

Lifetime and current substance use patterns in adolescent and adult Mexican population

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Abstract

Objective. To identify substance experimentation and current use profiles among the Mexican adolescent and adult population, overall and by sociodemographic characteristics. **Materials and methods.** We analyzed data from the 2025 National Drug, Alcohol, and Tobacco Consumption Survey. We considered lifetime use for adolescents and current use for adults. To identify classes of substance use, including legal, illegal, and non-prescribed medical substances, we performed latent class analysis. **Results.** A three-class model provided the best fit for both groups: non-users, legal substance users, and polysubstance users. Among adolescents, user classes were characterized by a higher male proportion and a greater medium socioeconomic level distribution (67.3%) in polysubstance experimenters. In adults, polysubstance use remained mainly in male and metropolitan groups, while the “legal substance” class showed a significant female majority (63.4%). **Conclusions.** Substance use patterns in Mexico are heterogeneous across the life course. Strengthening MPOWER, SAFER, and illegal drug control measures are essential to address these epidemiological profiles.

Keywords: tobacco; alcohol; illicit drug; psychotropic drugs; health surveys; latent class analysis

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Resumen

Objetivo. Identificar perfiles de experimentación y uso actual de sustancias en la población adolescente y adulta mexicana, de manera general y por características sociodemográficas. **Material y métodos.** Se analizaron datos de la Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco 2025. Se consideró uso alguna vez en la vida para adolescentes y uso actual para adultos. Se identificaron clases de consumo por un análisis de clases latentes, incluyendo sustancias legales, ilegales y médicas no prescritas. **Resultados.** Se describió un modelo de tres clases en ambos grupos: no usuarios, usuarios de sustancias legales y usuarios de polisustancias. En adolescentes, las clases de experimentación se caracterizaron por mayor proporción de hombres y mayor concentración en el nivel socioeconómico medio en los experimentadores de polisustancias. En adultos, el uso de polisustancias fue mayor en masculinos y área metropolitana; usuarios de sustancias legales fueron de mayoría femenina. **Conclusiones.** Los patrones de uso en México son heterogéneos en adultos y adolescentes. Es esencial fortalecer las medidas de control de sustancias y las estrategias MPOWER y SAFER para atender estos perfiles.

Palabras clave: tabaco; alcohol; drogas ilícitas; psicotrópicos; encuestas epidemiológicas; análisis de clases latentes

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The global burden of morbidity and mortality associated with the use of alcohol and tobacco remains a critical public health priority, as these substances are two of the five leading preventable risk factors for non-communicable diseases.¹ In 2019 alone, tobacco and alcohol consumption were responsible for approximately 8.7 million and 2.6 million deaths, respectively.^{2,3} Beyond these traditional licit substances, the landscape is increasingly growing by the inclusion of new nicotine products and the evolution of the illicit drug market, characterized by the rise of potent synthetic drugs, such as fentanyl and other opioids.^{4,5} Regarding illicit substances, approximately 600 000 deaths were associated with illicit drug use worldwide in 2019, with 80% of these deaths being related to opioid use and overdose.⁶ Another factor associated with the current substance use landscape is the inclusion of pharmaceutical medications into the illegal drug market. In some populations, drug-induced deaths were more likely to be due to prescription drugs than illicit drugs.⁷ Evidence suggests that licit and illicit substances are commonly used together, even among the young population.^{8,9}

In Mexico, the prevalence of substance use reflects these global challenges while highlighting specific vulnerable populations. As of 2025, 17.3% of Mexican adults currently smoked tobacco, and 50.8% reported current alcohol consumption.¹⁰ Among adolescents, while these figures are lower (2.0% for tobacco and 17.8% for alcohol), there is a significant increase in the use of novel nicotine products; for instance, e-cigarette use reached 2.6% among adolescents in the same year.¹⁰ Regarding illicit substances, cannabis remains the most common (used by 2.5% of the Mexican population in 2025), yet the synthetic drug market continues to expand.^{10,11} A particular concern in Mexico is the non-medical prescription drug use (NMPDU), especially opium and sedatives. In 2023, 1.5% of the population reported NMPDU at least once, and 0.5% in the last year.¹¹ Evidence suggests changing patterns of use, where these substances are increasingly misused in specific vulnerable groups (e.g., middle-aged women), often as a coping mechanism for underlying conditions and frequently in combination with alcohol.^{12,13}

Estimating the prevalence of each substance use can inform policy; however, this approach fails to consider that substances are not consumed in isolation. There is a knowledge gap regarding how psychoactive substance combinations cluster within specific populations and groups, and how these patterns vary by the demographic and socioeconomic context.¹⁴ To address this, a person-centered methodology like latent class analysis (LCA) is more adequate to identify distinct heterogeneous user profiles. This approach identifies un-

observable (latent) subgroups within a population based on shared patterns of behavior, rather than focusing on individual variables, allowing the characterization of substance experimentation and use and the identification of high-risk clusters that traditional variable-centered methods might overlook.^{9,15} Therefore, this study aims to identify substance experimentation and current use profiles among the Mexican adolescent and adult population and to assess their demographic and socioeconomic characteristics.

Materials and methods

This study was conducted using data from the 2025 National Drug, Alcohol, and Tobacco Consumption Survey (Encodat, by its Spanish acronym). Encodat is a probabilistic, complex, and multi-stage survey designed to describe the psychotropic substance consumption and mental health of the Mexican adolescent (12 to 17 years) and adult (18 to 65 years) population.^{14,16} The age threshold of 18 was selected to align with the legal minimum age for alcohol and tobacco purchase in Mexico. Encodat was approved by the Ethics and Research Committees of the National Institute of Public Health (register CI: 1967).

The initial sample consisted of 3 847 adolescents and 15 353 adults. We excluded 273 individuals with missing information regarding substance use (licit substances= 68, illicit substances= 199, prescription drugs= 4, and 2 observations with missing information in more than one substance group). After exclusions, our study population included 3 787 adolescents and 15 140 adults, 98.6% of the initial sample.

Substance use

We considered two international standard definitions of substance use: a) lifetime use, reflecting experimentation, which is defined as having used or consumed the substance at least once during a person's life, measured in adolescents, and b) current use, indicating substance use at least once in the 12 months preceding the survey, measured in adults. This difference allowed for the exploration of both initial substance contact and active use patterns. The focus on lifetime use among adolescents was chosen given that experimentation is more likely than regular use at this age, as suggested by the low prevalence of current consumption.¹⁰ In contrast, a 12-month period accounts for the seasonality of consumption and identifies active users who require clinical attention or treatment. The substances of interest considered in this study were classified into three main categories: 1) legal substances, including: a)

alcohol, b) smoked tobacco, and c) electronic cigarettes; 2) illegal substances: a) marijuana, b) cocaine (powder, base paste, and cocaine paste), c) crack, d) hallucinogens (i.e., mushrooms, peyote, mescaline, LSD, PCP), e) amphetamine-type stimulants (e.g., design drugs, ecstasy and MDM), f) other substances, such as inhalants (i.e., thinner, PVC, cement, glue, paint, gasoline, aerosols), opioids, ketamine, and GHB; 3) non-prescribed medical substances: a) opioids (e.g., morphine and derivatives), b) tranquilizers (e.g., benzodiazepines and derivatives), c) sedatives and barbiturates (e.g., carbamate derivatives, methaqualone), d) amphetamines or stimulants (e.g., methylphenidate, diethylpropion).

Sociodemographic variables

Sex. Assigned at birth (male or female).

Socioeconomic level. In the household sample, an index was constructed to summarize asset ownership and housing conditions. The index combines responses to the following variables: wall material (brick or cinder block vs other materials), roofing material (concrete slab vs other materials), availability of water within the home or on the premises (yes/no), number of bedrooms, ownership of a car or truck (yes/no), number of electronic devices (television, radio, computer, cell phone, and cable TV service), and number of household appliances (refrigerator, stove, water heater, and microwave). The index was developed using the first component of a principal component analysis (PCA) for polychoric correlations, which accounted for 30% of the data variability. The index was categorized into tertiles, classified as low, middle, and high.

Urbanization level. Based on the number of inhabitants in the locality of residence and categorized as rural (<2 500 inhabitants), urban (2 500-99 999 inhabitants), or metropolitan ($\geq 100\,000$ inhabitants).

Statistical analysis

We estimated prevalence with 95% confidence intervals (95%CI) for substance use (lifetime and current use) and by sociodemographic characteristics. To identify profiles of substance use among adolescents and adults, we performed a LCA, including all substances for each group. This statistical approach identifies groups based on latent (unobserved) characteristics while accounting for categorical data distributions.¹⁷ To determine the optimal number of substance-use classes, we fitted models ranging from one to five classes, selecting the best-fitting model based on fit statistics: bayesian

information criterion (BIC) and akaike information criterion (AIC), which balance model parsimony against goodness-of-fit by penalizing excessive complexity. That is, it considers the model with the best fit that has the fewest parameters. The final selected model was based on the BIC and AIC, considering the size of each class and the theoretical relevance of the classes. For the final selected models, we assigned each individual to their highest-class membership probability. We considered substance experimentation and use as high if the prevalence within each class was above 50%.^{8,17} Additionally, we described the sociodemographic characteristics and population size for each class. Analyses were conducted using Stata version 17 (College Station, TX) for prevalence and confidence interval estimations and R (R Core Team 2025) for latent class analysis. Survey weights were applied for all estimations to account for the complex survey design.

Results

Substance consumption and population characteristics

Table I describes the prevalence of experimentation and current substance use in adolescent and adult populations, respectively, as well as their demographic and socioeconomic characteristics. Lifetime alcohol use was the most prevalent substance use by 33.9% of the adolescent population (95%CI: 31.4,36.5), followed by smoked tobacco (12.8%, 95%CI: 11.3,14.6), electronic cigarette (11.9%, 95%CI: 10.5,13.6), marijuana (3.9%, 95%CI: 3.1,4.9), cocaine (0.9%, 95%CI: 0.5,1.6), and opioids (0.9%, 95%CI: 0.6,1.5). Regarding current substance use prevalence in the adult population, more than half reported alcohol consumption in the year prior to the survey (50.3%, 95%CI: 48.9,51.7), while 16.5% (95%CI: 15.2,17.8) reported the use of smoked tobacco. The most consumed illicit substance was marijuana (2.5%, 95%CI: 2.1,3.0), followed by cocaine (0.4%, 95%CI: 0.3,0.5) and stimulants (0.3%, 95%CI: 0.2,0.5), while the most consumed non-medical prescription drugs were opioids (1.2%, 95%CI: 1.0,1.5) and tranquilizers (0.4%, 95%CI: 0.3,0.5).

Most of the adolescent population lived in metropolitan areas of the country (43.8%, 95%CI: 40.8,46.8), compared to rural (24.2%, 95%CI: 20.9,27.8) and urban regions (32.0%, 95%CI: 29.4,34.8). The distribution across categories for sex and socioeconomic level was equal. The adult population was predominantly female (52.3%, 95%CI: 50.9,53.7), compared to male (47.7%, 95%CI: 46.3,49.1). Furthermore, participants were concentrated in the metropolitan region (51.0%, 95%CI: 48.8,53.2)

Table I
SOCIODEMOGRAPHIC CHARACTERISTICS AND SUBSTANCE USE PREVALENCE IN
MEXICAN POPULATION. MEXICO, ENCODAT 2025

Substance use prevalence	Adolescents n= 3 787		Adults n= 15 140	
	%	95%CI	%	95%CI
	Lifetime use		Current use	
Legal substances				
Alcohol	33.9	31.4,36.5	50.3	48.9,51.7
Tobacco	12.8	11.3,14.6	16.5	15.2,17.8
Electronic cigarette	11.9	10.5,13.6	1.4	1.1,1.8
Illegal substances				
Marijuana	3.9	3.1,4.9	2.5	2.1,3.0
Cocaine	0.9	0.5,1.6	0.4	0.3,0.5
Crack	0.0	0.0,0.1	0.2	0.1,0.4
Hallucinogens	0.6	0.3,1.3	0.2	0.1,0.3
Amphetamine-type stimulants	0.5	0.2,1.2	0.3	0.2,0.5
Other	0.2	0.0,1.2	0.0	0.0,0.1
Non-prescribed medical substances				
Opioids	0.9	0.6,1.5	1.2	1.0,1.5
Tranquilizers	0.7	0.4,1.3	0.4	0.3,0.5
Sedatives	0.3	0.1,0.6	0.1	0.1,0.3
Amphetamines and stimulants	0.1	0.0,0.2	0	0.0,0.1
Sociodemographic characteristics				
Sex				
Male	50.3	48.0,52.6	47.7	46.3,49.1
Female	49.7	47.4,52.0	52.3	50.9,53.7
Socioeconomic level*				
Low	34.0	31.3,36.9	30.7	29.0,32.5
Medium	34.7	32.2,37.3	33.8	32.3,35.3
High	31.3	28.9,33.8	35.5	33.7,37.4
Area				
Rural	24.2	20.9,27.8	18.9	16.6,21.5
Urban	32.0	29.4,34.8	30.1	28.3,31.9
Metropolitan	43.8	40.8,46.8	51.0	48.8,53.2

Encodat: *Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco*. Consumption Survey. n: sample size. %: prevalence. 95%CI: 95% confidence interval. * Socioeconomic index tertiles. Urbanization: rural (<2 500 inhabitants), urban (2 500-99 999 inhabitants) or metropolitan (≥100 000 inhabitants). Current use refers to use in the 12 months preceding the survey prevalence.

and, to a lesser extent, in rural regions (18.9%, 95%CI: 16.6,21.5). The distribution across categories for socioeconomic level was equal.

Model selection

AIC and BIC for each model (from one to five classes) are presented in table II. BIC was the main indicator for model fit given that it favors a simpler model.¹⁷ For the

adolescent and adult population, the 3-class model was the best fit.

Class membership and response probability

Table III shows the class membership probabilities and the item-response probabilities for substance use within each class, stratified by adolescents and adults. Class 1,

categorized as non-users, included 83.7% of the adolescent population. This class was characterized by low or zero probability of experimental substance use. Class 2, categorized as legal substance users, accounted for 15% of the adolescent population. This class was characterized by high probabilities of experimental alcohol (0.82) and tobacco use (0.61) and moderate electronic cigarette probability use (0.46). Class 3, with 1.4% of the adolescent population, was characterized as polysubstance users by consumption of alcohol (0.96), smoked tobacco (0.93), marijuana (0.86), electronic cigarettes (0.55), and moderate probabilities of cocaine (0.41) and amphetamine type stimulants (0.34) use.

In the adult population, class 1 was categorized as non-users and included 86.3% of the adult sample. This class was characterized by low probability use for all substances, except for a moderate probability of current alcohol consumption (0.38). Class 2, categorized as legal substance users, accounted for 12.9% of the sample. This class was characterized by a high probability of current alcohol (0.81) and tobacco use (0.51), but a low probability of current use of illicit and non-prescribed medical substances. Class 3, with 0.8% of the adult sample, was characterized as polysubstance users by a high probability of alcohol (0.84), marijuana (0.75), and tobacco (0.67) use, and moderate probability for current use of cocaine (0.39).

Table II
MODEL FIT FOR LATENT CLASS SELECTION.
MEXICO, ENCODAT 2025

Model	AIC	BIC
Adolescent population (classes)		
1	14 165.84	14 265.67
2	12 422.09	12 627.99
3*	12 206.50	12 518.50
4	12 201.63	12 619.67
5	12 211.36	12 735.46
Adult population (classes)		
1	46 653.33	46 775.33
2	44 687.85	44 939.47
3*	44 263.75	44 645.01
4	44 246.19	44 757.07
5	44 231.47	44 871.98

Encodat: National Drug, Alcohol and Tobacco Consumption Survey.
AIC: Akaike information criterion. BIC: Bayesian information criterion
* Selected as final model

Demographic and socioeconomic characteristics of classes

Table IV describes the demographic and socioeconomic characteristics across adolescent (lifetime use) and adult (current use) classes. Regarding the adolescent population, no major differences by sex were observed in the non-users' class; however, legal substance class was characterized by a higher proportion of males (64.5%). In terms of socioeconomic level, the non-users' class showed a balanced distribution, while legal substance users class showed a higher distribution as socioeconomic level increased, and polysubstance users' class were heavily concentrated in the medium level (67.3%). Although all three classes were primarily located in metropolitan areas, the gap between rural and metropolitan residency was most pronounced in the legal substance class (18.4 vs 42.9%) and the least marked among polysubstance users.

For the adult population, sex distribution varied significantly across groups: while the non-users and polysubstance use, classes were predominantly male (55.8 and 81.4%, respectively), the legal substance users' class was the only class where female population represented the majority (63.4%). Regarding socioeconomic characteristics, non-users were more concentrated in the high socioeconomic level (40.2%), legal substance users showed a higher presence in the low socioeconomic level (36.7%) compared to high level (30.1%), and polysubstance users were more evenly distributed across levels. Finally, while metropolitan areas concentrated the largest proportion of the population in the three adult classes, this was most evident in the polysubstance users' class (60.8%), which also showed the lowest representation in rural settings (11.7%), compared to non-users (16.5%) and legal substance users (22.1%).

Discussion

This study identified three distinct profiles of substance use for both adolescent and adult groups in Mexico, providing evidence of the heterogeneous nature of substance use patterns across the life course. While most of the population belongs to a non-user class in both groups, a high-use class with specific demographic and socioeconomic characteristics was found in each group. Notably, in the adolescent population, a higher proportion of males was found in the legal substance users' class, and a marked concentration of polysubstance experimenters in the medium socioeconomic level. Among adults, the gender distribution varied across classes, with the legal substance class the only one with a higher proportion of females. Furthermore, while metropolitan areas were more populated across

Table III
MEMBERSHIP PROBABILITY AND SUBSTANCE USE PROBABILITY BY CLASS IN MEXICAN ADOLESCENT AND ADULT POPULATION. MEXICO, ENCODAT 2025

	Lifetime use in adolescent population			Current use in adult population		
	Class 1 Non users	Class 2 Legal substance users	Class 3 Polysubstance user	Class 1 Non users	Class 2 Legal substance users	Class 3 Polysubstance user
Membership probability (%)	83.7	15.0	1.4	86.3	12.9	0.8
Legal substances						
Alcohol	0.202	0.822	0.959	0.380	0.812	0.845
Tobacco	0.018	0.607	0.926	0.052	0.511	0.671
Electronic cigarette	0.031	0.461	0.554	0.001	0.043	0.188
Illegal substances						
Marijuana	0.003	0.153	0.864	0.001	0.071	0.750
Cocaine	0.000	0.003	0.407	0.000	0.008	0.386
Crack	0.000	0.001	0.034	0.000	0.001	0.093
Hallucinogens	0.000	0.000	0.196	0.000	0.000	0.209
Amphetamine-type stimulants	0.000	0.002	0.340	0.000	0.003	0.209
Other	0.000	0.000	0.065	0.000	0.000	0.031
Non-prescribed medical substances						
Opioids	0.010	0.013	0.017	0.010	0.019	0.071
Tranquilizers	0.001	0.009	0.224	0.001	0.012	0.120
Sedatives	0.003	0.000	0.033	0.001	0.004	0.045
Amphetamines and stimulants	0.001	0.002	0.017	0.000	0.001	0.024

Encodat: *Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco*. Membership probability refers to posterior class membership probability. Lifetime use evaluated in adolescent population. Current use refers to use in the 12 months preceding the survey, measured in adults.

Table IV
POPULATION SIZE AND SOCIODEMOGRAPHIC CHARACTERISTICS BY CLASS IN MEXICAN ADOLESCENT AND ADULT POPULATION. MEXICO, ENCODAT 2025

Sociodemographic characteristics	Panel A. Lifetime use in adolescent population						Panel B. Current use in adult population					
	Non users N= 11 611.4 n= 3 169		Legal substance users N= 1 288.1 n= 566		Polysubstance users N= 164.7 n= 52		Non users N= 41 977.0 n= 7 778		Legal substance users N= 34 933.0 n= 7 082		Polysubstance users N= 1 413.0 n= 280	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Sex												
Male	48.6	46.2,51.1	64.5	57.5,70.9	60.3	38.3,78.9	55.8	54.0,57.6	36.6	34.8,38.4	81.4	73.3,87.4
Female	51.4	48.9,53.8	35.5	29.1,42.5	39.7	21.1,61.7	44.2	42.4,46.0	63.4	61.6,65.2	18.6	12.6,26.7
Socioeconomic level*												
Low	34.9	32.1,37.9	28.6	22.4,35.6	14.2	6.7,27.5	25.7	23.8,27.7	36.7	34.4,39.0	33.7	24.6,44.2
Medium	33.9	31.2,36.6	38.1	31.3,45.4	67.3	46.7,82.9	34.1	32.2,34.1	33.3	31.5,35.2	34.9	25.8,45.3
High	31.2	28.6,33.9	33.3	26.9,40.4	18.5	7.5,38.7	40.2	37.8,42.7	30.1	28.2,32.0	31.4	21.9,42.6
Area												
Rural	24.8	21.4,28.5	18.4	13.5,24.7	29.0	10.1,59.9	16.5	13.9,19.6	22.1	19.7,24.6	11.7	5.6,23.0
Urban	31.3	28.5,34.3	38.7	30.4,47.6	27.3	13.2,48.2	29.7	27.4,32.1	30.7	28.5,32.8	27.4	18.0,39.5
Metropolitan	43.9	40.7,47.1	42.9	35.0,51.3	43.6	24.2,65.2	53.7	51.0,56.4	47.3	44.8,49.8	60.8	48.9,71.6

Encodat: *Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco*. N: population size, in thousands. n: sample size. %: weighted proportion. 95%CI: 95% confidence interval. * Socioeconomic index tertiles. Urbanization: rural (<2 500 inhabitants), urban (2 500-99 999 inhabitants) or metropolitan (≥100 000 inhabitants).

all classes, the rural-urban gap was higher in adult polysubstance users. These results indicate that substance use in Mexico is not a uniform issue; rather, it is shaped by specific socioeconomic environments in youth and distinct demographic shifts in adulthood.

In Mexican adolescents and adults, our analysis identified three distinct patterns of experimentation (adolescents) and current use (adults): a large majority of non-users, a legal substance class dominated by alcohol and tobacco, and a small polysubstance class. These patterns are less heterogeneous than the five classes observed in similar US-based research,⁸ yet they confirm that while most of the youth population remains in similar abstinent profiles, specific classes of polysubstance use are being defined. Our identification of a distinct polysubstance use class across both adolescents and adults aligns with previous latent class analyses that highlight small but highly vulnerable sub-populations. In adolescent cohorts, prior research has identified similar profiles, such as a full experimenter class comprising roughly 2% of the population with high item-response probabilities (67-93%) across all assessed substances.⁸ This finding is particularly concerning given the current social and commercial push for the legalization of cannabis and electronic cigarettes in Mexico.¹⁸ As the use of these substances increases and moves toward legalization, the probability that these substances become normalized entry drugs for adolescents increases. In this specific population, the goal of substance use control and prevention efforts should be to ensure that adolescents remain within the non-user class by promoting evidence-based prevention through the implementation of the WHO SAFER and MPOWER measures.¹⁹⁻²² Furthermore, although the proportion of the adolescent population in legal and illicit substance experimentation classes appears to be low (1.4%), it is essential to reduce them through the strict regulation of alcohol and tobacco sales to minors, the elimination of advertising for these products on social media, and a decrease in their market availability.^{21,23}

The demographic and socioeconomic characteristics of the identified classes underscore the high degree of heterogeneity in substance use patterns in Mexico, which appear to be shaped by the intersection of life course, gender, and specific urban and socioeconomic environments. While a study in the United States found that females have significantly lower odds of entering substance experimentation classes (e.g., OR= 0.28 for full experimenters), our data demonstrated a pronounced male predominance (64.5%) within the legal substance use class, compared to a balanced distribution among non-users.⁸ Adolescent polysubstance

experimentation was concentrated in the medium socioeconomic level, contrasting with patterns in other countries where polysubstance classes concentrate at the extremes of the socioeconomic scale.^{24,25} This indicates that the middle-income youth population may require targeted interventions, such as school-based interventions.

In adulthood, the different classes and their characteristics illustrate the demographic heterogeneity of substances classes. The polysubstance use class was concentrated in male and metropolitan groups. However, the predominance of women in the legal substance use class may indicate a shift in the national epidemiological trends, consistent with a narrowing gender gap in consumption.^{26,27} These findings highlight the need for precision public health policies that move beyond broad messaging toward gender-sensitive tobacco and alcohol control, alongside urban-focused harm reduction and cessation programs that address the specific demographic and socioeconomic characteristics of each identified profile.

Despite the strengths of the person-centered methodology used, our study has some limitations. There are concerns about the precision of the estimators for the smaller latent classes, particularly among the adolescent population. Due to the small sample sizes in the polysubstance use class, some estimators had wide confidence intervals, which may affect the robustness of the demographic and socioeconomic description. Future research would benefit from larger sample sizes to enhance the precision of these indicators. Also, implementing school-based substance use surveys could serve as a strategic methodological approach to mitigate this limitation, as they typically yield higher participation rates for the adolescent population, compared to household-based surveys.²⁸

This study indicates that substance use in Mexico follows a three-class structure across the life course, moving from experimentation in adolescence to current use patterns in adulthood. Our findings show that, while most of the population is in a non-user profile, the substance use classes were defined by significant demographic and socioeconomic heterogeneity. In the adolescent population, polysubstance experimentation was uniquely characterized by a marked concentration in the medium socioeconomic level. Among adults, the legal substance use class, the only profile where females represented the majority, provides evidence of a narrowing gender gap and a potential shift in national epidemiological trends. Furthermore, the presence of marijuana and electronic cigarettes within the adolescent polysubstance experimentation class, despite their current regulatory status in Mexico, suggests

that consumption is driven by specific socioeconomic and demographic determinants. While this analysis focuses on the descriptive identification of substance experimentation and consumption profiles, it serves as a baseline for exploring the social determinants of these classes. Future studies are encouraged to integrate social variables to transition from profile-based descriptions toward comprehensive predictive modeling. Therefore, prevention should not be based on generic measures; it requires policies that integrate gender-sensitive tobacco and alcohol control with socioeconomic-specific interventions. Prioritizing the implementation of evidence-based frameworks like the WHO SAFER and MPOWER measures is essential to safeguard the non-user majority and address the specific patterns in the Mexican population.

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