SHORT COMMUNICATION

Demographic and contextual factors associated with inhalant use among youth in rural Alaska

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***Background*:** Abuse of harmful legal products that can be inhaled or ingested is a serious and growing problem in many rural Alaskan communities, and particularly so among preteens.
***Methods*:** This study analyses data collected during baseline measurements of a 5-year NIH/NIDA-funded study entitled *A Community Trial to Prevent Youth's Abuse of Harmful Legal Products in Alaska*. Youth in 8 communities located throughout the state participated in a survey during the fall of 2009 to measure the prevalence and availability of harmful legal products (n = 697). The goal of the analysis presented here is to compare the contextual factors of inhalant users and non-users in rural Alaskan communities.
***Results*:** As reported in national surveys of substance use among youth, participants in this study indicated using alcohol more than any other substance. Inhalants were the second-most common substance abused, higher than either cigarettes or marijuana. Lifetime use varied among demographic factors such as age, gender and ethnicity as well as contextual factors including academic performance, parent employment, household living situation and income. When compared to non-users, significantly larger proportions of participants reporting lifetime inhalant use indicated easy availability of inhalants in their home, school and retail outlets. Users were also significantly more likely than non-users to have consumed alcohol.
***Conclusion*:** Results of this study may inform the development of effective interventions in other rural communities.

Keywords: *rural alaska*; *school-aged children*; *inhalants*; *drugs and alcohol*; *prevalence*; *environmental effects*; *survey*

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Inhalant abuse, defined as the deliberate inhalation of vapors from volatile substances for the purpose of becoming intoxicated or altering consciousness (1), is a significant problem among young people (2). Youth inhale legal products such as gasoline, aerosol hairsprays and whipping cream and solvent-based paints to get high. The problem of inhaling and ingesting harmful legal products is especially concentrated among preteens in Alaskan rural communities (3). Studies of inhalant use among young people in Alaska have found prevalence rates as low as low as 6.8% (4) and as high as 48% (5). These variations are likely associated with contextual factors. Inhalant use in First Nation's youth in Canada, for example, has been associated with disruptions in family structure (3). Increases in inhalant use in rural, isolated communities have been observed when older people are preoccupied with work (6) and in homes with disrupted family structures (7). Initiation of inhalant use is associated with poor academic performance, use of other drugs (8) and availability of volatile substances (9,10). Evaluating current rates of inhalant use among young residents of rural communities in Alaska is necessary to develop appropriate interventions to reduce that use.

The aim of this study is to assess the strength and direction of associations between various contextual factors and inhalant use in young people living in rural Alaskan communities. We assess the relationship between inhalant

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use and demographic and contextual factors including age, gender, ethnicity, household living situations, academic performance, drug and alcohol use and the availability of harmful legal products.

Material and methods

Demographics

This study analysed baseline data from a randomized controlled trial (RCT) involving young people's use of legal products to get high. The RCT employs a 2-group (experimental vs. control), design with repeated cross-sectional surveys of youth to assess the determinants of inhalant use and determine the effects of an intervention to mitigate those determinants. The 16 targeted communities represent the variety of communities and populations in Alaska and include 4 of its 5 regions. The communities' 2006-certified populations range from 536 to 5,937. There are 6 communities with populations under 1,500, 4 between 1,500 and 3,000, 4 between 3,001 and 4,500 and 2 between 4,501 and 6,000. According to the 2000 US Census, 10 of the 16 communities have non-White populations greater than 50%, and 4 of the 16 are isolated villages with Alaska Native populations greater than 90%. Two communities are located on the Alaskan road system and are mostly White population. To obtain pre-intervention data, a questionnaire was administered between November and December 2009 in classrooms in 8 of the 16 study communities (n = 697). Study participants were 9–14 years of age (mean = 11.4; SD = 0.9) and 55% were male. Approximately 30% (n = 212) self-identified as White, 26% (n = 153) as American Indian/Alaska Native (AI/AN), 20% (n = 114) as "other" or bi/multiracial identification and 18% (n = 104) as Asian. Participation in the study was voluntary and required active written parental and student consents. Active written parental consent was required by Alaska state statute. In this process, we received signed forms from the parents/guardians of 91% (n = 986) of the students enrolled (n = 1,078). With parental refusals (n = 242), student refusals (n = 22) and student withdrawals and absences from school (n = 27), there were 697 completed surveys returned, representing an overall response rate of 65%. This type of consent process has been shown to reduce response rates significantly (11,12). The protocols used for data collection, analysis and management were approved by the University of Alaska Anchorage and PIRE Institutional Review Boards. In addition to items related to the use of illicit substances and legal products to get high, the survey questionnaire included items about contextual factors in the home, school and community environments. For example, the instrument asked participants about family employment, academic performance, household income, household living situations and the availability of inhalants.

Table I. Demographic and contextual variables related to inhalant use (n = 697)

		Used inhalants to get high		
		No% (n = 602)	Yes% (n = 63)	Test stat. (χ^2)
Demographic factors				
Age mean (SD) [range: 9–14]		11.47 (0.97)	11.34 (1.13)	
Gender (%)	Female	45.4	50.8	0.66
	Male	54.6	49.2	
Ethnicity (%)	AI/AN	25.3	29.8	3.36
	Asian	17.1	25.5	
	White	37.8	29.8	
	Other	19.8	14.9	
Contextual factors				
Inhalant availability				
Home	Easy	42.4	66.7	13.64*
	Hard	57.6	33.3	
School	Easy	15.6	34.9	14.76*
	Hard	84.4	65.1	
Retail	Easy	40.9	58.7	7.45*
	Hard	59.1	41.3	
Substance use				
Alcohol	No	78.9	50.0	25.84*
	Yes	21.1	50.0	

*$p < 0.05$.

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Data analysis

To determine whether community level differences influenced individual level differences, an intraclass correlation was computed for inhalant prevalence (ICC <0.001, $p>0.50$). Statistical differences between subgroups and bivariate associations between variables were tested using chi-square and t-tests. Inhalant users were compared to non-users on demographic factors as well as the following contextual factors: parent employment, academic performance, household income, household living situation, inhalant availability and use of other substances. PASW for Windows was used to conduct the statistical analysis.

Results

More Participants reported using alcohol (23.2%) more than any other substance, followed by inhalants (9.5%) and cigarettes (6.9%), and marijuana (2.7%). Overall, 45% ($n=314$) of the participants reported easy availability of inhalable products in their home, 42% ($n=295$) reported easy availability in a local retail outlet and 17% ($n=118$) reported easy availability in their school (Table I).

Differences between users and non-users varied slightly according to demographic factors such as age, gender and ethnicity. A significantly higher proportion of users reported easy availability of inhalable products in the home ($\chi^2=13.64$; $p<0.05$), school ($\chi^2=14.76$; $p<0.05$) and retail ($\chi^2=7.45$; $p<0.05$) environments when compared to non-users. Users (50.0%) were also more likely than non-users (21.1%) to have consumed alcohol ($\chi^2=25.84$; $p<0.05$). Inhalant users and non-users did not differ significantly on other tested contextual factors.

Discussion

As reported in national surveys of substance use among youth, participants in this study indicated lifetime use of alcohol more than any other substance. However, the prevalence of lifetime inhalant use reported here (9.5%) was higher than either cigarettes or marijuana. Participants reported inhaling a variety of legal products found in rural and isolated communities across the circumpolar north, including gasoline, glue, markers, paint and propane.

The primary determinant of inhalant use within the study population was the perceived availability of inhalable products. A large proportion of participants indicated that inhalants are easy to obtain in homes and local retail outlets. A smaller proportion of participants indicated that inhalants are easily available in the school environment. When compared to non-users, significantly larger proportions of participants reporting lifetime inhalant use indicated easy availability of inhalants in all locations listed in our survey; the home, school and local retail environments. These results seem to suggest that, while a large majority of students perceive inhalants to be more difficult to obtain in their school, participants who have used these products to get high find them easily obtainable.

Lifetime use varied slightly by demographic factors such as age, gender and ethnicity as well as contextual factors including parent employment, academic performance, availability and alcohol use. While the strength of these differences was not statistically significant, they were similar to those found in previous studies of inhalant use in rural and isolated communities in the United States and Canada.

This brief communication presents the initial findings of a study to assess the strength and directions of association between various contextual factors and inhalant use in young people living in rural Alaskan communities. It is limited by the relatively short duration of the data collection process; however, these findings provide important evidence that interventions aimed at reducing inhalant use among rural young people should target the availability of these products in the home, school and retail environments.

Conflict of interest and funding

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