

A Transnational Study of Migration and Smoking Behavior in the Mexican-Origin Population

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Epidemiological studies have found large differences in smoking between Latinos and non-Hispanic Whites in the United States. Latinos are less likely than non-Hispanic Whites to initiate smoking. For instance, in the 2003 Tobacco Use Supplement to the Current Population Survey (CPS), a large nationally representative sample, the lifetime prevalence of smoking was 25% among Latinos and 44% among non-Hispanic Whites.¹ Among smokers, Latinos are more likely to be nondaily smokers²⁻⁴ and smoke fewer cigarettes per day³ than non-Hispanic Whites. The 2003 CPS found that 36% of Latino smokers were nondaily smokers, compared with 17% of non-Hispanic White smokers and that among daily smokers 63% of Latinos smoked 10 or fewer cigarettes per day, compared with only 29% of non-Hispanic Whites.³ A recent study suggests that differences in smoking account for close to three quarters of the advantage in life expectancy at age 50 years that Latinos have relative to non-Hispanic Whites.⁵

The immigrant origins of a large portion of the Latino population may be one factor contributing to these differences. Immigrant Latinos are less likely to be current smokers than are US-born Latinos,⁶⁻⁹ leading some to suggest that there may be positive selection among immigrants. However, our previous study found that in the years before arrival in the United States, migrants were *more* likely to have smoked than the general Mexican population.¹⁰ In addition, the increase in smoking in 2nd and higher generations of Latinos suggests that the distinctive patterns among immigrants become less common with assimilation and, therefore, that the differences in lifetime smoking patterns may narrow or disappear as the US-born portion of the Latino population grows.¹¹ However, no information is available on the extent to which the distinctive patterns of smoking among Latinos reflect continuity with the source population in the

Objectives. We examined migration-related changes in smoking behavior in the transnational Mexican-origin population.

Methods. We combined epidemiological surveys from Mexico (Mexican National Comorbidity Survey) and the United States (Collaborative Psychiatric Epidemiology Surveys). We compared 4 groups with increasing US contact with respect to smoking initiation, persistence, and daily cigarette consumption: Mexicans with no migrant in their family, Mexicans with a migrant in their family or previous migration experience, migrants, and US-born Mexican Americans.

Results. Compared with Mexicans with a migrant in their family or previous migration experience, migrants were less likely to initiate smoking (odds ratio [OR]=0.56; 95% confidence interval [CI]=0.38, 0.83) and less likely to be persistent smokers (OR=0.41; 95% CI=0.26, 0.63). Among daily smokers, the US-born smoked more cigarettes per day than did Mexicans with a migrant in their family or previous migration experience for men (7.8 vs 6.5) and women (8.6 vs 4.3).

Conclusions. Evidence suggests that smoking is suppressed among migrants relative to the broader transnational Mexican-origin population. The pattern of low daily cigarette consumption among US-born Mexican Americans, noted in previous research, represents an increase relative to smokers in Mexico. (*Am J Public Health.* 2012;102:2116-2122. doi:10.2105/AJPH.2012.300739)

countries of origin of Latino immigrants or environmental influences on migrants and their US-born descendants that occur in the context of assimilation.

We examined the trajectory of smoking behaviors related to migration and assimilation to the United States across the transnational Mexican-origin population of Mexico and the United States. Mexican Americans constitute more than 60% of the US Latino population, and about 40% of Mexican Americans were born in Mexico.¹² Immigrants from Mexico are by far the largest group of immigrants in the United States, constituting about 30% of the total foreign-born population.¹² Combining population-based surveys from both countries, we examined differences in initiation and cessation of smoking and in cigarette consumption among daily smokers across a series of groups with increasing contact with the United States, from Mexicans with no familial connection to migration at one extreme,

through US-born Mexican Americans at the other.

METHODS

We combined samples from epidemiological surveys in Mexico and the United States to create a composite sample that was representative of the transnational Mexican-origin population in both countries. The Mexican sample comes from the Mexican National Comorbidity Survey (MNCS),¹³ which was based on a stratified, multistage area probability sample of household residents in Mexico aged 18 to 65 years, who lived in communities of at least 2500 people. Between September 2001 and May 2002, 5782 respondents were interviewed. The response rate was 76.6%. Data on the Mexican-origin population of the United States came from 2 of the 3 component surveys of the Collaborative Psychiatric Epidemiology Surveys (CPES)¹⁴: the National Comorbidity

Survey Replication (NCSR)¹⁵ and the National Latino and Asian American Survey (NLAAS).¹⁶ The NCSR is based on a stratified multistage area probability sample of the English-speaking household population of the continental United States.¹⁷ The NLAAS is based on the same national sampling frame as the NCSR, with special supplements to increase representation of the survey's target ethnic groups, including monolingual Spanish speakers.^{16,18} 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. A total of 1442 respondents in the CPES are of Mexican origin. 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 Muniz.

Assessment of Smoking Status

In all 3 surveys, nonclinician interviewers collected data in face-to-face interviews by using the World Mental Health version of the Composite International Diagnostic Instrument (CIDI).¹⁹ Interviewer training was standardized and carried out by CIDI-certified trainers.^{20,21} The wording of the smoking-related items was identical, and the same Spanish translations of the items were used in the MNCS and the NLAAS.

Respondents were asked: "Are you a current smoker, ex-smoker, or have you never smoked?" Current and past smokers were asked the age at which they began smoking ("How old were you the very first time you ever smoked even a puff of a cigarette, cigar, or pipe?"), the frequency with which they smoked in the past year ("Think about the past 12 months. About how many days out of the last 365 did you smoke at least one cigarette, cigar, or pipe?"), and the amount they smoked on the days that they smoked ("On the days you smoked in the past 12 months, about how many cigarettes did you usually have per day?"). These survey items were used to identify lifetime, current, and daily smokers, and to characterize age of first use of tobacco, and the number of cigarettes smoked per day by daily smokers.

Respondents in Mexico were asked whether they had ever lived in the United States and

whether they had a member of their immediate family living in the United States. Respondents in the United States were asked whether they were of Mexican origin and their country of birth. Those born outside the United States were asked the age at which they first arrived in the United States. Using this information, we divided the sample into 4 groups representing a continuum of migration experience that reflects increasing levels of contact with the United States: (1) Mexican residents with no migrant in their immediate family, (2) Mexican residents with a migrant in their immediate family or previous migration experience, (3) US residents who were born in Mexico, and (4) US-born Mexican Americans. In multivariable statistical models, we used group 2 as the reference group, because it represents the source population of migrants to the United States.

Statistical Analyses

We made comparisons across the 4 groups with respect to age; gender; the prevalence of lifetime, current, and daily smoking; the age of first tobacco use; and average number of cigarettes smoked per day by daily smokers. We estimated age- and gender-adjusted associations between migration group and initiation of smoking by using discrete time survival models with person-year as the unit of analysis.^{22,23} In survival models, we coded migration as a time-varying covariate for respondents who were born in Mexico and interviewed in the United States: we included person-years up to and including age at migration in the reference category and person-years following arrival in the United States in the "migrant" category.

We estimated age- and gender-adjusted associations of migration group with current smoking among lifetime smokers and daily smoking among current smokers in logistic regression models. Among daily smokers, we used ordinary least squares regression to estimate the association between migration group and the average number of cigarettes smoked per day. We log transformed the number of cigarettes smoked per day because of the skewed distribution, and the results are reported as differences in geometric means across migration groups. On the basis of existing evidence regarding variation in the

association between migration and substance use by age at immigration^{24,25} and gender, we used statistical interactions to examine variations in the association of migration and smoking behavior across age period (aged 13 years and younger vs aged 14 years and older) and gender.

We conducted statistical tests adjusted for the complex survey design with the SUDAAN statistical analysis software package version 8.0.1 (RTI International, Research Triangle Park, NC). The sample design specification variables for the combined MNCS and CPES sample employed the primary stratum and primary sampling unit identification codes and the sampling weight variables developed by the sample design team at the Institute for Social Research, including the integrated CPES sampling design and weight variable they developed to account for the overlapping coverage of Mexican Americans by the NCSR and NLAAS.^{14,26,27} We modified sampling stratification variables to ensure that codes used for the CPES and MNCS components did not overlap.²⁸ Sampling weights reflect adjustments for unequal selection and response probabilities as well as poststratification adjustments to enhance the representativeness of weighted inferences with respect to contemporaneous national census estimates of target population sizes. We applied an additional rescaling factor to the sampling weights in the cross-national data set so that the weighted sample sizes would reflect the relative sizes of the Mexican-origin target populations in Mexico and the United States, enhancing the suitability of the weights for use in design-based analyses involving the full population as well as population subgroups.^{27,29}

RESULTS

The 4 migrant groups varied in age and gender (Table 1). The groups also differed in all measured aspects of smoking (Table 2). Lifetime prevalence of smoking was highest among the US-born (46.9%) and lowest in the Mexicans with no migrant in their family (28.2%). The same 2 groups had the youngest (14.4) and oldest (15.5) median ages of onset of smoking. Current prevalence of smoking was highest in the US-born (24.8%) and lowest among migrants (13.7%). The current

TABLE 1—Demographic Characteristics of the Combined Mexican and Mexican American Sample, by Migration Group: MNCS (2001–2002) and CPES (2001–2003)

Characteristic	Total (n = 6996)	MNCS, No Migrant in Family (n = 2878)	MNCS, Migrant in Family or Return Migrant (n = 2904)	CPES, Mexico-Born Migrants (n = 554)	CPES, US-Born Mexican Americans (n = 660)	Test of Association, χ^2_{df} (P)
Gender						$\chi^2_3 = 12.15$ (.007)
Male	2826 (49.3)	1088 (45.7)	1197 (49.7)	259 (54.2)	282 (52.8)	
Female	4170 (50.7)	1790 (54.3)	1707 (50.3)	295 (45.8)	378 (47.2)	
Age, y						$\chi^2_9 = 48.08$ (.001)
18–25	1685 (27.4)	709 (28.9)	670 (26.3)	105 (20.0)	201 (32.6)	
26–35	2058 (28.5)	810 (27.4)	857 (29.6)	231 (38.7)	160 (19.6)	
36–45	1601 (21.4)	661 (20.9)	692 (22.3)	117 (23.1)	131 (18.8)	
46–89	1652 (22.8)	698 (22.8)	685 (21.8)	101 (18.2)	168 (29.0)	

Note. CPES = Collaborative Psychiatric Epidemiology Surveys; MNCS = Mexico National Comorbidity Survey. Sample sizes are unweighted. Percentages are weighted.

prevalence of smoking among lifetime smokers (i.e., persistence of smoking) was higher in the 2 groups in Mexico than in the 2 groups in the United States, and lowest among migrants.

Among current smokers, daily smoking was more common in migrants and the US-born than the groups in Mexico. Among daily smokers the number of cigarettes smoked per day was higher in the United States. The

median daily smoker among Mexicans with no migrant in their family smoked 4.4 cigarettes per day whereas the median daily smoker among US-born Mexican Americans smoked 7.2 cigarettes per day.

Differences associated with migration were generally similar for men and women, although the small sample sizes in some of the groups (e.g., 8 female daily smokers among migrants)

is a reason to be cautious about the gender-specific comparisons.

Smoking Initiation

Table 3 shows age- and gender-adjusted associations between migration and initiation of smoking for the entire sample and separately for men and women. In the total sample, risk of smoking relative to Mexicans in families with

TABLE 2—Smoking Behavior, by Migration Group and Gender: MNCS (2001–2002) and CPES (2001–2003)

Variable	Lifetime Smokers		Age of Onset		Current Smokers (In Total Sample)		Current Smokers (Among Lifetime Smokers)		Daily Smokers (Among Current Smokers)		Number of Cigarettes per Day (Among Daily Smokers)	
	No. (%)	χ^2_3 (P) ^a	Median (IQR)	χ^2_3 (P) ^a	No. (%)	χ^2_3 (P) ^a	No. (%)	χ^2_3 (P) ^a	No. (%)	χ^2_3 (P) ^a	Median (IQR)	χ^2_3 (P) ^a
Overall		32.58 (<.001)	18.64 (<.001)		20.04 (<.001)		13.78 (.003)		11.34 (.01)		27.54 (<.001)	
MNCS no migrant in family	771 (28.2)		15.5 (13.3–17.7)		499 (18.4)		499 (65.2)		250 (49.2)		4.4 (2.3–9.5)	
MNCS migrant in family	976 (35.0)		15.1 (13.2–17.2)		615 (23.0)		615 (65.6)		343 (56.4)		4.9 (2.6–9.6)	
CPES migrants	146 (29.6)		15.0 (12.8–17.0)		65 (13.7)		65 (46.4)		37 (65.7)		5.0 (1.9–11.2)	
CPES US-born Mexican American	303 (46.9)		14.4 (11.4–17.0)		149 (24.8)		149 (52.9)		99 (67.7)		7.2 (4.3–14.0)	
Male only		8.15 (.04)		5.54 (.14)		11.38 (.01)		14.18 (.003)		7.85 (.049)		8.71 (.03)
MNCS no family migrant	476 (44.2)		15.1 (12.8–17.2)		321 (29.6)		321 (66.9)		164 (49.4)		4.3 (2.3–9.1)	
MNCS migrant in family	599 (49.4)		14.7 (12.7–16.7)		400 (33.8)		400 (68.5)		213 (55.7)		5.2 (2.8–9.8)	
CPES migrants	112 (43.6)		14.8 (12.3–16.5)		50 (20.6)		50 (47.3)		29 (67.0)		7.4 (2.4–12.5)	
CPES US-born Mexican American	156 (55.3)		14.2 (11.0–16.0)		83 (29.7)		83 (53.7)		56 (68.0)		6.2 (4.2–11.7)	
Female only		40.9 (<.001)		24.14 (<.001)		16.74 (<.001)		2.73 (.43)		5.69 (.13)		26.13 (<.001)
MNCS no family migrant	295 (14.8)		16.7 (14.1–19.3)		178 (9.0)		178 (60.9)		86 (48.7)		4.5 (2.3–9.6)	
MNCS migrant in family	377 (20.9)		16.0 (14.2–18.3)		215 (12.3)		215 (58.8)		130 (58.4)		4.2 (2.2–8.3)	
CPES migrants	34 (13.0)		16.8 (14.4–19.2)		15 (5.6)		15 (42.8)		8 (61.0)		1.4 (1.0–7.7)	
CPES US-born Mexican American	147 (37.5)		14.6 (12.3–17.3)		66 (19.3)		66 (51.6)		43 (67.1)		9.2 (5.2–15.4)	

Note. CPES = Collaborative Psychiatric Epidemiology Surveys; IQR = interquartile range; MNCS = Mexico National Comorbidity Survey. Frequencies are unweighted. Percentages are weighted. ^aWe tested associations between migration group and each smoking outcome by using design-adjusted χ^2 tests.

TABLE 3—Comparison of Smoking Initiation Across Migration Groups, by Age at Initiation and Gender: MNCS (2001–2002) and CPES (2001–2003)

Migration Category	Person-Years From 1 to 46 y		Person-Years From 1 to 13 y		Person-Years From 14 to 46 y	
	HR (95% CI)	χ^2_3 (P)	HR (95% CI)	χ^2_3 (P)	HR (95% CI)	χ^2_3 (P)
Main effect model						
MNCS no family migrant	0.77 (0.67, 0.87)		0.68 (0.49, 0.93)		0.75 (0.65, 0.86)	
MNCS family or return migrant (Ref)	1.00		1.00		1.00	
CPES migrants	0.56 (0.38, 0.83)		1.27 (0.63, 2.56)		0.48 (0.30, 0.78)	
CPES US-born Mexican American	1.44 (1.19, 1.74)		2.59 (1.92, 3.50)		1.16 (0.90, 1.49)	
Interaction						
Interaction effect (gender × migration category)		23.36 (<.001)		11.43 (.01)		13.51 (.004)
Gender-specific models						
Male						
MNCS no family migrant	0.80 (0.69, 0.94)		0.71 (0.49, 1.03)		0.78 (0.66, 0.93)	
MNCS family or return migrant (Ref)	1.00		1.00		1.00	
CPES migrants	0.54 (0.33, 0.87)		1.30 (0.62, 2.74)		0.44 (0.25, 0.79)	
CPES US-born Mexican American	1.20 (0.97, 1.48)		2.20 (1.56, 3.10)		0.91 (0.67, 1.24)	
Female						
MNCS no family migrant	0.70 (0.57, 0.86)		0.52 (0.25, 1.06)		0.70 (0.56, 0.89)	
MNCS family or return migrant (Ref)	1.00		1.00		1.00	
CPES migrants	0.62 (0.34, 1.13)		1.18 (0.18, 7.62)		0.57 (0.30, 1.09)	
CPES US-born Mexican American	2.15 (1.63, 2.84)		5.11 (2.83, 9.23)		1.77 (1.22, 2.58)	

Notes. CI = confidence interval; CPES = Collaborative Psychiatric Epidemiology Surveys; HR = hazard ratio; MNCS = Mexico National Comorbidity Survey.

a migrant was lower among Mexicans with no migrant in their family (odds ratio [OR] = 0.77; 95% confidence interval [CI] = 0.67, 0.87) and in migrants after arrival in the United States (OR = 0.56; 95% CI = 0.38, 0.83) but higher in US-born Mexican Americans (OR = 1.44; 95% CI = 1.19, 1.74). The increase in initiation relative to reference group was stronger in women than in men (*P* value for the statistical interaction between gender and migration group < .05).

However, the relationship between migration group and initiation of smoking varied by age. This difference was maximized by contrasting years up to and including age 13 years with years at age 14 years and afterward ($\chi^2_3 = 17.81$; *P* = .001). Stratified results showed that the greater likelihood of initiation among the US-born was specific to the early age period (OR = 2.59; 95% CI = 1.92, 3.50) and that the lower risk of initiation among migrants was specific to the later age period (OR = 0.48; 95% CI = 0.30, 0.78). The difference within the Mexican population between those with and without migrants in their family did not vary by age.

Associations between migration group and initiation differed by gender as indicated by statistically significant interaction terms in both the younger ($\chi^2_3 = 11.43$; *P* = .01) and older ($\chi^2_3 = 13.51$; *P* = .004) ages. Gender-specific results showed that the direction of the association between migration and smoking initiation was the same for males and females, but that the relative odds of smoking initiation in the US-born compared with Mexicans in families with a migrant was larger for females than for males. The gender-specific results also showed that the higher likelihood of smoking initiation relative to Mexicans in families with a migrant continued into the older age period among US-born Mexican American women (OR = 1.77; 95% CI = 1.22, 2.58) but not men (OR = 0.91; 95% CI = 0.67, 1.24).

Current and Daily Smoking

Migration group remains significantly associated with current and daily smoking after statistical adjustment for age and gender (Table 4). Among lifetime smokers, migrants (OR = 0.41; 95% CI = 0.26, 0.63) and US-born

Mexican Americans (OR = 0.61; 95% CI = 0.39, 0.95) were less likely to be current smokers than were Mexicans in a family with a migrant. Among current smokers, the relative odds of being a daily smoker were higher among migrants and US-born Mexican Americans relative to Mexicans with a migrant in their family, but these differences did not reach statistical significance.

Tests of interaction between migration group and gender in the prediction of current and daily smoking were not statistically significant ($\chi^2_3 = 1.98$; *P* = .583, and $\chi^2_3 = 0.69$; *P* = .875, respectively). There was a statistically significant interaction between migration group and gender in the prediction of cigarettes per day among daily smokers ($\chi^2_3 = 9.27$; *P* = .026). The number of cigarettes smoked per day by daily smokers was highest among the US-born Mexican Americans for both men and women.

DISCUSSION

Evidence from this first transnational study of Mexico–US migration and smoking suggests

TABLE 4—Comparison of Current Smoking, Daily Smoking, and Number of Cigarettes Per Day Across Migration Groups: MNCS (2001–2002) and CPES (2001–2003)

Migrant Category	Current Smokers Among Lifetime Smokers		Daily Smokers Among Current Smokers		No. Cigarettes per Day Among Daily Smokers, Male		No. Cigarettes per Day Among Daily Smokers, Female	
	OR (95% CI)	χ^2_3 (P)	OR (95% CI)	χ^2_3 (P)	Geometric Mean (95% CI) ^a	χ^2_3 (P)	Geometric Mean (95% CI) ^a	χ^2_3 (P)
MNCS no family migrant	0.96 (0.71, 1.28)	19.80 (<.001)	0.74 (0.55, 0.99)	12.28 (.007)	5.1 (4.1, 6.3)	8.66 (.034)	5.8 (4.3, 7.7)	24.93 (<.001)
MNCS family or return migrant	1.00 (Ref)		1.00 (Ref)		6.5 (5.3, 7.9)		4.3 (3.2, 5.6)	
CPES migrants	0.41 (0.26, 0.63)		1.55 (0.84, 2.86)		6.5 (5.0, 8.4)		2.5 (0.9, 7.2)	
CPES US-born Mexican American	0.61 (0.39, 0.95)		1.66 (0.99, 2.79)		7.8 (6.5, 9.3)		8.6 (6.9, 10.7)	

Notes. CI = confidence interval; CPES = Collaborative Psychiatric Epidemiology Surveys; MNCS = Mexico National Comorbidity Survey; OR = odds ratio.

^aWe obtained model-based estimates of number of cigarettes smoked per day by daily smokers by exponentiating predicted marginal means from regression of the log-transformed raw data.

that differences in smoking behavior associated with migration are pervasive. However, these changes are neither unidirectional across migrant generations nor consistent across different aspects of smoking behavior—initiation, cessation, daily smoking, and cigarette consumption.

Initiation and Cessation

Previous studies have reported that migrants are less likely to be current smokers than US-born children of immigrants⁷ and researchers have suggested that this might be a result of positive selection. However, our previous work on this data set suggested that there is negative selection: within the Mexican population, migration was associated with a higher prevalence of previous initiation of smoking and with known risk factors for smoking such as childhood conduct problems.¹⁰ Evidence from the current study explains these apparently contradictory results. It suggests that the low prevalence of smoking among migrants, relative to the US-born Mexican Americans, results from a combination of (1) a lower likelihood of initiating smoking after arrival in the United States for those migrants who had never smoked before migration, a finding consistent with an earlier study,³⁰ and (2) a higher likelihood of cessation among migrants who smoked. Cessation has also been found to be higher among Asian immigrants in the United States than among US-born Asian Americans.³¹

These 2 processes lead to the striking finding that migrants are the least likely of all the groups examined to be current smokers, despite the negative risk factor profile identified

in the previous study. This suppression of smoking in the migrant population may reflect more general social sanctions against personal consumption among migrants who have taken on the responsibility of leaving home to earn money to build savings for their households.^{32,33} In addition, this finding implies that differences between immigrant and US-born Mexican Americans do not simply reflect the impact of assimilation to the United States, but distinctive influences affecting smoking among migrants and successive generations. Our study's findings suggest that public health interventions reaching out to Latino smokers might consider targeting specific subgroups and their specific social and cultural context.

US-born Mexican Americans are more likely to start and more likely to quit smoking than Mexican residents in families with a migrant. More detailed analyses found that the cross-national difference varied by age, with the elevation in initiation of smoking in the United States limited to early adolescence (i.e., at age 15 years or younger). This finding is surprising given evidence that controls on youths' access to cigarettes in Mexico are not effective.³⁴ It is important to note that the group of migrants who are in the United States before age 15 years, and thus at risk for early initiation in the United States, are different from migrants who arrive at later ages with respect to mental health³⁵ and use of other substances.²⁵ One study in California found that differences in smoking initiation associated with language use, which is closely related to immigrant generation, were explained by factors such as access to cigarettes and having friends who smoke.⁹ It is not known how these potential

explanatory factors vary across countries. Low educational achievement may be one factor influencing smoking initiation among migrants in early adolescence in the United States. Migrants face numerous barriers to achievement³⁶ and low achievement relative to peers is a strong predictor of smoking initiation.^{37,38} Future interventions to prevent initiation should target early adolescence as a crucial period for both US-born and migrants in the United States.

Daily Smoking and Cigarette Consumption

Previous research has found that Latino smokers in the United States are less likely to be daily smokers and consume fewer cigarettes per day than non-Hispanic White smokers.³ This finding has led researchers to search for factors related to Latino ethnicity that reduce daily smoking among Latinos in the United States.³⁹ Our finding suggests that among Mexican Americans the low rates of daily smoking and lower cigarette consumption reflect continuity of smoking behavior with the source population in Mexico. In fact the relatively low prevalence of daily smoking among the US-born Mexican American smokers is actually an increase over the prevalence of daily smoking relative to the Mexico referent group. Moreover, the level of cigarette consumption in US-born groups is also an increase relative to the referent group. Thus, to the extent that factors in the United States affect smoking behavior among Mexican Americans, they appear to increase rather than suppress smoking among US-born Mexican Americans relative to smokers in Mexico.

The continuity of smoking behavior across the entire transnational Mexican-origin population suggests the presence of enduring cultural or biological influences that lead to low prevalence of daily smoking and low cigarette consumption relative to non-Hispanic Whites in the United States. We found the same pattern of results when we added a further distinction among the US-born Mexican Americans between those with immigrant versus US-born parents (data not shown, available on request). There is evidence consistent with a biological explanation for other ethnic differences in smoking behavior in the United States. Asian Americans and African Americans also have lower prevalence of daily smoking and lower daily cigarette consumption than do non-Hispanic Whites, and this difference may be attributable to differences in nicotine metabolism between these groups that have been found in laboratory studies.^{40,41} However, the rate of nicotine metabolism has not been found to differ between Latinos and non-Hispanic Whites.^{42,43}

One cultural explanation suggests that the low prevalence of smoking among coethnics reduces the availability and exposure to smoking cues in the Latino population.³⁹ It is not clear why this process would occur with respect to smoking and not with respect to other health behaviors, such as use of alcohol and diet.⁴⁴ Light smoking remains poorly understood as a pattern of smoking behavior because it differs from the accepted model of heavy smoking driven by nicotine dependence.^{45,46} There is evidence that despite low levels of consumption and relatively mild symptoms of dependence, very light daily smokers are not more likely to quit than are smokers with higher daily consumption levels.⁴⁷ Future research on the cultural and biological factors that influence smoking among nondaily and light smokers may help identify factors that lead to continuing prevalence of light smoking among Latinos and other ethnic minority groups in the United States.

These results should be interpreted in light of several study limitations. First, data came from retrospective recall of smoking behavior, and therefore are likely to underestimate the lifetime prevalence of smoking. However, there is no reason to believe that underreporting varies across migrant groups. Second, data

were not available on the timing of migration for return migrants who were part of the Mexico survey. For this group we were unable to determine whether they were in the United States or in Mexico at the time that they initiated smoking. In the analysis shown here, return migrants were included with family members of migrants residing in Mexico in all analyses. Removal of this group from the analyses did not alter the results (available on request). Third, current smoking status was not verified by biological measurement. A previous study that compared self-reports with serum cotinine measurements found that less-aculturated Latinos were more likely to underreport current smoking.⁴⁸ It is not known what impact this tendency would have on cross-national comparisons because the reference group in this study presumably shares reporting tendencies of the less-aculturated Latinos in the United States. It is possible that estimates of current smoking are biased downward for the 3 Mexico-born groups relative to US-born Mexican Americans.

Migration to the United States is associated with changes in smoking behavior, but these changes are not unidirectional and they fall far short of full assimilation to patterns of smoking behavior among non-Hispanic Whites. Smoking appears to be suppressed among the migrant generation (i.e., lower initiation and higher cessation relative to the source population), only to rise to levels higher than the source population among US-born Mexican Americans. The pattern of light smoking persists across immigrant generations indicating that this pattern of smoking is not merely a transitional stage on the way to assimilation to more familiar patterns of heavy smoking. In light of the evidence that light smoking is a serious health hazard,^{49,50} this finding underscores the importance of developing approaches to prevention and cessation that target the distinctive biological, cultural, and behavioral characteristics of these smokers.^{39,51} ■

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