: MNCS (1)	1 No migrant in family	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
	4+5 NLAAS/NCSR Mexico born	1.17	(1.00 – 1.38)	1.90	(1.15 – 3.16)	0.54	(0.24 – 1.24)	1.06	(0.12 – 9.62)	0.50	(0.21 – 1.15)	0.42	(0.04 – 4.44)				
Group 2. Reference: MNCS (3)	3 Returned migrants	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
	4 NLAAS/NCSR Mexico born	0.58	(0.39 – 0.86)	2.81	(1.58 – 5.02)	0.68	(0.35 – 1.33)	1.04	(0.39 – 2.74)	0.67	(0.35 – 1.28)	0.66	(0.19 – 2.31)				
	migrated at 13y or older																
Group 2. Reference: MNCS (3)	5 NLAAS/NCSR Mexico born	0.87	(0.67 – 1.13)	2.21	(1.29 – 3.77)	0.43	(0.21 – 0.88)	1.32	(0.45 – 3.89)	0.45	(0.23 – 0.89)	0.78	(0.22 – 2.71)				
	migrated at 12y or younger																
OR estimates adjusted by sex, age (4 categories), education (Time-Varying), any mood disorder (T-V), any anxiety disorder (T-V) and person-year as a categorical var. Mexico-Born category include ONLY person-time BEFORE migration																	
OR estimates adjusted by sex, age (4 categories), education (Time-Varying), any mood disorder (T-V), any anxiety disorder (T-V) and person-year as a categorical var. Mexico-Born categories includes ONLY person-time AFTER migration																	