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Volatile Substance Misuse Among High School Students in South America

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Abstract

This article summarizes data from a 2004 study of over 300,000 high school students (aged 13–18 years) in nine South American countries. A probabilistic sample targeted urban secondary schools, utilizing a self-administered questionnaire on prevalence and frequency of substance use. Multivariate analysis showed that volatile substances were the first or second most commonly reported substances used after alcohol and cigarettes in all countries (lifetime prevalence range: 2.67% [Paraguay] to 16.55% [Brazil]). Previous studies have highlighted volatile substance misuse among street children, whereas this study demonstrates that it is common among South American high school students.

Keywords

high school students; volatile substance; inhalants; drug use; South America; *loló*; *lança*

INTRODUCTION

Among the most commonly misused volatile substances in Latin America are those that contain toluene, a volatile substance found in paint thinner and glue (Medina Mora & Real, 2008), in addition to gases, propellants, and aerosols (Ferigolo, Arbo, Malysz, Bernardi, & Barros, 2000). Other commonly used volatile substances are illicit drugs such as poppers, *lança* perfumes (a mixture of ethyl chloride or chloroethyl sold in tubes or perfume spray bottles and traditionally used during the week-long Brazilian *Carnaval* celebrations before Lent), and *loló*, the homemade version of *lança*.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

The scant research on volatile substance misuse (VSM) in South America suggests that glue, toluene, and other volatile substances are frequently used by street children (Forster, Tannhauser, & Barros, 1996; Kozel, Sloboda, & De La Rosa, 1995; Wittig, Wright, & Kaminsky, 1997). Studies conducted in Brazil, Mexico, and Peru suggest that street children use volatile substances because they produce hallucinogenic effects and that certain substances suppress hunger and may be easier to obtain than food (Cruz, in this issue; National Institute on Drug Abuse [NIDA] and Fogarty International Center, 2005). In other words, the poverty conditions on the street may drive children to use volatile substances.¹ Rates of VSM among street children are purportedly high in each of these countries (e.g., 58% among street children in Peru; NIDA and Fogarty International Center, 2005). It is difficult to translate this into clear numbers because reliable estimates regarding the number of street children are not available (United Nations International Children's Emergency Fund [UNICEF], 2009).

Although VSM has clearly been a problem among street children in several Latin American countries, there is a growing concern about the extent to which it is becoming a common practice among school-attending youth (Hynes-Dowell, Mateu-Gelabert, Barros-Taunhauser, & Delva, 2009; United Nations Office on Drugs and Crime [UNODC] and the Inter-American Observatory on Drugs Inter-American Drug Abuse Control Commission [CICAD], 2006). In this study, we provide current evidence that the misuse of substances among secondary school students in South America, not accounting for alcohol or tobacco, is either more prevalent than marijuana or follows as a close second.

METHODS

Data for this study were taken from the comparative study on drug use in South American youth, *Jóvenes y Drogas un Desafío para la Política Pública* (in English, *Youth and Drugs a Challenge for Public Policy*) (UNODC/CICAD, 2006). This study was conducted in nine South American countries simultaneously during 2005 as a joint effort between the CICAD of the Organization of American States (OAS) and the United Nations Drug Control Programme (now known as UNODC) through its regional office in Peru. The participating countries were Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Paraguay, Peru, and Uruguay. The following is an original analysis of the combined databases of the participating countries.

Research Design

The study used a cross-sectional design, modeled after national surveys (i.e., *Monitoring the Future*) of school-attending youth conducted previously in Latin America and the United States. Each country had a lead researcher and a research team. Data were collected during the second semester of the 2005 school year, with the exception of Bolivia, where data were collected in the second semester of 2004 due to funding availability. Fieldwork in Argentina, Bolivia, Ecuador, and Uruguay was executed directly by personnel contracted and supervised by the technical officers at the national drug commissions, the governmental entities in charge of dealing with the policies associated with the drug problem (see Table 1). In Peru and Chile, external agencies, such as universities, research institutes, or non-governmental organizations, were contracted to perform data collection and were overseen by the respective national drug offices. The grades selected correspond to 8th, 10th, and 12th grades in the United States; generally, the students comprise three age groups: 13–14 years,

¹The reader is referred to Hills's criteria (1965), which were developed in order to help assist researchers and clinicians determine if *risk factors* were causes of a particular disease or outcomes or merely associated. Editor's note.

15–16 years, and 17–18 years, although due to variations there are some children under 13 years in the youngest group and some over 18 years in the oldest group.

Sample

The study utilized a multistage sampling design to obtain nationally representative samples of secondary school students. The sampling of students underwent three stages (Kish, 2009): The individual countries applied the sampling procedure in each of their geographic regions, states, or provinces in order to provide national representative samples. This was done in each country with the exception of Brazil, where, given the large size of the country, a random sample of schools was taken from the 27 capital cities. From each of the countries' regions (or cities in Brazil), a random sample of schools was drawn. Schools were identified through the countries' national register of secondary schools during the school year in which the study was performed. The third sampling stage consisted of randomly selecting classrooms from each of the schools sampled. Once a classroom was selected, all of its students were administered a questionnaire (for which parental consent was obtained). This method was applied in each country with a slight variation in Chile, where instead of the entire class taking the questionnaire, 20 students were selected randomly within each class. This was done to maintain consistency with previous studies carried out in Chile through their national drug use surveillance system. Sample weights were assigned to each student to take into account differences in population size and age group structure across countries. Each individual country performed an Institutional Review Board ethics assessment prior to administration of the study.

Measures

The instrument consisted of a standardized questionnaire with a common format in Spanish with items adjusted for linguistic differences, where necessary, depending on the local vernacular. In the case of Brazil, the questions were in Portuguese. The format is referred to as the “common model” or the “Modelo de Cuestionario Subregional” (MCS) (in English, Subregional Questionnaire Model) and was developed by the Organization of American States Inter-American Uniform Drug Use Survey (SIDUC). The common model consists of the administration of anonymous, self-applied questionnaires that gather information on the use of tobacco, alcohol, pharmaceutical drugs without a prescription (tranquilizers and stimulants), and illicit substances such as marijuana, cocaine, coca paste, and ecstasy, in addition to volatile substances. The MCS questionnaire is the same instrument that was used by the CICAD epidemiology program known by its Spanish acronym SIDUC (Sistema Interamericana de Datos Uniformes sobre el Consumo, translated as the Inter-American System of Uniform Data on [drug] Consumption), and is the primary questionnaire that has been used in each of the countries that participated in the joint study since the late 1990s. The questionnaire has been pretested in every country.

The questionnaire consisted of three sections with approximately 80 questions, with slight variations among countries. Questions that were standardized across all countries and formed the core of the questionnaire included prevalence and frequency of use of various substances for three periods of time (lifetime, past year, past month), perceptions of risk associated with the use of substances, and risk factors such as parental involvement, perception of risk associated with substance misuse, and perceived accessibility of substances. Questions about sociodemographic characteristics (age, sex, and public versus private school) were standardized, but individual countries may have included their own questions regarding race, ethnicity, or additional questions pertinent to their particular drug use situation. These additional data are not available in the cross-national databases.

The dependent variables are defined as the proportion of students who used volatile substances in their lifetime and in the past 12 months. The following question was used to assess lifetime VSM: “Have you ever used any of the following substances in your lifetime?” with the response option: “Inhalants such as volatile substances and others (paint thinner, glue, etc.).” A subsequent question asked was “Have you used inhalants in the past 12 months?”

Analysis

The distribution of lifetime and past 12-month use of volatile substances by sex and age group (13–14, 15–16, and 17–18 years) was provided by the country. All percentages consisted of weighted data. Sample weights were assigned to each student to take into account differences in population size and age group structure across the countries. The adjusted analyses in this study permitted comparisons between the countries. The prevalence rates in this study varied slightly from those reported by individual countries in their national reports because their analyses relied on unadjusted rates.

RESULTS

Over 300,000 youth from the equivalent of 8th, 10th, and 12th grades participated in this study. About 50% were males and 50% females. Approximately 44% were 13–14 years old, 35% were 15–16 years old, and 21% were 17–18 years old (Table 2).

Volatile Substances Versus Other Substances

As shown in Table 3, the highest lifetime prevalence of VSM occurred in Brazil with the lowest observed among students in Bolivia, Paraguay, and Uruguay. When compared with the use of other substances, volatile substances are the second most commonly used substances after marijuana in nearly every country except Brazil and Peru, where lifetime prevalence of VSM was higher than for any other drug (Table 4). In Brazil, 16% of public secondary school children have reported misusing volatile substances at least once in their lifetime.

Differences by Sex

In Argentina, Bolivia, Brazil, Colombia, Ecuador, and Peru, lifetime prevalence of VSM is higher among males with a ratio of 1.2 to 1.0 in Peru to nearly 2.0 to 1.0 in Ecuador (Table 5). Lifetime prevalence rates of use are similar in the other countries. Among all used substances, volatile substances have the highest lifetime prevalence rates among girls in Brazil (15.48%), Ecuador (3.66%), Paraguay (2.75%), and Peru (4.16%) (see Table 5). Volatile substances tend to be the second most common drug for lifetime use among males, following marijuana, except in Brazil where volatile substances are the most commonly used drugs among males as well. This is consistent with other data from the UNODC/CICAD study, which indicate that drug use overall is lower among high school females than males.

VSM Across Age Groups

In the United States (Johnston, O’Malley, Bachman, & Schulenberg, 2009) and Canada (Population Health Research Group, 2006–2007), VSM is reported to peak in the youngest age group (8th grade) and declines sharply thereafter. However, in most countries in the present study, we see a mixed pattern. VSM throughout secondary school continues to rise with age in Bolivia, Brazil, Colombia, Paraguay, and Peru. In Argentina, Chile, Ecuador, and Uruguay, VSM peaks between 15 years and 16 years of age. Nevertheless, the rate of VSM in the oldest age group is still statistically significantly higher ($p < .05$) than the rate of use in the youngest age group (Figure 1).

Volatile substances are the second most commonly used substances among 13- to 14-year-old and 15- to 16-year-old youth. This also holds for both past month and past year use (Table 4). Only in Argentina and Bolivia does cocaine exceed VSM among the youngest age group; in Uruguay, cocaine and volatile substances show equal rates of past month use. However, in Brazil, Ecuador, and Peru, volatile substances are the most common substances used among 13- to 14-year-old students. Figure 1 shows past year prevalence rates of VSM by age for each country. Only when we look at the oldest age group, then we see that past year prevalence rates of volatile substances begin to decline. Students aged 17–18 years in Argentina, Chile, Ecuador, Paraguay, and Uruguay have lower rates than their younger counterparts. However, in Bolivia, Brazil, Colombia, and Peru, volatile substances are still either the first or the second most common drug of misuse.

DISCUSSION

Data from this study are derived from students in public and private secondary schools (including religious schools), aged 13–18 years. This analysis clearly demonstrates that VSM is not restricted to street children, or the poorest children in society only. Rather, it is a common occurrence across the socioeconomic spectrum and is clearly a behavior among high school students. Prevalence rates of VSM follow those for marijuana use, thus making volatile substances the second most common category of illicit substances used by secondary school students in the countries studied. The only exception is Brazil, where volatile substances are the most commonly used substances. This pattern holds true across lifetime, past year and past month use, and across age groups and sex (Table 2).

Despite the fact that overall drug use is lower among females than males in most of the countries in this study, VSM presents a disturbing trend by sex. In Brazil, Ecuador, Paraguay, and Peru, lifetime VSM among females followed alcohol and tobacco use and exceeded illicit drug use (Table 2).

Use by age groups also shows disturbing patterns among South American secondary school students. In the 13- to 14-year age group, volatile substances were the second most common substances used, regardless of the frequency of use in most of the countries. Children this young who already manifest past month drug use are the most likely candidates for long-term dependence (Chen, Storr, & Anthony, 2009).

In the countries in this study, VSM peaked between 15 years and 16 years of age (roughly comparable to 10th grade in the United States) in Argentina, Chile, Ecuador, and Uruguay, but in Bolivia, Brazil, Colombia, Paraguay, and Peru, past year use of volatile substances continued to increase among the 17 and older age group. This is of particular concern because the high toxicity of certain volatile substances can have serious detrimental effects if the use is sustained over time (see Dingwall and Cairney, this issue).

The prevalence of use, that is, past year and past month, demonstrates that VSM extends beyond a single event. In fact, VSM appears to be an ongoing practice in many countries and, unlike the United States and Canada, the misuse of volatile substances rises with age, thus introducing potential health consequences for teenagers repeatedly exposed to volatile substances over a long period of time.

Limitations

Research on VSM among street children has already established a body of evidence that many street children begin sniffing substances such as glue and toluene to ward off hunger. However, this focus on street children leads to the perception that volatile substance misuse is restricted to the most impoverished children in society.

Research on VSM is complicated by the fact that terms such as *volatile substances*, *volatile solvents*, and *inhalants* refer to a broad range of chemical substances that produce a varying range of psychoactive and pharmacological effects. Nevertheless, most substance use surveys continue to refer to volatile substances as a single category. This practice leads to underdiagnosis of several serious toxic effects that are more or less specific to each substance group (Balster, 1996; Bowen, Batis, Paez-Martinez, & Cruz, 2006; Byrne, Kirby, Zibin, & Ensminger, 1991; Esmail, Meyer, Pottier, & Wright, 1993; Forster et al., 1996; Lara, Galindo, Romero, Salvador, & Dominguez, 2003; NIDA, 1997).

It may be important to note that although the common model in this study did not include questions on race or ethnicity, this does not imply that the populations studied were homogeneous. On the contrary, questions regarding race and ethnicity were not included because of the extreme diversity of the populations from one country to another, and the different local concepts and definitions of race and ethnicity that made it impossible for the countries to agree on a standardized question. As mentioned, some countries included their own questions regarding race and ethnicity, but these data are not available in the cross-national databases.

Of notable absence in this study are questions regarding socioeconomic status. Early SIDUC questionnaires in the late 1990s included questions regarding household income; however, it was found that the secondary school students were unable to answer these questions consistently and the majority left the questions blank. This might be due to the fact that in many countries, although parents were employed, their employment might be informal, and salaries received were in cash only. This made it difficult for youth to answer clearly questions regarding monthly income. Colombia has a national system to identify socioeconomic status. In this case, nearly all the children were able to identify which social strata they belong to. However, this system unique to Colombia was not applicable to other countries. As a result, questions regarding household income and socioeconomic status were left out of the core questionnaire. Other countries, such as Chile, were able to stratify their data by municipality, and even neighborhood, providing further information regarding socioeconomic status. However, not all the countries were able to stratify their data with that degree of accuracy. Therefore, socioeconomic status was left out of this analysis.

A very crude proxy for socioeconomic status is public versus private schools. In each of the countries studied, it was quite common for families of middle and higher socioeconomic status to send their children to private schools. Families of low to lower-middle socioeconomic status tend to send their children to public schools. Therefore, public versus private schools might be taken as a proxy to separate the lower socioeconomic status from middle and upper strata. Nevertheless, it should be understood that this is a very crude indicator and better estimates are needed.

A further limitation is that this study did not survey the strengths, resources, or social capital of the samples' daily functioning and adaptation in a range of roles, networks, contexts, and environments that might be associated with the abilities of youth to perceive, judge, make decisions, implement them or not, learn from what they do or not, and are relevant to the development of policies and interventions.

Conclusion

It is unclear whether VSM is a recent phenomenon or has always existed but either has not been recognized or has not been of sufficient interest to relevant policymakers and societal stakeholders. The findings of this study do make it clear, nonetheless, that it will be important to monitor whether these data represent a passing trend or a permanent one.

Brazil may be a special case as there is a sociocultural history of VSM documented as far back as the 1930s (Decreto-lei, 1938), when *lança* perfumes (inhalable mixtures of perfume, ether, and other substances) and *loló* (a home-made version of the same) began to appear at *Carnival* as a party drug. Unfortunately, due to the limitations of the SIDUC instrument, this analysis does not provide enough detail on substances inhaled to ascertain exactly the substances that are being used. However, another national household study carried out in Brazil in 2005 indicated that approximately 40% of inhalants used among the general population (aged 12–65 years) are *lança* perfumes, and another 28% are *loló*. About 8.7% is shoe glue, 5.7% benzene, 4.3% paint thinner, and the remainder are various substances, including gasoline, ether, nail polish, and others. This household study also indicated that the past year prevalence of VSM remained high in the 12- to 35-year age group (Secretaria Nacional Antidrogas [SENAD], 2004). The variety of volatile substances that may be misused represents a significant knowledge gap in substance use research. It is important to address this in future research because the reasons children choose a particular substance may pose significant implications for policies related to access to these substances, the prevention of their use, treatment of volatile substance misusers, and the consequences of misuse.

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Biography

Marya Hynes-Dowell received her M.H.S. in Public Health from Johns Hopkins Bloomberg School of Public Health and Hygiene in 1997. Since then she has been working in the Inter-American Drug Abuse Control Commission (CICAD) in its research and analysis unit, known as the Inter-American Observatory on Drugs (Spanish acronym OID), where she develops and promotes programs to study the epidemiology of drug use, and other scientific research on drug use in Latin America and the Caribbean. In addition, Marya manages the OID's Research Development and Training Program, which involves several collaborative projects with NIDA. She is currently pursuing her doctorate in Public Health at Johns Hopkins University. Her areas of interest are the epidemiology of substance abuse, and treatment needs among drug users. Marya enjoys training for marathons and triathlons and is currently learning Tae Kwon Do from her two children, Fiona (aged 8, bo-black belt) and Pippin (aged 5, yellow belt).

Pedro Mateu-Gelabert, Ph.D., is a sociologist specializing in urban ethnography with over 15 years of experience in qualitative research both in New York City and abroad. Dr. Mateu-Gelabert is currently Principal Investigator of a NIDA developmental project aimed at training injecting drug users in strategies to avoid HIV and HCV infections at the National Development and Research Institutes, Inc. (New York, USA).

Helena ia Taunhauser Barros, M.D., Ph.D., is a Professor of Basic and Clinical Pharmacology at the Universidade Federal de Ciências da Saúde de Porto Alegre and coordinator of VIVAVOZ, the National Service for Information and Orientations about Drugs in Brazil. Her research has focused on studying factors that influence the acquisition and relapse of drug abuse, using both clinical and experimental paradigms. She has a special interest in studies regarding the misuse of volatile substances, comparing the trends of use and effects on groups of homeless children and in females. Another interest is the effectiveness of telephone-based interventions for drug abstinence in Brazilian clinical settings with funding from Conselho Nacional de Ciência e Tecnologia, Conselho de Aperfeiçoamento de Pessoal de Ensino Superior e Secretaria Nacional de Políticas sobre Drogas. Dr. Barros is a member of the Latin American epidemiology group REDLA, Society for Neuroscience, Sociedade Brasileira de Farmacologia e Terapêutica (SBFTE), and Sociedade Brasileira de Neurociências e Comportamento (SBNEC).

Jorge Delva, Ph.D., is an Associate Dean for Research and Professor in the School of Social Work, University of Michigan. He conducts research focused on understanding trends and effects of individual risk and protective factors on substance use while taking into account neighborhood and other contextual level factors. He is particularly interested in how these factors manifest themselves among racial and ethnic minority families and communities and among diverse cultural groups in the United States and abroad. His work has been funded by national (i.e., NIH, Robert Wood Johnson Foundation) and international (i.e., Swedish Medical Research Council, Organization of American States) organizations. He was a

founding co-director and director of the School of Social Work Vivian A. and James L. Curtis Research and Training Center and served as an associate director of educational programs for the University of Michigan Center for Global Health. He is a mentor in several NIH pre- and post-doctoral training grants and is a faculty associate with the Center for Global Health and the Institute for Social Research. He also enjoys practicing martial arts, paddling outrigger canoes, and rowing. He is married and has two mischievous daughters.

GLOSSARY

<i>Lança perfumes</i>	A mixture of ethyl chloride or chloroethyle sold in tubes or perfume spray bottles and used traditionally during Brazilian <i>Carnaval</i> celebrations. The manufacture of lança perfumes is prohibited in Brazil.
<i>Loló or cheirinho de loló</i>	A homemade version of lança perfumes frequently mixes chloroform and ether with perfume.

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FIGURE 1.
Past year prevalence of volatile substance misuse by age group in South America. *Note:* Differences between groups are statistically significant, $p < .05$.

TABLE 1

National drug commissions in South America

Country	Commission
Argentina	Secretaría de Programación para la Prevención de la Drogadicción y la Lucha contra el Narcotráfico (SEDRONAR)
Bolivia	Consejo Nacional de Lucha Contra el Tráfico Ilícito de Drogas (CONALTID)
Brazil	Secretaria Nacional de Drogas (SENAD)
Colombia	Dirección Nacional de Estupefacientes (DNE)
Chile	Consejo Nacional del Control de Estupefacientes (CONACE)
Ecuador	el Consejo Nacional de Control de Sustancias Estupefacientes y Psicotrópicas (CONSEP)
Paraguay	La Secretaría Nacional Antidrogas
Peru	la Comisión Nacional para el Desarrollo y Vida Sin Drogas (DEVIDA)
Uruguay	la Junta Nacional de Drogas (JND)

Source: CICAD (2006).

TABLE 2

Sample size and population represented by South American countries

Country	Sample size	Age group (%)				Male	Female
		13–14 years	15–16 years	17–18 years			
Argentina	39,961	51.37	28.84	19.79		45.90	54.10
Brazil	48,155	57.82	21.65	20.53		46.40	53.60
Bolivia	20,386	32.00	34.66	33.35		50.30	49.70
Colombia	100,059	50.39	31.08	18.53		45.00	55.00
Chile	36,108	37.94	35.08	18.53		49.50	50.50
Ecuador	13,912	41.84	32.87	25.30		46.70	53.30
Paraguay	20,420	36.70	33.40	29.90		44.30	55.70
Peru	60,229	36.57	48.37	15.06		49.30	50.70
Uruguay	8,033	37.74	34.89	27.38		44.80	55.20
TOTAL	311,155	44.38	34.55	21.07		46.91	53.09

Source: UNODC/CICAD, 2006.

TABLE 3
Prevalence of misuse of volatile substances, marijuana, cocaine, alcohol, and tobacco in South American secondary school students

Country	N	Volatile substances (%)			Marijuana (%)			Cocaine (%)			Alcohol (%)			Tobacco (%)		
		Lifetime	Past year	Past month	Lifetime	Past year	Past month	Lifetime	Past year	Past month	Lifetime	Past year	Past month	Lifetime	Past year	Past month
Argentina	39,961	4.74	2.63	1.40	10.52	6.71	3.80	3.96	2.45	1.46	64.71	53.03	42.25	46.74	30.77	23.64
Bolivia	48,155	3.44	1.21	0.53	4.62	2.25	1.05	1.88	0.94	0.50	39.0	26.67	16.42	41.79	25.38	13.27
Brazil ^a	20,386	16.55	15.25	10.57	6.36	5.11	3.60	1.94	1.70	1.24	69.29	67.45	47.95	26.86	17.23	10.98
Colombia	100,059	4.00	3.49	1.04	8.20	7.09	2.51	1.95	1.66	0.52	76.36	65.43	51.87	47.60	32.01	23.69
Chile	36,108	5.47	2.50	0.99	16.65	12.73	5.28	4.08	2.40	0.99	68.13	56.90	40.14	66.62	50.36	38.33
Ecuador	13,912	5.29	2.27	0.79	6.80	3.56	1.61	2.31	1.20	0.58	60.49	41.70	28.05	53.53	28.04	18.39
Paraguay	20,420	2.67	1.52	0.73	3.69	2.72	1.45	0.90	0.62	0.43	59.79	48.56	40.05	30.70	21.62	13.33
Peru	60,229	4.57	1.82	0.75	4.46	1.82	1.31	1.71	1.01	0.49	50.90	37.55	25.90	42.96	26.78	16.17
Uruguay	8,033	2.91	1.52	0.57	11.40	1.52	5.30	2.30	1.36	0.48	78.16	66.95	50.11	51.17	34.50	23.95

Source: UNODC/CICAD, 2006.

^a Datum on cocaine refers to both cocaine hydrochloride and cocaine base paste.

TABLE 4

Past year prevalence of volatile substances and other substances among secondary school students in South America by type of school

Country	<u>Past year prevalence (%)</u>		<u>Past month prevalence (%)</u>	
	Private school	Public school	Private school	Public school
Argentina	1.70	3.27	0.85	1.78
Bolivia	1.33	1.14	0.84	0.55
Colombia	3.60	3.44	1.01	1.04
Chile	2.60	2.52	1.16	1.02
Ecuador	2.39	2.23	0.80	0.77
Paraguay	1.81	1.41	0.71	0.80
Peru	1.68	1.85	0.52	0.81
Uruguay	1.11	1.63	0.40	0.62

Source: UNODC/CICAD, 2006.

TABLE 5
Lifetime prevalence of volatile substance misuse among secondary school students by sex in South America

Country	N	Lifetime (%)		Past year (%)		Past month (%)	
		Males	Females	Males	Females	Males	Females
Argentina	39,961	5.98	3.71	2.95	2.37	1.55	1.27
Bolivia	48,155	4.37	2.51	1.84	0.58	0.89	0.17
Brazil	20,386	17.77	15.48	16.29	14.38	11.26	9.98
Colombia	100,059	5.24	2.96	4.50	2.63	1.39	0.72
Chile	36,108	5.40	5.54	2.24	2.77	0.99	1.00
Ecuador	13,912	7.14	3.66	3.15	1.49	1.08	0.53
Paraguay	20,420	2.60	2.75	1.53	1.53	0.71	0.76
Peru	60,229	4.99	4.16	1.90	1.74	0.89	0.63
Uruguay	8,033	3.65	2.30	1.82	1.29	0.64	0.52

Source: UNODC/CICAD, 2006.