

The EpiLink

A public health news bulletin from the Texas Department of State Health Services
Infectious Disease Control Unit



You can now find us at: <http://epilink.org>

Volume 64/Number 2/February 26, 2007

Substance Use on the Texas-Mexico Border and in Colonias

The aims of this study were:

1. To describe the prevalence of drug problems and their correlates in urban and rural border sites
2. To investigate the relationship between acculturation and drug use
3. To examine utilization of drug treatment services

Sampling and interviewing were carried out between March 2002 and June 2003. A sample of 1,200 respondents 18 years of age and over was interviewed in 3 sites on the Texas-Mexico border: 400 in the El Paso metropolitan area, 400 in the Rio Grande Valley metropolitan area (Brownsville, McAllen, Edinburg, Harlingen, and other urban areas in Hidalgo and Cameron counties), and 400 in colonias from Hidalgo and Cameron counties. In each of the 2 urban sites (El Paso and the Valley urban area), sampling utilized a multistage cluster design; in colonias, the sample was stratified by size and density and a random sample was drawn from each stratum.

The main findings are presented below:

Prevalence of Alcohol and Drug Use

- Slightly more than half of all respondents had consumed alcohol in the past year, ranging from 54% in the Valley to 61% in El Paso (not a statistically significant difference). About 7% of respondents were heavy drinkers (5 or more drinks at least 5 times in the past month), and 23% were heavy episodic drinkers (5 or more drinks at least once in the past month).

(Continues next page)

Health Focus: Substance Abuse

Adolescent Substance Use in Texas, [page 6](#)

Substance Use and Related Behaviors Among College Students in Texas, [page 14](#)

Methamphetamine: A Constantly Changing Epidemic, [page 22](#)

Latest Research on the Effects of Methamphetamine, [page 29](#)

Prevalence of Alcohol Consumption in Texas and Selected Consequences, [page 35](#)

Unintentional Poisoning Deaths—United States, 1999-2004, [page 45](#)

Public Health in Action:

Program spotlight: InSight— Screening and Brief Intervention for Alcohol and Drugs in the Public Healthcare System, [page 50](#)

Also in this issue:

Botulism in Heroin Addict, [page 54](#)

Corrections, [back page](#)

- While the overall prevalence of alcohol and heavy alcohol use was similar in all 3 survey sites, heavy episodic drinking was significantly higher in the colonias (33%) than either of the urban sites (23%).
- About one-third of all border respondents had ever used an illicit drug, and about 9% had used drugs in the past year.
- Marijuana was the most commonly used illicit drug in the past year, with 5% of all respondents having used it, followed by cocaine and uppers, at about 3% each. In El Paso, past-year use of opiates other than heroin was also seen in 3% of residents. Past-year use of other drugs was low.
- There were no significant differences in overall lifetime or past-year illicit drug use across the 3 sites. However, respondents in the urban Valley had a significantly lower prevalence of lifetime use of cocaine and crack than respondents in El Paso or in colonias; and respondents in El Paso had a significantly higher lifetime use of hallucinogens than respondents in the other 2 sites.
- About 9% of lifetime drug users in El Paso and almost 5% in colonias said they had ever injected a drug; however, injection drug use was very low in the Valley, with less than 1% of drug users reporting it.

Substance Abuse and Dependence

- About 12% of all respondents (21% of those who had drunk alcohol in the past year) had a past-year problem of alcohol abuse or dependence, based on Diagnostic and Statistical Manual of Mental

Disorders, Fourth Edition™ (DSM-IV) criteria.

- Heavy alcohol use and problems of abuse and dependence were significantly more likely to occur among men than women and among younger respondents. Neither education nor income was significantly related to heavy alcohol use, abuse, or dependence.
- Alcohol dependence was significantly higher in the colonias (12%) than in the adjacent urban Valley (6%), and marginally higher in colonias than in El Paso (7.5%).
- About 4% of respondents had problems of drug abuse or dependence. (Among past-year drug users, 46% percent had problems of abuse or dependence.) There was no significant difference in drug abuse or dependence across the 3 sites.

Other Factors Related to Drug Use

- About 57% of border adults said that it would be easy or very easy for them to acquire marijuana if they wanted to get some, and 47% said it would be easy to get other drugs like cocaine, crack, or heroin. Residents of the colonias were more likely (57%) than residents of the adjacent Valley urban area (44%) to say that drugs other than marijuana were easy to get. Some 37% of all respondents said it would be easy for grade-school children in their community to get some beer, wine, or liquor if they wanted.
- The most important reason border residents gave for not using drugs or alcohol was concern over the health effects. Many also cited the potential for substance use to cause problems with family or friends.

...border residents were found to be less likely than adults in Texas statewide to drink alcohol, binge drink, or use illicit drugs, but were more likely to report substance dependence.

- About 10% of border adults admitted to having driven while intoxicated in the past year, although only 1% had gotten in trouble with the law in the past year because of it. During their lifetime, 14% of respondents had ever gotten in trouble with the law for driving while intoxicated.
- About 2% of Valley residents, 6% of El Paso residents, and 7% of colonia residents had gotten into trouble with the law at some time in their lives for possession or sale of drugs. About 5% of all respondents had gotten into trouble for an act committed while drinking or while using drugs.

Comparison with Statewide and National Prevalence Levels

- Using comparative data from the National Survey on Drug Use and Health, border residents were found to be less likely than adults in Texas statewide to drink alcohol, binge drink, or use illicit drugs, but were more likely to report substance dependence. When compared with Hispanics nationwide, again border Hispanics were less likely to drink, binge drink, or use illicit drugs, but slightly more likely to report heavy alcohol use and substance abuse or dependence. When compared to survey data from the northern region of Mexico, illicit drug use was 4 times higher on the Texas side of the border, and substance abuse or dependence was over twice as high. However, Mexicans were more likely to be heavy drinkers. Due to relatively high standard errors for some of the comparisons, not all of these differences were statistically significant, but the patterns appeared consistent.

...colonia residents showed high motivation and were intermediate among the three sites in the likelihood of ever having actually received services...

Comparison with Historical Border Data

- The findings from this survey were compared with those from the same 3 sites in the 1996 survey, which was carried out by the same investigators.¹ In El Paso, lifetime alcohol use declined slightly but significantly, and in the urban Valley, lifetime drug use increased by 50%. There were no other noteworthy differences in those 2 sites. The colonias showed more changes: past-year illicit drug use rose significantly, from 6% to 11%, as did lifetime drug use, from 25% to 32%. The prevalence of alcohol- and drug-related problems rose significantly in colonias as well: alcohol abuse/dependence increased from 12% to 23% and drug abuse/dependence doubled from 3% to 6%. This appears to represent a “catching-up” effect in colonias, from rates about half as high as those in the urban areas in 1996 to rates similar to or slightly higher than urban areas in 2002.

Service Needs, Motivation, and Utilization

- Border residents were asked what they would do if they experienced physical problems, mental or emotional problems, or substance-related problems that interfered with their day-to-day activities. For each of these 3 kinds of problems, medical or professional help was the source most often cited. Respondents were the most likely to say they would seek professional help for physical problems (81%) or for psychological problems (75%), and least likely to say they would do so for drug or alcohol problems (59%).

- Colonia residents were the most likely to say they would seek medical or professional help for substance abuse problems. Residents of El Paso were the most likely to mention using self-help groups as well. Family and friends, religious sources of support, and “curanderos” (faith or magic healers) were rated very low as potential sources of help with substance problems.
- When respondents who were in potential need of services were considered (those who had DSM-IV symptoms or who self-reported alcohol or drug problems), about 29% in El Paso, 19% in the urban Valley, and 24% in colonias had ever “sought” services (defined as having received or having wanted but failed to get services, or were motivated now to seek them). While these differences among sites were not statistically significant, probably because the number in potential need was relatively small, they are intriguing in that colonia residents showed high motivation and were intermediate among the 3 sites in the likelihood of ever having actually received services (14% in El Paso, 3% in the Valley and 7% in the colonias, among those in potential need).
- About one-quarter (26%) of respondents who had a past-year substance problem of abuse or dependence said that they would be interested in receiving treatment at this time, “if they did not have to worry about the cost and it was reasonably convenient to get to.” The percentage of those motivated was highest in the colonias (39%).
- About 3% of border residents who had ever used alcohol or drugs said they had wanted treatment at some point, but ended up not getting it. Barriers cited included cost, location, embarrassment, lack of childcare or transportation, and believing it would not help. Worry about not finding anyone who spoke their language or who was from the same ethnic background was not reported as a barrier to getting services.

Acculturation Effects

- Acculturation (as measured by the Acculturation Rating Scale for Mexican Americans-II, or ARSMA-II) was related to lower rates of alcohol use disorders among men and a higher frequency of heavy episodic drinking among women. Acculturation was also related to higher rates of drug use for both men and women. Generation in the United States, sometimes used as a proxy for acculturation in other studies, was found to be not strictly collinear with acculturation and showed some different relationships with substance use. Additionally, the effects of generation appeared to differ by site.

This study contributes to our hitherto limited knowledge of alcohol and drug use behaviors among the general population living on the border and especially in colonias. Given the existence there of multiple risk factors for drug use, as well as potential disparities in access to and utilization of treatment, it was important to assess levels and correlates of drug abuse and the need for and perceived barriers to treatment. The findings are expected to lead to a better understanding of service needs in this population and on how to

provide them in a culturally appropriate way.

Acknowledgement

As part of its initiative to investigate (and eliminate) health disparities, the National Institute on Drug Abuse funded a 5-year study entitled Drug Attitudes and Behaviors on the United States/Mexico Border, conducted by researchers at the University of Texas at Austin (Principal Investigators were Richard Spence, PhD, Lynn Wallisch, PhD, and Raul Caetano, MD, PhD).

Further details about this study are available in the following publications:

Wallisch LS, Spence RT. Alcohol and drug use, abuse, and dependence in urban areas and colonias of the Texas-Mexico border. *Hispanic Journal of Behavioral Sciences* 2006; 28: 286-307.

Wallisch L. Methamphetamine use in the 2003 survey of adult substance use on the Texas-Mexico border. *Proceedings of the Border Epidemiology Work Group*, September

2004. 2004. Bethesda, MD: National Institute on Drug Abuse.

Spence RT, Wallisch LS. Alcohol and drug use in rural colonias and adjacent urban areas of the Texas border. *Journal of Rural Health* [in press].

Spence RT, Wallisch LS, Smith S. Treatment seeking in Hispanic populations in urban and rural settings on the border. *Alcoholism: Clinical and Experimental Research* [in press].

Caetano R, Ramisetty-Mikler S, et al. Acculturation, drinking, and alcohol abuse and dependence among Hispanics in the Texas-Mexico border. *American Journal of Drug and Alcohol Abuse* [in press].

Reference

¹ Wallisch, LS. 1996 Survey of Substance Use on the Texas-Mexico Border and in Colonias. 1996. Austin, TX. Texas Commission on Alcohol and Substance Abuse.

Prepared by Lynn Wallisch, PhD, Center for Social Work Research, University of Texas at Austin.

Adolescent Substance Use in Texas

Abstract

Adolescent alcohol and drug use has been a major national concern. Treatment, prevention, and education efforts have focused on reducing the demand of substances. The statewide studies of youth use patterns have been conducted to better understand the scope of problem. Reliable data on the prevalence of use, trends in the use of different substances, and behaviors and attitudes associated with substance use are necessary to plan and evaluate efforts to reduce demand.

The data presented in this article are based on self-reports of secondary school students sampled in the 2006 Texas School Survey of Substance Use. In the spring of 2006, the Texas Department of State Health Services, in conjunction with the Public Policy Research Institute at Texas A&M University, conducted its tenth biennial survey of drug and alcohol use among 141,905 students in grades seven through twelve from 81 school districts in the state. Alcohol, tobacco, and marijuana were the most widely used substances by young people in Texas. About 48% of adolescents used either alcohol, tobacco, inhalants, or illicit drugs during the past school year.

Methodology

In order to make school survey administration practical, students were selected using a multi-stage stratified sampling procedure. This involved sampling districts within 11 strata, schools within districts, and classrooms within districts. All students in a sampled classroom were asked to participate in the survey. School districts in 28 counties along the Texas-Mexico border were encouraged to participate in the survey and had been over-sampled since 1998, so that substance use among border students could be examined in detail. In 2006, a total of 37,450 students in grades seven through twelve were sampled from 22 school districts located in border counties. The comparison group of students was the 104,455 secondary students sampled from the other 59 school districts elsewhere in Texas.

The 6-page survey instrument for secondary students asked about use of alcohol, tobacco, inhalants, and illicit drugs, as well as student attitudes,

extracurricular involvement, sources of information, and other related problems. The questionnaire was self-completed and formatted for optical scanning, similar to those used in achievement tests and other forms of standardized testing. Relevant personnel in the selected districts and campuses were provided with complete instructions and materials necessary to administer the survey. Information was provided on the number of students that should have taken the survey but were absent, and the number that were present but failed to complete the survey. This information was useful for computing error estimates.

To ensure the quality of the statewide survey data, a number of internal checks were put into place to guide survey processing, including the litho-coding on the instrument, pre- and post-analysis quality control procedures, and cross-analysis for data consistency. Exaggerated responses, such as those claiming to

use a false drug or extremely high levels of drug and alcohol use, were also identified and dropped from the analyses. If students failed to report both their grade level and age, the data were dropped from the analyses as well. Confidence is high that these quality control features will ensure valid and reliable survey findings.

Each case was weighted based on the strata, district, and campus. The weights were applied so that the aggregation of students in each campus, district, and strata reflected their proportions in the actual district, campus, and strata populations. All the survey findings in this report are weighted. Table 1 shows the survey participant composition.

Patterns of Substance Use by Drug

- Alcohol continues to be the most widely used substance among Texas secondary school students with 66% in 2006 reporting they had used alcohol at some point in their lives, down from 68% in 2004 and 81% in 1990 (Figure 1). Past-month use of

alcohol also decreased from 44% in 1990 to 32% in 2006 (Figure 2).

- Heavy consumption of alcohol or binge drinking, defined as drinking 5 or more drinks on one occasion in the past 30 days, is of concern. About 22% of secondary school students reported binge drinking in 2006.
- Lifetime use of tobacco (cigarettes or/and smokeless tobacco) among secondary school students showed a continuous decrease from 56% in 1990 to 39% in 2004 and to 35% in 2006. Past-month use of tobacco was 15% in 2006, down from the recent peak of 26% in 1998.
- The term “inhalants” refers to many different household and commercial products that can be abused by sniffing or huffing (inhaling through the mouth). Inhalants include volatile substances (such as gasoline, glue, and paint), anesthetics (such as ether and nitrous oxide), aerosols (such as hair spray and Freon), and nitrites (poppers and Locker Room). Lifetime inhalant use in 2006 was

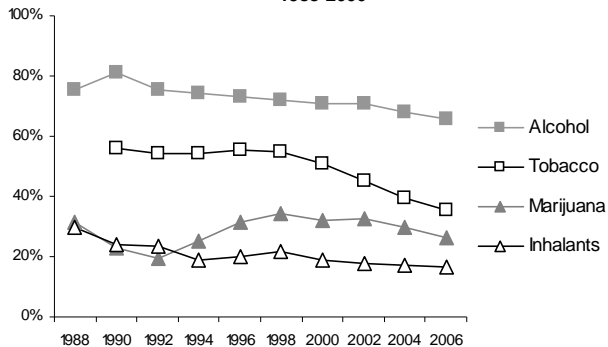
Table 1. Total Number of Secondary Students Participating in the 2006 Texas School Survey, by Grade and Demographic Characteristic

	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	Total
Total Sample							
All Students	29,646	25,484	26,966	21,455	20,971	17,383	141,905
Gender							
Males	14,463	12,236	13,115	10,033	9,965	8,195	68,007
Females	15,118	13,181	13,777	11,370	10,962	9,125	73,533
Ethnicity							
Anglos	9,113	8,083	9,033	7,524	8,074	6,372	48,199
African American	3,744	3,153	2,981	2,435	2,526	1,800	16,639
Hispanics	13,415	11,423	11,593	8,935	7,715	6,885	59,966
Asian Americans	825	766	911	711	718	683	4,614
Native Americans	297	249	254	172	173	124	1,269
Others	1,700	1,363	1,665	1,339	1,416	1,222	8,705

Notes: 1. Numbers reported for each demographic characteristic by grade may not add to the total sample of students due to missing values within the specific category.

2. More Hispanic students were included in the sample due to over-sampling of border area where the majority of the students are Hispanic.

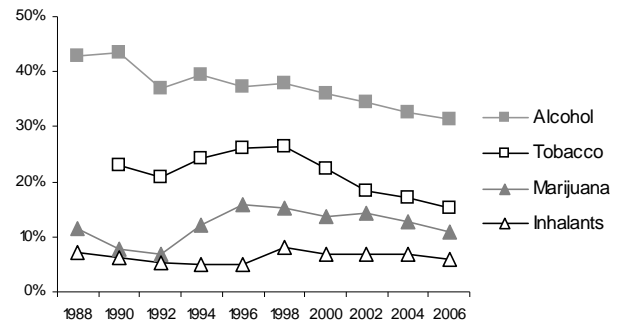
Figure 1. Percentage of Texas Secondary School Students Who Had Ever Used Selected Substances: 1988-2006



17% and the past-month use was 6%.

- Marijuana remained the most commonly used illegal drug among 7-12 graders. About 26% in 2006 reported having smoked marijuana in their lives, down from 30% in 2004. Past-month use of marijuana was 11% in 2006, compared to 13% in 2004. The 2006 prevalence rates were still higher than the lowest rates in 1992.
- Cocaine and/or crack use remained a problem among teens, with 8% reporting lifetime use and 3% past-month use. Both prevalence of use showed a decrease from the peak level in 1998.
- Use of Ecstasy decreased sharply at all grade levels during the past 4 years. About 5% reported lifetime use of Ecstasy in 2006, compared to 9% in 2002.
- Six percent of secondary school students reported using uppers (stimulants, speed, Ritalin etc.) at least once in their lifetime. More than 2% admitted past-month use of uppers.
- Lifetime use of downers (sleeping pills, barbiturates, sedatives,

Figure 2. Percentage of Texas Secondary School Students Who Had Used Selected Substances in the Past Month: 1988-2006



tranquilizers, etc.) remained level at 6% in 2006. Past-month use of downers was about 3%.

- Reported lifetime use of hallucinogens (LSD, PCP, Mushrooms, etc.) among this age group has leveled at 5% in recent years. Similar patterns held for past-month use of hallucinogens at 1 to 2%.
- Rohypnol is known by street names such as roches, roofies, or roach. Lifetime use of Rohypnol showed a notable decrease from 1998 (7%) to 2006 (3%).
- Some 1.5% of Texas secondary school students reported lifetime use of steroids, and less than one percent had used steroids during the month before the survey.
- Lifetime use of heroin was reported at 1.5% among all secondary students in 2006.
- About 6% of students in grades 7-12 were considered heavy drug users, those who used an illicit drug on a daily or weekly basis.

Over-the-Counter (OTC) or Prescription-Type Drugs

- Use of OTC or prescription-type drugs was first reported in the 2004 school survey. About 5% of secondary students in 2006 said they had ever taken Dextromethorphan (DXM), Triple C's, Skittles, or Coricidin to get high during their lifetime, a 16% increase from 2004 (4.3%). Similar patterns held for the past-month use.
- In the 2006 survey, 8.1% of secondary students reported using codeine cough syrup to get high at some point in their lives, and 3.0% did so in the past month. Both prevalence of use showed an increase in the lower grades, but a decrease in the upper grades between 2004 and 2006.
- Girls (68%) in 2006 reported a higher rate of lifetime alcohol use than boys (64%), although both girls and boys reported similar rates in past-month drinking.
- Boys were more likely to have a higher prevalence use of tobacco and most illicit drugs, except for uppers, downers, and Rohypnol.
- Overall, Hispanic youths reported the highest rates of lifetime and past-month use of alcohol, inhalants, marijuana, cocaine/crack, Rohypnol, and heroin, and the highest lifetime use of tobacco.
- Adolescents who lived with both of their parents were less likely to use substances than those who lived in other family structures. For example, 9% of secondary school students living with both parents reported past-month use of marijuana, compared to 15% of those from other family structures.
- Students making poor grades were more likely to use substances, although this survey did not collect information to determine whether

Demographic Correlates of Substance Use

- Prevalence use increased linearly by classroom grade for most substances except for inhalants, where students in grades 7-8 reported higher use of inhalants than did students in the upper grades.

Figure 3. Percentage of Texas Secondary School Students Who Had Ever Used Substances, Border vs. Non-Border Area: 2006

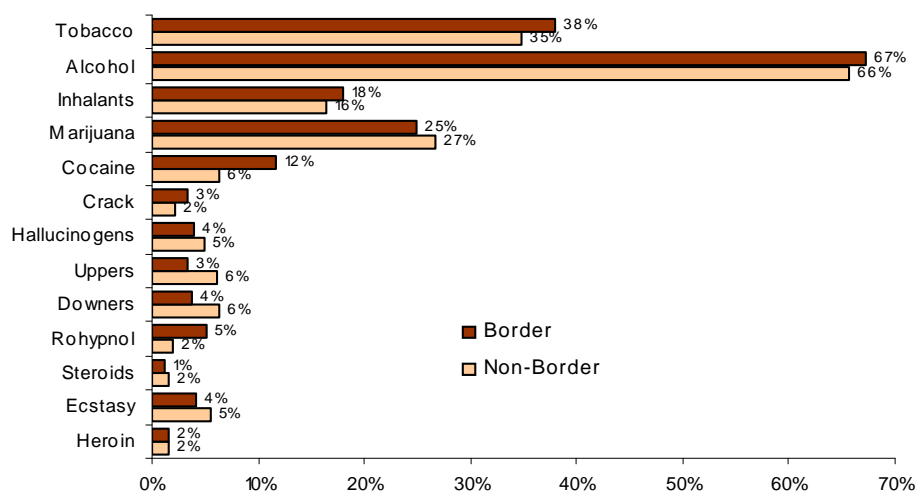
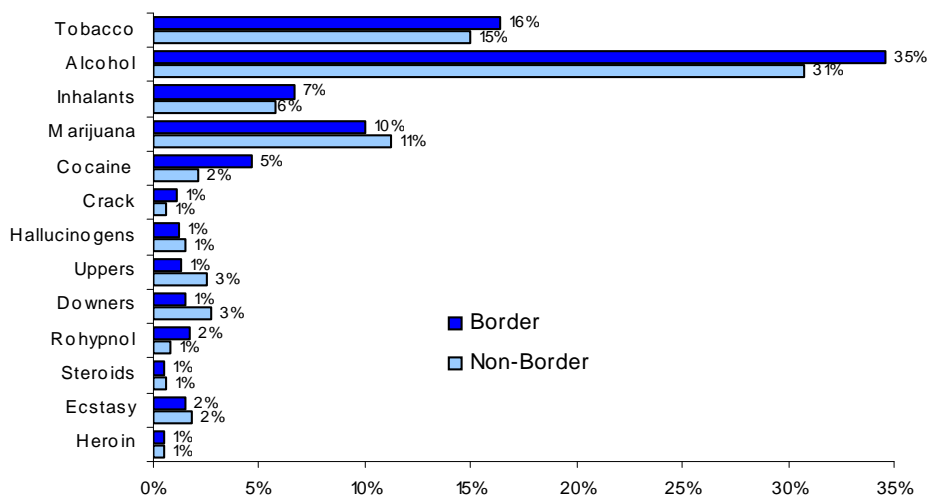


Figure 4. Percentage of Texas Secondary School Students Who Had Used Substances in the Past Month, Border vs. Non-Border Area: 2006



poor grades are a cause or a consequence of substance use.

- In terms of regional differences, students from the border schools reported higher lifetime and past-month use of tobacco, alcohol, cocaine, crack, and Rohypnol than students living elsewhere in the state (Figure 3 and Figure 4). The differences in use between border and non-border students were greater in the upper grades.

Protective and Risk Factors Related to Substance Use

Age at First Use of Substances

- Adolescents start using licit substances earlier than they begin using illicit drugs. This observation is consistent with the views of substance use progression, which maintain that alcohol, tobacco, and inhalants are “gateway drugs” into the continuum of substance use.

- Fifty-three percent of Texas students in grades 7-12 reported initiating alcohol use before 13 years of age, 45% reported first using tobacco before 13 years of age, and 28% reported first use of marijuana before 13 years of age.

Peers' Substance Use and Behaviors

- While 26% of the students in 2006 reported ever having used marijuana, they estimated that 48% of their close friends had ever used marijuana. This overestimation may be a factor in increased drug use because students may be more likely to use a drug if they believe (incorrectly or not) that most other students use drugs.
- Substance users were more likely than non-users to say that all or more of their friends carried weapons, belonged to a gang, or wished to drop out of school.
- Seniors (15%) were more likely than seventh graders (2%) to say that

illicit drugs were always used at parties they attended.

Perceived Danger of Substance Use

- Youths who believed substances were dangerous to use were less likely to use them. The perceived danger of substance use varies among grade levels, which reflects the expanding variety of drugs to which older students have been exposed.
- Only 3% of adolescents who thought marijuana was very dangerous to use had actually used it in the past month, whereas 51% of those who believed marijuana was not dangerous at all had used it.

Perceived Availability of Substances

- Older students said that it was easier to get substances than did younger students. Parties were still the major source of alcoholic beverages for youths, with friends as the second most common source.
- The easier it is to obtain a substance, the higher the rate of use by students. Forty-four percent of students who said that alcohol was very easy to obtain actually drank alcohol in the past month before the survey, compared to only 7% of those who said alcohol was impossible to get actually drank in the previous month.

Perceived Parental Attitudes

- Youths who said that their parents disapproved of teens their age using substances were less likely to use these substances.

- In the 2006 survey, only 17% of secondary students whose parents strongly or mildly disapproved of their drinking beer actually drank in the past month, compared to 53% of those whose parents strongly or mildly approved.
- As students get older, their parents are less likely to disapprove of the students' drinking alcohol or smoking cigarettes, although parental attitudes toward marijuana use do not change much as the students age.

Perceived Safety of the Environment

- Substance users felt less secure in their homes, neighborhoods, and schools than did those who did not use substances.

Extracurricular Activities

- Participation in extracurricular activities could be a protective factor. Students who participated in such activities reported lower use of substances than did those who did not participate, although the levels of use varied among the different activity groups.
- The 19% of secondary school students who participated in school band/orchestra reported the lowest lifetime and past-month use of most substances.
- Younger students, girls, Anglo students, and non-border students were more likely to participate in multiple extracurricular activities.

Alcohol- and Drug-Related Problems

- About 21% of seniors admitted they had driven a car after having had “a good bit to drink” at least once in the past year, and 16% drove while they were high on drugs.
- Students who missed class or had conduct problems in school were more likely to have used alcohol or drugs. Marijuana users reported having school conduct problems on an average of 5.1 days in the school year as compared to 1.5 days for non-users.
- During the past school year, 9% of secondary school students went to school drunk, and 10 percent went to school high on marijuana on at least one occasion.
- More students in the upper grades said they had trouble with the law because of alcohol consumption.

Sources of Information and Assistance for Problems

- The percentage of secondary school students who reported receiving substance abuse information from any school source has decreased since 1990.
- Fifty-six percent of secondary school students also reported receiving information on drugs or alcohol from TV, radio, or other audio/video.
- The most often-reported sources of help-seeking intentions were friends for all grades, except the seventh graders who said they would most likely to go to their parents for help.

- About 7% of secondary school students in 2006 said they had sought help, other than from family or friends, since school began for problems related to their substance use.

Comparisons to the National Survey

- Table 2 shows that in 2006, Texas students were more likely to report lifetime use of cigarettes, alcohol, cocaine/crack, and Ecstasy than their peers nationally (2006 Monitoring the Future study).¹ These patterns held for past-month use between the national and state surveys, except for the use of cigarettes among eighth graders.
- While Texas eighth and tenth graders reported higher lifetime use of marijuana than their counterparts nationally, Texas seniors were less likely to have ever used marijuana than the national sample.
- National prevalence levels were higher for smokeless tobacco among eighth and tenth graders, and for steroids among seniors.

*Prepared by Liang Y. Liu, PhD,
Community Mental Health and
Substance Abuse Program Services,
Texas Department of State Health
Services*

¹Johnston LD, O'Malley PM, et al. December 21, 2006. Teen drug use continues down in 2006, particularly among older teens; but use of prescription-type drugs remains high. University of Michigan News and Information Services: Ann Arbor, Michigan. <http://www.monitoringthefuture.org/data/06data.html#2006data-drugs>

**Table 2. Lifetime and Past-Month Use of Selected Substances
Among 8th, 10th, and 12th Graders Nationwide and in Texas: 2006**

	Lifetime Use		Past-Month Use	
	USA	Texas	USA	Texas
Cigarettes				
Grade 8	24.6%	25.8%	8.7%	8.3%
Grade 10	36.1%	38.4%	14.5%	16.2%
Grade 12	47.1%	48.2%	21.6%	24.7%
Smokeless Tobacco				
Grade 8	10.2%	7.0%	3.7%	2.3%
Grade 10	15.0%	11.5%	5.7%	4.4%
Grade 12	15.2%	15.5%	6.1%	6.7%
Alcohol				
Grade 8	40.5%	59.7%	17.2%	22.9%
Grade 10	61.5%	72.7%	33.8%	36.8%
Grade 12	72.7%	77.9%	45.3%	46.3%
Marijuana				
Grade 8	15.7%	17.0%	6.5%	6.9%
Grade 10	31.8%	32.3%	14.2%	13.4%
Grade 12	42.3%	41.6%	18.3%	17.3%
Cocaine/Crack				
Grade 8	3.4%	4.9%	1.0%	1.7%
Grade 10	4.8%	9.4%	1.5%	3.4%
Grade 12	8.5%	12.9%	2.5%	4.5%
Ecstasy				
Grade 8	2.5%	3.0%	0.7%	1.0%
Grade 10	4.5%	6.8%	1.2%	2.4%
Grade 12	6.5%	8.9%	1.3%	2.9%
Steroids				
Grade 8	1.6%	1.5%	0.5%	0.5%
Grade 10	1.8%	1.7%	0.6%	0.7%
Grade 12	2.7%	1.8%	1.1%	0.8%

Note: The Monitoring the Future survey gathered information from eighth, tenth, and twelfth graders in a regional nationwide sample annually.

Substance Use and Related Behaviors Among College Students in Texas

Abstract

Alcohol and drug use among college students is a serious problem. Campus environments are often seen as comforting not only use but abuse. Binge drinking is one form of substance abuse that is quite common among college students. Students who binge drink are more likely than non-binge drinkers to experience negative consequences due to their alcohol use, and they are more likely to engage in other risk behaviors besides binge drinking. Many students also suffer impairment as a result of others' abuse of alcohol.

This report presents main findings of the 2005 Texas College Survey of Substance Use. In the spring of 2005, the Texas Department of State Health Services, in conjunction with the Public Policy Research Institute at Texas A&M University, conducted a statewide survey of substance use and related behaviors among undergraduate students 18 to 26 years of age. Some 4,634 students from 40 randomly selected public and private universities, colleges, and community colleges participated in the study. Fifty-eight percent of underage college students reported drinking an alcoholic beverage within the past month prior to the survey and 27% reported bingeing on alcohol.

Methodology

A multi-stage cluster design was utilized in the 2005 college survey. Campuses were assigned to one of 6 strata based on the size of student enrollment and type of institution. The sampling frame included full-time undergraduate students 18 to 26 years of age at all public and private universities, colleges, and community colleges across the state. With the addition of community colleges and small institutions, sampling bias toward large four-year institutions was significantly reduced.

Survey data was collected through telephone interviews and online survey forms. A total of 761 telephone interviews and 3,873 online questionnaires were completed from the 40 participating campuses. Of those campuses, 17 were public and private community colleges and 23 were public and private 4-year institutions. In order to control access to the online survey, each sampled student was assigned a unique alphabetic password. A password and its resultant survey record were active for two days, so that a respondent could leave the survey

and return within 2 days to complete the record. Respondents surveyed by telephone were not offered passwords, nor given the option to return to the survey online. Validation rules were also used to prevent errors related to skip patterns within the survey.

The college survey instrument was developed to measure alcohol and drug usage and attitudes as well as other addictive behaviors. Much of the focus was on alcohol use and abuse. Questions related to student life (housing, academic major, grade point average, and student activities), knowledge of the school's alcohol policies and programs, gambling and sexual behaviors, and basic demographic information were also included.

To ensure the sample data accurately represented the population of the selected schools, weights were calculated to adjust the data analysis for the sample design and for differences in mode of data collection. All the survey findings in this report are weighted. Table 1 is a description of the student sample.

Table 1. Demographic Description of Sample: Texas College Students, 2005

	N	Weighted %		N	Weighted %
Total Sample	4,634				
Gender			Class Standing		
Male	1,722	42.7%	Freshman	1,068	28.9%
Female	2,908	57.3%	Sophomore	1,169	33.1%
Race/Ethnicity			Junior	1,129	20.1%
Anglo	3,143	60.5%	Senior	1,248	18.0%
Hispanic	939	25.7%	Grade Point Average (GPA)		
African American	228	8.8%	A+ to A-	1,558	34.3%
Asian, Pacific Islander	223	4.6%	B+ to B-	2,006	48.9%
Native American	20	0.3%	C+ to C	701	14.1%
Other	4	0.1%	C- to F	135	2.7%
Age			Fraternity/Sorority Member		
Age 18 to 20	2,310	50.4%	Non-Member	4,034	88.6%
Age 21 to 26	2,324	49.6%	Member	590	11.4%

Prevalence of Licit Substance Use

Tobacco

- More than half (52%) of all college students in Texas reported having used some type of tobacco product (cigarettes, cigars, or smokeless tobacco) during their lifetime; 28% reported tobacco use in the past month.
- College students were much more likely to smoke cigarettes or cigars than use smokeless tobacco. Twenty-six percent have smoked cigarettes or cigars in the past month and 6% have used smokeless tobacco in the past month.

Inhalants

- About 5% of college students reported ever having used inhalants (nitrous oxide, poppers, Freon, etc.) in their lifetime. Only 0.3% had used inhalants in the past month.
- Males (6%) were more likely than females (3%) to report lifetime inhalant use. Anglos and Hispanics were much more likely to use

inhalants than other ethnic or racial groups.

Alcohol

- Alcohol is the most commonly used substance among college students. Eighty-four percent of students have drunk an alcoholic beverage at least once during their lifetime, 78% have drunk alcohol in the past year, and 66% have drunk alcohol in the past month.
- Almost 30% of college students reported binge drinking, which is defined as consuming 5 or more drinks in a row for men and 4 or more drinks in a row for women on at least 2 occasions within the past month.
- Sixteen percent of college students reported getting drunk often and 9% had abused alcohol. Getting drunk often refers to becoming drunk on 3 or more occasions within the past month. Alcohol abuse is defined as having suffered 6 or more negative experiences as a result of drinking since the beginning of the school year.

Factors Related to Alcohol Use and Binge Drinking

Demographic Factors

- Although the legal drinking age in Texas is 21, about 58% of college students 18 to 20 years of age reported drinking an alcoholic beverage within the past month (Appendix 1).
- Women were almost as likely as men to have ever used alcohol, but they were less likely than men to currently drink, binge drink, and abuse alcohol.
- Thirty-five percent of Anglos and 25% of Hispanics reported binge drinking in the past month. African American students had the lowest rate of binge drinking rate at 9%.
- Students in 4-year institutions were more likely than those in 2-year colleges to report past-month use of alcohol, binge drinking, and abusing alcohol.
- Prevalence use of alcohol increased linearly by class standing and peaked at the senior year. However, junior students reported the highest rate of binge drinking (38%) and abusing alcohol (11%).

Lifestyle Factors

- Binge drinking and abusing alcohol were positively associated with a student's attending parties or clubs daily/weekly, skipping a class or lab daily/weekly, and having a majority of friends who are heavy or problem drinkers.
- Members of fraternities or sororities were more likely than non-members to currently drink (72% versus 65%), binge drink (42% versus 28%), get drunk often (26% versus 15%), and abuse alcohol (14% versus 8%).

- Students who lived with a spouse/partner or parent/relative and students who regularly attended religious services were less likely to binge drink, get drunk often, or abuse alcohol than other students.
- Overall, athletes were more likely than non-athletes to binge drink (40% versus 29%) or abuse alcohol (16% versus 9%).

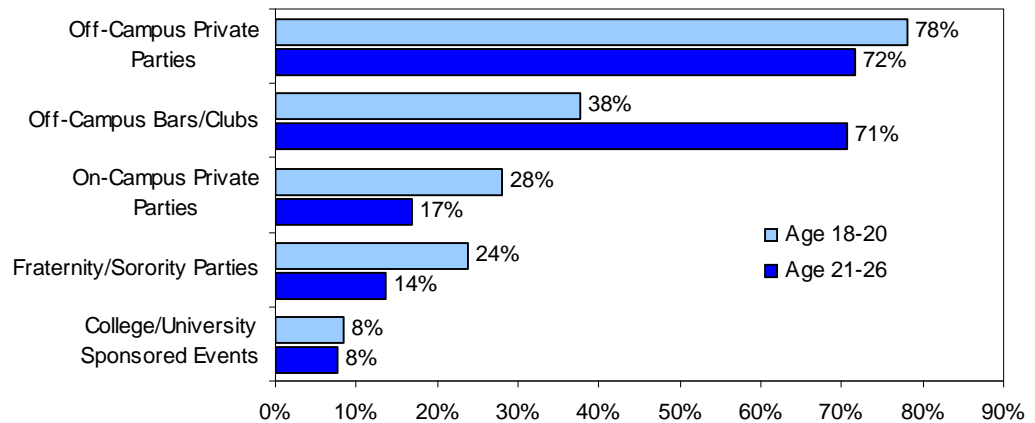
High School Drinking Behavior

- Many students had already established a pattern of drinking before coming to college. Sixty-seven percent of all college students have drunk alcohol before reaching 18 years of age.
- College students who reported drinking at least several times a month in high school were more likely than those who drank less frequently in high school to binge drink in college.
- Students who binge drank during their last year in high school were 3 times more likely (59%) than students who did not binge drink during their last year (18%) to be binge drinkers in college.

Availability of Alcohol

- Among underage past-year drinkers, 81% obtained alcohol from someone 21 years of age or older, 38% from someone under 21 years of age, 38% from parents or other relatives, 27% from someone else who made it, and 23% bought it without getting carded.
- About 8% of underage past-year drinkers said they obtained alcohol by using a fake identification at a bar or store. Men (11%) were 2 times more likely than women (5%) to do so.

Figure 1. Percentage of Current Drinkers in College Who Attended Various Places to Obtain Alcohol, by Age: Texas, 2005



- More than one fourth of college students said they usually could get alcohol without being carded from a local restaurant, a local bar or club off campus, or a local gas station.
- Most of the current alcohol users had drinks at off-campus private parties and off-campus bars (Figure 1).

Perceptions of Peer Alcohol Use

- Most students disagreed with the notion that drinking is an important part of the college experience either for themselves or their peers. Eighty percent of college students opposed the statement, “You can’t make it socially without drinking” or “It’s important to show how much you can drink.”
- Students on college campuses tended to overestimate the levels of alcohol consumption and the percentage of heavy or problem drinkers among their peers and school student body.
- The average of students’ estimates of past-month alcohol use among all campus students was about 71%, compared to their own reported rate of past-month drinking at 66%.

Students also estimated that on average 13% of their close friends at school were heavy or problem drinkers, compared to the actual rate of reported behavior at 4%.

Perceptions of Parental Attitudes and Their Use of Alcohol

- Some 32% of college students believed that their family did not approve of drinking alcohol, 46% said their family accepted light drinking, but disapproved of heavy drinking, and only 3% said their family accepted heavy drinking.
- Students who said their family disapproved of drinking were much less likely to currently drink, binge drink, and abuse alcohol than those who said their family accepted alcohol use.
- Students’ drinking problems are related to their father’s and/or mother’s use of alcohol. Female binge drinkers (21%) were 2 times more likely than male binge drinkers (11%) to have been brought up by their alcoholic fathers and/or mothers.

Prevalence of Illicit Substance Use

Marijuana

- Marijuana was the most popular used illicit drug and the third most prevalent substance that college students reported using, after alcohol and tobacco. About 37% of college students have used marijuana during their lifetime and 11% have used it in the past month.
- Males (15%) were twice as likely as females (7%) to smoke marijuana in the past month. Anglos and Hispanics were 3 times more likely than African Americans to smoke marijuana in the past month.

Cocaine or Crack

- Nearly 9% of college students reported using cocaine or crack at least once during their lifetime, and 1.4% reported past-month use.
- Males students and members of fraternities/sororities were more likely to report prevalence use of cocaine or crack.

Stimulants

- Ten percent of all college students reported ever using stimulants (uppers, amphetamine, crystal meth, Ritalin, etc.) and only 2% have used them in the past month.
- Anglo students (3%) were more likely than Hispanics or Asians (1%) to use stimulants in the past month. Students in 4-year institutions also reported much higher use of stimulants than their peers in 2-year colleges.

Sedatives

- Over 9% of college students have ever used sedatives (downers, red devils, yellow jackets, Valium, etc.) during their lifetime and only 2%

have used downers in the past month.

- Males and Anglos were more likely to use sedatives.

Hallucinogens or Psychedelics

- Ten percent of students reported using hallucinogens or psychedelics at least once during their lifetime and less than 1% reported use during the past month.
- Males were 2 times more likely than females to use hallucinogens or psychedelics.

Heroin or Other Opiates

- Five percent of college students reported ever using heroin or other opiates (codeine, morphine, oxycodone, Vicodin, etc.) and only 1% have used them during the past month.
- Anglo students reported the highest prevalence use of heroin or other opiates.

Club Drugs

- Nine percent of students reported using Ecstasy (methylenedioxymethamphetamine, MDMA) in their lifetime and only 1% of students have used Ecstasy in the past month.
- About 2% of students have ever used Ketamine (Special K) or GHB (gamma hydroxy butyrate, Fantasy) during their lifetime.
- Males, older students 21 to 26 years of age, and students in 2-year colleges were more likely to report lifetime use of these club drugs.

Rohypnol

- Over 1% of students reported lifetime use of Rohypnol (flunitrazepam). Males, Anglos, and

students 21 to 26 years of age were more likely to have used Rohypnol in their lifetime.

Dextromethorphan (DXM)

- Five percent of college students reported using DXM, such as Robitussin-DM, Coricidin, and Drixoral cough suppressant without a doctor's prescription at some point in their lives. Less than 1% abused these drugs in the past month.
- DXM is often used in combination with other drugs such as marijuana, Ecstasy, or alcohol, which increases the risk for dangerous physiological effects.

Factors Related to Illicit Drug Use

Perceptions of the Danger of Drug Use

- Marijuana was thought to be the least threatening illicit drug to use. Only 13% of college students thought marijuana was very dangerous to use. Fifty-seven percent and 69% believed that sedatives and stimulants were very dangerous, respectively.
- Some 72% to 75% of college students believed that hallucinogens, club drugs, and Rohypnol were very dangerous to use, and 86% to 89% thought that cocaine, crack, and heroin were very dangerous.
- Students who thought that drugs were dangerous to use were less likely to actually use those drugs. For example, only 7% of college students who believed marijuana was very dangerous to use had actually used it in the past month; whereas, 52% of those who believed marijuana was not dangerous at all had used it.

Availability of Illicit Drugs

- Among college students who have ever used illicit drugs, only 4% said they have obtained a drug from an online pharmacy, store, or seller for non-medical purposes.
- Among students who have ever taken prescription drugs to get high, 27% said they got the drugs from a doctor's prescription, 36% got them from someone with a prescription, and 21% took them from someone without a prescription.

Comparisons to College Students Nationwide

- Texas college students reported lower prevalence use of marijuana than their counterparts nationally (2005 Monitoring the Future study).¹ For example, past-month use of marijuana was 11% among college students in Texas compared to 17% in the nation.
- Findings on lifetime and past-month use of cocaine/crack or Ecstasy were remarkably similar between college students in Texas and college students nationwide.
- Past-month use of cigarettes was slightly higher among Texas college students (26%) than their counterparts in the nation (24%).

¹Johnston LD, O'Malley PM, et al. Monitoring the Future national survey results on drug use, 1975-2005. Volume II: College students and adults ages 19-45 (NIH Publication No. 06-5884). 2006. Bethesda, MD: National Institute on Drug Abuse, 302 pp. http://www.monitoringthefuture.org/pubs/monographs/vol2_2005.pdf.

Risky Behavior Associated with Substance Use

Driving While Drunk or High from Drugs

- Twenty-nine percent of Texas college students said they have driven after drinking within the past month, and 11% said they have driven after drinking 5 or more drinks. Twelve percent of all students believed they could consume 4 or more drinks in an hour and still drive safely.
- Over 8% of students admitted having driven when they were high or stoned from drugs. Twenty-three percent reported riding as a passenger with a driver while drunk or high from drugs.
- Binge drinkers were much more likely than non-binge drinkers to put themselves and others at risk as a result of drinking and driving.

Gambling Behavior

- Thirty-eight percent of college students in Texas said they have placed a bet or gambled money on various gambling activities at least once within the past year.
- Males and athletic-team members were more likely to gamble and to have gambling problems if they did gamble. Gambling and problem gambling were also significantly associated with binge drinking, alcohol abuse, and heavy or problem drinking.

Risky Sex

- About 19% of students who have been sexually active reported they were drinking the last time they had sex, and 4% said they were using

illicit drugs the last time they had sex.

- Among sexually active students who had drunk alcohol in the past year, 12% said that at least once they failed to use protection as a result of drinking alcohol.
- Members of fraternities/sororities, students with 2 or more sexual partners, binge drinkers, and heavy or problem drinkers often were more likely to fail to use protection as result of drinking alcohol.

Student Knowledge and Opinions of Campus Substance-Related Policies and Programs

- Forty-one percent of college students in Texas reported that their school prohibits all alcohol use on campus by students. About 35 % did not know what the alcohol policy was on their campus.
- Nearly 90% of all students said they would support their university if it were to offer free alcohol and drug counseling to students, if it were to make the alcohol rules more clear, or if it were to have the policy of drug testing student athletes.
- About 37% to 40% have received information about the dangers of alcohol overdose, where to get help for alcohol-related problems, or the long-term health effects of heavy drinking.
- Only 10% of all students said they have ever attended a drug and alcohol abuse prevention event provided by their college's drug and alcohol program. Half of the college students did not know if there was a drug and alcohol abuse prevention program on their campus.

Acknowledgement

The aim of the 2005 Texas College Survey of Substance Use, sponsored by Texas's Strategic Prevention Framework State Incentive Grant (SPF SIG) from the Center for Substance Abuse Prevention (CSAP), Substance Abuse and Mental Health Services Administration (SAMHSA), is to assess and characterize the levels in behaviors

and attitudes toward alcohol and drug use among college population across the state. It also allows for substance abuse prevention programs to be targeted as needed for this age group.

*Prepared by Liang Y. Liu, PhD,
Community Mental Health and
Substance Abuse Program Services,
Texas Department of State Health
Services*

Appendix 1. Prevalence and Recency of Substance Use Among College Students, by Age: Texas, 2005

	Lifetime Use		Past-Year Use		Past-Month Use	
	Age 18-20	Age 21-26	Age 18-20	Age 21-26	Age 18-20	Age 21-26
Alcohol	78.1%	90.5%	71.7%	85.3%	57.6%	73.7%
Tobacco	44.2%	59.4%	33.9%	42.6%	23.9%	32.4%
Cigarettes	43.4%	58.1%	32.7%	40.9%	22.4%	30.5%
Smokeless Tobacco	13.6%	18.2%	8.8%	9.1%	5.5%	6.2%
Inhalants	3.1%	6.0%	1.1%	0.6%	0.3%	0.2%
Any Illicit Drug	32.3%	45.1%	23.0%	24.8%	11.9%	13.5%
Marijuana	30.3%	42.8%	20.2%	21.3%	10.4%	11.0%
Cocaine/Crack	5.8%	11.3%	3.5%	4.0%	1.3%	1.6%
Stimulants	8.4%	12.4%	5.4%	5.1%	2.4%	2.0%
Sedatives	6.5%	12.5%	3.7%	6.0%	2.0%	2.2%
Hallucinogens	6.2%	14.3%	3.5%	3.5%	0.6%	0.6%
Heroin/Other Opiates	3.4%	6.6%	1.9%	2.9%	0.8%	1.0%
Rohypnol	0.2%	2.6%	0.1%	0.1%	0.0%	0.0%
DXM (e.g. Coricidin)	4.1%	5.2%	2.1%	2.3%	0.6%	0.7%
Ketamine	0.9%	2.7%	0.0%	0.1%	0.0%	0.0%
GHB	1.1%	2.2%	0.7%	0.1%	0.0%	0.0%
MDMA (e.g. Ecstasy)	5.9%	12.1%	3.5%	3.0%	0.8%	0.9%

Methamphetamine: A Constantly Changing Epidemic

The methamphetamine epidemic is characterized by type, location, risk to users, and reasons for use. In terms of categorizing methamphetamine use by type, one problem is that there is no common definition of the substance and its different forms. Some datasets use separate “methamphetamine” and “amphetamine” categories, while others collect data on “stimulants” or “amphetamine-type substances,” which can include ecstasy as well as amphetamines. “Speed” is often a powder of relatively low purity and sold in grams or ounces and can be inhaled or injected. “Pills” can be pharmaceutical grade stimulants, such as Adderall®, Ritalin®, or phentermine; or, the pills can be methamphetamine powder that has been pressed into tablets and sold as amphetamine, ecstasy, or “Yaba.” Pills can be taken orally, crushed for inhalation or dissolved in water for injection. According to the Drug Enforcement Administration (DEA), the price of a gram of powder methamphetamine in the United States has declined from \$20-\$400 in 2002 to \$20-\$300 in 2005.¹

There is also a damp, sticky powder known as “Base,” “Wax,” “Point,” or “Peanut Butter.” It is difficult to dissolve for injection without heat, but it can be of higher purity than Speed² and can be wrapped in bread and swallowed. A third form, “Ice,” also known as “Tina,” “Shard,” “Shabu,” or “Crystal,” has been “washed” in a solvent, such as denatured alcohol, to remove

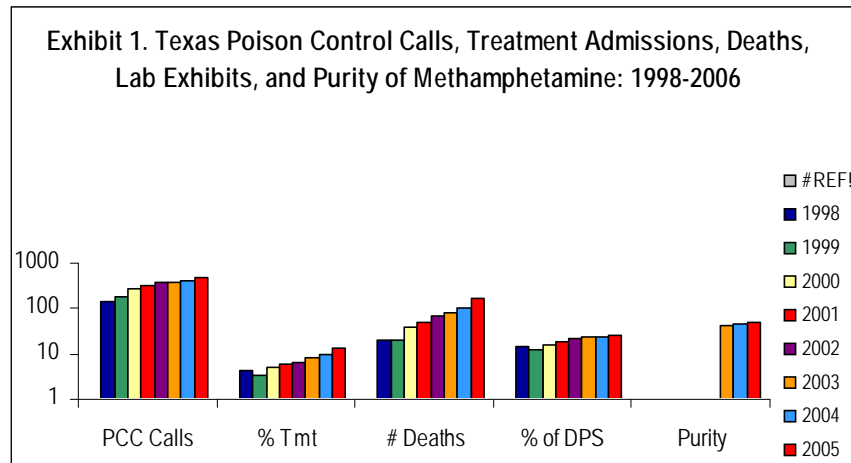
impurities and resembles glass shards or ice shavings. Ice is usually smoked in a glass pipe, but it can be “chased” on aluminum foil, mixed with marijuana and smoked through a bong, or injected. It has longer-lasting physical effects and purity levels above 80%.³ In 2005, the price of a gram of Ice in the United States has decreased from \$120-\$700 in 2002 to \$30-\$700. With the increasing presence of the purer forms of methamphetamine, DEA reports that, between 2002 and 2005, the average purity of a gram has increased from 49% to 69% and the purity of a kilogram has increased from 43% to 80%.⁴

Route of administration appears to be related to the severity of a user’s condition, with injectors being more impaired than inhalers.⁵ Nationally, the Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Episode Data Set (TEDS) reports that smoking methamphetamine (Ice) has increased from 12% to 59% for all methamphetamine treatment admissions between 1992 and 2004. In the same time period, the proportion of methamphetamine admissions for Whites has decreased from 83% to 73% and the proportion for Hispanics has doubled from 6% to 12%, while the proportion of referrals from the criminal justice system has increased from 38% to 50%.⁶

In Texas, methamphetamine and amphetamine admissions to treatment programs funded by the Department of State Health Services

increased from 5% of all admissions in 2000 to 12% in 2006 (Exhibit 1), and the average age of clients admitted for a primary problem with stimulants increased. In 1985, the average age was 26; in 2006, it was 30 (Table 1). The proportion of White clients rose from 80% in 1985 to

readmissions) as compared to amphetamine pill swallowers (43%), Ice smokers (43%), or powder inhalers (40%). Injectors had been using methamphetamine longer, with an average of 13 years from first use to treatment admission, as compared to 9 years of use for Ice smokers.



Injectors reported more visits to the hospital or emergency room in the past year and more days of problems in the month prior to admission, as measured by the Addiction Severity

Index.⁷ 86% in 2006, while the proportion of Hispanics remained at 11% and the proportion of African Americans dropped from 9% to 2%. Unlike the other drug categories, more than one half (54%) of these clients entering treatment were women. More clients now smoke “Ice” than inject “Speed.” The proportion smoking Ice also increased from less than 1% in 1988 to 53% in 2006 and the percentage of clients injecting the drug dropped from 84% in 1988 to 32% in 2006.

Users of amphetamines or methamphetamine tend to differ depending on their route of administration (Table 1). Methamphetamine injectors in Texas were more likely to have been in treatment before (62%

Index.⁷

There were 144 calls to Texas poison control centers involving exposure to methamphetamines in 1998 and 490 in 2005 (Exhibit 1). Of the 2005 calls, there were 123 mentions of “Ice” or “Crystal.”

In the Houston area, methamphetamine and amphetamine comprised 6% of all non-alcohol cases seen in the Houston emergency departments, which reported to the SAMHSA Drug Abuse Warning Network (DAWN) in 2004-2006. Patients who reported use of methamphetamine or amphetamine were more likely to be male (62%), White (61%), or Hispanic (20%). Forty-two percent were in their twenties, 26% in their

thirties, and 21% were under 20 years of age.

Statewide, there were 20 deaths where amphetamines or methamphetamines were mentioned on death certificates in 1998, as compared to 174 in 2005 (Exhibit 1). Of the decedents in 2005, 69% were male, 83% were White, 2% were African American, 14% were Hispanic, and average age was 37 years of age.

Methamphetamine and amphetamine together represented 16% of all items examined by Department of Public Safety laboratories in 2000, but the percentage increased to 25% in 2005 and dropped to 22% in 2006 (Exhibit 1).

	Smoke	Inject	Inhale	Oral	All*
# Admissions	5,301	3,255	1,012	520	10,096
% of Stimulant Admits	53	32	10	5	100
Lag-1st Use to T mt-Yrs.	9	13	10	12	11
Average Age-Yrs.	29	32	31	33	30
% Male	41	47	44	50	44
% Black	2	1	1	3	1
% White	82	92	87	81	86
% Hispanic	5	6	10	14	11
% CJ Involved	58	62	67	67	61
% Employed	6	23	36	33	28
% Homeless	9	12	6	10	10
*Total includes clients with "other" routes of administration					
Source: DSHS					

While Texas indicators of adverse effects of methamphetamine use show an increase in use, other data sources which measure behaviors in

the general household or student populations do not. The Texas secondary school survey reported that lifetime use of uppers was 6.7% in 2000 and 5.7% in 2006 and past-month use was 2.7% in 2000 and 2.3% in 2006.⁸ The 2005 Texas Survey of Substance Use among College Students found 10.4% of students reported lifetime use of stimulants, and 5.3% reported past-year use.⁹ The National Household Survey of Drug Use and Health reported that nationally, the percentage of lifetime users of methamphetamine went from 5.3% in 2002 to 4.3% in 2005, while past-month users dropped from 0.3% to 0.2% in the same time period.¹⁰

In terms of the location of methamphetamine use, the epidemic is also characterized by extreme spatial variations.¹¹ The United Nations Office on Drugs and Crime in 2006 estimated that 35 million people use amphetamine-type substances (ATS), as compared to 16 million who use opiates and 13 million who use cocaine. Sixty percent of the ATS users (mostly methamphetamine users) live in Asia,¹² and methamphetamine manufactured in this region influences the drug markets in Australia and the United States. The United States epidemic began in Hawaii and the western states and is

still a larger problem there. In California, the rate per 100,000 of treatment admissions went from 96 in 1994 to 204 in 2004, while in Wyoming, it went from 26 to 205 in the same time period. Use is up in the southern states, with the rate per 100,000 in Georgia going from 3 in 1994 to 40 in 2004. Admissions are increasing in the eastern states, with the rate per 100,000 in Maine increasing from 2 in 1994 to 5 in 2004.¹³

Types of methamphetamine and patterns of use differed by rural/urban status: the percentage of users admitted nationally who smoked the drug was highest in the most urbanized areas (62%) and lowest in the most rural areas (48%). In contrast, the percentage of users admitted who injected the drugs was lowest in large metropolitan areas (14% to 15%) and highest in small and non-metropolitan areas (24% to 25%), which reflects the presence of Ice in the metropolitan areas and powder in the smaller and non-metropolitan areas.¹⁴

Location

Location is also a factor because production of powder methamphetamine in small local laboratories has decreased due to the recent state and federal regulations limiting access to large quantities of over-the-counter pseudoephedrine products.¹⁵ Currently, locally-produced methamphetamine is being replaced with large quantities of higher-purity methamphetamine powder and crystalline “Ice” from Mexico.¹⁶

In 2006, the Houston DEA Field Division reported that the availability of both types of Mexican methamphetamine was increasing. Most of the methamphetamine came from Mexico, and Ice was being shipped via parcel service from California. The Dallas DEA Field Division reported that the availability of methamphetamine, especially Ice, was steady or rising at the retail level. The El Paso DEA Field Division reported methamphetamine traffickers were operating out of California, Arizona, and Texas, with sources of supply being Mexico and California.

Risk to users

Many methamphetamine users are at high risk of sexually transmitted and blood-borne diseases, but the literature on sexual risk behavior of heterosexual methamphetamine users is still emerging. Molitor, et al.¹⁷ found that non-injecting methamphetamine users engaged in multiple sexual risk behaviors. A study of 139 HIV-negative heterosexuals who had become dependent on methamphetamine found that they used the drug to get high, to get more energy, and to party. They reused syringes, shared needles, drank alcohol daily, used other drugs, had unprotected sex, had multiple sex partners (average of 9.4 in the past 2 months), and engaged in marathon sex.¹⁸

Patterns of high-risk use by men who have sex with men are better described. Use of methamphetamine, particularly Ice, has increased at circuit and dance

parties.¹⁹ Ice became popular among gay men on the West Coast and moved east at the end of the 1990s²⁰ and has now become embedded in many urban gay communities. It appears to be especially sexually arousing and disinhibitory²¹ and is strongly associated with sexual behaviors that put men at risk for HIV infection.²² A study of 194 HIV-positive men who had sex with men found that methamphetamine injectors not only had more years of use and were heavier users, but they scored significantly higher on measures of impulsivity and experiences of rejection and lower on measures of emotional support.²³ Methamphetamine and sex are not only integrally connected, but participants report that sex while on methamphetamine is “compulsive” and “obsessive,” and causes loss of control over sexual expression.²⁴ In addition, methamphetamine is sometimes used in combination with a wide variety of other drugs including alcohol, cocaine, ecstasy, ketamine, and gamma hydroxybutyrate (GHB), which increases the risk of overdose and other adverse events.²⁵

Medical complications for methamphetamine abuse in HIV-infected patients include hypertension, hyperthermia, rhabdomyolysis, and stroke. Psychiatric problems in methamphetamine abusers with HIV infection include acute psychotic reactions and long-term depression.

QuickLinks

Substance Abuse and Mental Health Services Administration

National Survey on Drug Use and Health

Office of National Control Drug Policy

Reasons

Except for studies about those who use methamphetamine in the context of risky sexual behavior, the literature is still developing about users and their reasons for use. Small “mom and pop” laboratories have proliferated in rural areas²⁶ that produce what is called “red neck cocaine.” Women are more likely to start using methamphetamine to lose weight.²⁷ There is also evidence that some individuals may use methamphetamine to be able to work longer hours. This is especially the case for long-distance truck drivers.²⁸ Use by workers is also found in a June 19, 2006, report from Quest Diagnostics, which provides workplace drug testing. The company reported that among general United States workforce employees, the incidence of positive drug tests attributed to amphetamines rose from 0.34% in 2002 to 0.48% in 2005 and dropped to 0.43% in the first half of 2006.²⁹ Use of methamphetamine on the job remains an area of concern which needs to be examined.

Methamphetamine use appears to be an emerging problem among Hispanic users. The doubling of Hispanic treatment admissions nationally may reflect “spillage” from trafficking³⁰ as well as use by migrant and day laborers working multiple jobs and long hours. Increasing methamphetamine treatment admissions in states on both sides of the United States-Mexico border are also indicators of this trend.³¹ Further

research into trends in methamphetamine use on the border is needed.

In conclusion, the methamphetamine epidemic is unlike any other drug epidemic in that the forms of the drug vary, the patterns of use in different areas of the country vary, and the sources of the drug and the marketing patterns are changing from locally-produced powder to the more potent imported Ice. Health professionals need to be aware of these evolving changes as services are being designed and delivered.

References

- 1 Drug Enforcement Administration. Working Paper: Cocaine and Methamphetamine Price and Purity: 2002 to 2005. 2006. DEA: Arlington, VA.
- 2 Churchill A, Topp L. Methamphetamine Forms. Drug Trends Bulletin. Undated. Retrieved July 19, 2003 from <http://ndarc.med.unsw.edu.au/ndarc.nsf/website/DRS.bulletins>.
- 3 National Drug Intelligence Center. National Drug Threat Assessment. 2004 Jonestown, PA.
- 4 Drug Enforcement Administration. Working Paper: Cocaine and Methamphetamine Price and Purity: 2002 to 2005. 2006. Unpublished.
- 5 Maxwell, JC. Profiles of methamphetamine users as seen in various data sets. Illinois Law Enforcement Executive Forum 2003; 3:77–88.
- 6 Substance Abuse and Mental Health Services Administration (2006a). Treatment Episode Data Set (TEDS): 1994-2004. National Admissions to Substance Abuse Treatment Services 2006; DASIS Series: S-33, DHHS Publication No. (SMA) 06-4180, Rockville, MD.
- 7 McLellan A, Luborsky L, Woody G, O'Brien C. An improved evaluation instrument for substance abuse patients: the addiction severity index. *Journal of Nervous and Mental Disease* 1980; 168:26–33.
- 8 Liu, LY, Maxwell JC. 2000 Texas School Survey of Substance Use Among Students: Grades 7-12. Austin, TX: Texas Commission on Alcohol and Drug Abuse, 2001; Liu, L. The 2006 Texas Secondary School Survey. Austin, TX: Department of State Health Services, 2007.
- 9 Liu, L. 2005 Texas Survey of Substance Use among College Students, Austin, TX. 2006. Department of State Health Services.
- 10 Substance Abuse and Mental Health Services Administration. Results from the 2005 National Survey on Drug Use and Health: National Findings. 2006. Office of Applied Studies, NSDUH Series H-30, DHHS Publication No. SMA 06-4194. Rockville, MD.
- 11 Caulkins JP. Methamphetamine epidemics: An empirical overview. *Law Enforcement Executive Forum* 2003; 3(4):17-42.
- 12 United Nations Office on Drugs and Crime. Annual Report, 2006. Vienna.
- 12 United Nations Office on Drugs and Crime. Annual Report, 2006. Vienna.
- 13 Substance Abuse and Mental Health Services Administration, Office of Applied Studies. Treatment Episode Data Set (TEDS): 1994-2004. National Admissions to Substance Abuse Treatment Services, DASIS Series: S-33, DHHS Publication No. (SMA) 06-4180, Rockville, MD, 2006.
- 14 Substance Abuse and Mental Health Administration. Methamphetamine/Amphetamine Treatment Admissions in Urban and Rural Areas: 2004. The DASIS Report, 27, 2006.
- 15 See The Combat Methamphetamine Epidemic Act of 2005, Title VII of Public Law 109-177, for the federal legislation, and for the status of legislation in each state, See The Office of National Drug Control Policy, Pushing Back Against Meth: A Progress Report on the Fight Against Methamphetamine in the United States, published November 30, 2006. Available online at: http://www.whitehousedrugpolicy.gov/publications/pdf/pushingback_against_meth.pdf
- 16 National Drug Intelligence Center, National Methamphetamine Threat Assessment 2007. Jonestown, PA., 2006. Available online at: <http://www.usdoj.gov/ndic/pubs21/21821/index.htm>
- 17 Molitor F, Truax S, et al. Association of methamphetamine use during sex with risky sexual behaviors and HIV infection among non-injection drug users. *Western Journal of Medicine* 1998;168, 93–97.
- 18 Semple SJ, Patterson TL, Grant I. The context of sexual risk behavior among heterosexual methamphetamine users. *Addictive Behaviors* 2004; 29: 807–810.
- 19 Kurtz SP, Inciardi JA. Crystal meth, gay men, and circuit parties. *Law Enforcement Executive Forum* 2003;3(4),97–114.
- 20 Reback CJ, Ditman D. The social construction of a gay dance: Methamphetamine use among gay and bisexual males in Los Angeles (Executive Summary). 1997. Los Angeles, CA: Office of the AIDS Coordinator.

- ²¹ Ireland P, Paul JP, et al. Sexual risk for HIV transmission among gay/bisexual men in substance-abuse treatment. *AIDS Education and Prevention* 1993;5(1):11–24; Semple, SJ, Patterson, TL, Grant I. Motivations associated with methamphetamine use among HIV+ men who have sex with men. *Journal of Substance Abuse Treatment* 2002; 22(3):149–156; Zule WA, Desmond DP. An ethnographic comparison of HIV risk behaviors among heroin and methamphetamine injectors. *American Journal of Drug and Alcohol Abuse* 1999;25(1):1–23.
- ²² Kurtz, SP, Inciardi, JA. Crystal meth, gay men, and circuit parties. *Law Enforcement Executive Forum* 2003; 3(4), 97-114.
- ²³ Semple, SJ, Patterson, TL, Grant I. A comparison of injection and non-injection methamphetamine-using HIV positive men who have sex with men. *Drug and Alcohol Dependence* 2004;76:203–212.
- ²⁴ Reback C, Larkins S, Shoptaw S. Changes in the meaning of sexual risk behaviors among gay and bisexual male methamphetamine abusers before and after drug treatment. *AIDS Behavior* 2004; 8(1): 87–98.
- ²⁵ Ross M, Mattison A, Franklin D. Club drugs and sex on drugs are associated with different motivations for gay circuit party attendance in men. *Substance Use and Misuse*. 2003; 38(8): 1173-1183.
- ²⁶ Booth BM, Leukefeld C, Falck R, et al. Correlates of rural methamphetamine and cocaine users: results from a multistate community study. *Journal of Studies on Alcohol* 2006;67(4):493–501; Draus PJ, Siegal H, Carlson, R, et al. Cracking the cornfields: Recruiting illicit stimulant drug users in rural Ohio. *Sociological Quarterly* 2005;46:165-189; Falck RS, Siegal HA, et al. Nonmedical drug use among stimulant-using adults in small towns in rural Ohio. *Journal of Substance Abuse Treatment* 2005;28:341–349; Stoops W, Tindall M, Mateyoke-Scrivner A, Leukefeld C. [Methamphetamine use in nonurban and urban drug court clients](#). *International Journal of Offender Therapy and Comparative Criminology* 2005;49:260-76.
- ²⁷ Von Mayrhauser C, Brecht M, Anglin M. Use ecology and drug use motivations of methamphetamine users admitted to substance abuse treatment facilities in Los Angeles: An emerging profile. *Journal of Addictive Diseases* 2002;21(1): 45-60.
- ²⁸ Grunstein, R. Medical and physiological factors. Paper presented at the National Roads and Motorists Association Conference: Driver fatigue: issues, causes and countermeasures. 2001.Sydney, Australia: National Drug and Alcohol Research Centre, University of New South Wales; Hartley LR, Arnold PK. Management of fatigue in the road transport industry. Recommendations from the Second International Conference on Fatigue in Transport. 1996. Fremantle, W.A.; Hartley LR, Penna F, et al. Comprehensive review of fatigue research. 1997. Institute for Research in Safety and Transport (Report Number 226), ISBN:0–86905–539–0; Hartley LR, Arnold PK, et al. Fatigue in the Western Australian transport industry Part 1: The principle and comparative findings. 1997. Institute for Research in Safety and Transport (Report Number 117), ISBN 086905-534-8. Fremantle: Western Australian Department of Transport; Mabbott NA, Hartley LR. Patterns of stimulant drug use on Western Australian heavy transport routes. 1999.Transportation Research Part F2, 115-130; McCartt AT, Rohrbaugh, JW, et al. Factors associated with falling asleep at the wheel among long-distance truck drivers. *Accident Analysis and Prevention* 2000, 32, 493-504; Williamson A, Feyer A, et al. Demonstration project for fatigue management in the road transport industry: Summary of findings. 2000. Consultant Report CR192, Australian Transport Safety Bureau, Canberra, ACT.
- ²⁹ Quest Diagnostics. Amphetamines Use Declined Significantly Among U.S. Workers in 2005, According to Quest Diagnostics' Drug Testing Ind. 2006. Accessed January 4, 2007 at http://www.questdiagnostics.com/employersolutions/dti/2006_06/dti_index.html
- ³⁰ Maxwell JC. Profiles of methamphetamine users as seen in various data sets. *Illinois Law Enforcement Executive Forum* 2003;3,77–88.
- ³¹ Maxwell JC, Cravioto P, et al. Drug use and risk of HIV/AIDS on the Mexico-U.S. Border: A comparison of treatment admissions in both countries. *Drug and Alcohol Dependence* 2006;82 (Suppl. 1):S85-S93.

*Prepared by Jane C. Maxwell, PhD,
Addiction Research Institute, Center for
Social Work Research, The University
of Texas at Austin.*

Latest Research on the Effects of Methamphetamine

Effects on Users

In the short term, methamphetamine causes increases in heart rate, blood pressure, temperature, and rate of breathing as well as constriction of blood vessels and cardiac arrhythmia.¹ Over longer periods of time, methamphetamine use is associated with health problems such as stroke, cardiac valve thickening, and decreases in lung function. Prolonged use can also cause pulmonary hypertension, changes to the brain, poor cognitive functioning, and poor mental health.²

A survey of “Ice” or “crystal meth” users in Sydney found the users reported benefits that included alertness, energy, aphrodisiac effects, sociability, euphoria, and loss of inhibitions. Although most people in the survey did not have extensive experience with Ice, they reported high rates of physical and psychological side effects, including “comedown,” paranoia, inability to sleep, addiction, and aggression. Compared with a sample of longer-term, heavier, and predominately injecting methamphetamine users, crystal meth users appeared more likely to experience significant harms after a much shorter and lower level of use.³

The 2003 Australian Party Drug Survey found that Ice users, as compared to users of powder or other forms of methamphetamine, were significantly more likely to report that they had “binged” on stimulants in the past 6 months (i.e., used the drug continuously for more than 48 hours without sleep).⁴ Similarly, Ice users reported that drug use caused social, work, and financial problems. In addition, recent Ice injectors were significantly more likely to have sought treatment for mental health problems in the last 6 months, with the

most common problems being depression and anxiety.⁵

The Methamphetamine Treatment Project (MTP) in California found that participants had high levels of psychiatric symptoms, particularly depression and attempted suicide, as well as anxiety and psychotic symptoms.⁶ The MTP reported high levels of problems controlling anger and violent behavior, with a correspondingly high frequency of assault and weapons charges.

Past and current interpersonal violence is a characteristic of the lifestyles of the majority entering treatment for methamphetamine dependence.⁷ Persons in treatment for methamphetamine reported high rates of being victims of violence (85% of women and 69% of men). For women, the most common source of violence was their partner (80%); while for men, it was a stranger (43%). These clients also had a history of being the victim of sexual abuse (57% of women and 16% of men).⁸

Mental Effects

Methamphetamine abuse adversely impacts social support and social networks and behavioral functioning.⁹ It produces a variety of effects including irritability, physical aggression, hyperawareness, hypervigilance, and psychomotor agitation.¹⁰

Chronic intoxication can produce a psychotic paranoid state with frightening delusions that may result in aggressive acts. With increased dosage and duration of administration, amphetamines can produce delirium, which is manifested by disorientation, confusion, fear, and anxiety. During high-dose use, individuals can experience stimulant-induced psychosis

characterized by delusions, paranoid thinking, and compulsive behavior. There is also substantial evidence to associate the effects of its use with violence.¹¹

Abusers of methamphetamine have deficiency in the prefrontal cortex, which affects working memory and results in poor decision-making, impulsivity, and lack of insight.¹² Deficits are also found in the anterior cingulate gyrus, which causes selective attention spans and causes individuals to appear unmotivated.¹³ In addition, changes in the temporal lobe from methamphetamine use cause episodic memory loss and depression not only while withdrawing use from the drug, but also continuingly after withdrawal.¹⁴

Methamphetamine-dependent individuals who had been abstinent for 5 to 14 days performed significantly worse than control subjects on neurocognitive measures sensitive to attention/psychomotor speed, on measures of verbal learning and memory, and on executive system measures sensitive to fluency.¹⁵ Recently abstinent methamphetamine-dependent subjects demonstrated quantitative electroencephalogram abnormalities that are consistent with a generalized encephalopathy.¹⁶ These changes in brain electrical activity are frequently associated with a range of cognitive and psychiatric abnormalities.

Preliminary evidence suggests that methamphetamine dependence may cause long-term neuronal damage and deleterious effects on cognitive processes such as memory and

Preliminary evidence suggests that methamphetamine dependence may cause long-term neuronal damage and deleterious effects on cognitive processes such as memory and attention.

attention.¹⁷ Methamphetamine abusers who remain abstinent for 9 months or longer show modest improvement in performance on some tests of motor skill and memory and they appear to recover from some of the drug's damaging effects on metabolism in the thalamus.¹⁸ Drug-related deficits appear to persist longer, however, in the striatum, which could reflect long-lasting changes in dopamine cell activity and decreases in the nucleus accumbens that could account for the persistence of amotivation and anhedonia in detoxified patients. Methamphetamine users who had been abstinent 6 months or longer had significantly greater prefrontal gray matter density than short-term abstinent

users, but less than healthy comparison subjects.

Methamphetamine also produces long-term changes in dopamine neurons in the striatum.¹⁹ Decreases were noted in several measures of cognitive function in former

methamphetamine users as compared to controls. However, the magnitude of the differences was small, which should lead to a more optimistic attitude on the part of treatment practitioners and those in recovery from methamphetamine abuse/dependence.

Using magnetic resonance imaging (MRI) and new computational brain mapping techniques, Thompson, et al. demonstrated systematic brain structural deficits with chronic methamphetamine abuse in human subjects and related these deficits to cognitive impairment.²⁰ MRI-based maps suggest that chronic methamphetamine abuse causes a selective pattern of cerebral

deterioration that contributes to impaired memory performance.

One study of methamphetamine users found those users who had schizoid/schizotypal personalities prior to use of methamphetamine were predisposed to develop psychosis.²¹ Those with psychosis were younger at first use, used larger amounts, and possessed significantly higher mean Premorbid Schizoid and Schizotypal Trait scores. In addition, the methamphetamine users maintained higher rates of depressive disorder, alcohol dependence, and antisocial personality disorders.

Effects on the Family

Methamphetamine use during pregnancy may affect the developing fetus.²² The first large-scale investigation is underway to report the prevalence of methamphetamine use during pregnancy and the outcomes associated with prenatal methamphetamine exposure.²³

Therefore, caution should be exercised in inferring the extent of harm until this National Institute on Drug Abuse-funded study on prenatal methamphetamine exposure and child development is completed.

Maternal drug use is associated with risk factors such as poverty, chaotic and dangerous lifestyles, symptoms of psychopathology, history of childhood sexual abuse, and involvement in difficult or abusive relationships with male partners.²⁴ It is also associated with being single, less educated, having attended fewer than 11 prenatal visits if pregnant, and being on public financial assistance. High-risk pregnant women should receive targeted interventions to reduce serious adverse outcomes associated with prenatal alcohol and tobacco use as well as methamphetamine use.²⁵

Children are frequently found at the scene of methamphetamine laboratories and are exposed to toxic chemicals and fumes through absorption, inhalation, or ingestion.²⁶

In such cases, the homes maintain poor sanitation, hygiene, and nutrition. Being raised in such an environment or being around methamphetamine abusers may also cause developmental delays in children.²⁷ In these instances, the child welfare system often becomes involved and child protective services and other social work agencies need protocols to address the needs of the children and their parents, and of the legal system.

Treatment

A study of clients treated in a large state treatment system between 1992 and 2002 found risk factors for non-completion and shorter treatment retention in both residential and outpatient treatments.²⁸ Some of these risk factors include having lower than a high school education, being younger at admission, having a disability, having greater severity of methamphetamine use, and injecting drugs. Clients with legal supervision at admission had higher completion rates and longer retention than those reporting no legal status. Overall, clients with greater socioeconomic disadvantage and more severe problems required more services to be retained in treatment.

Treatment for methamphetamine abuse is based on previous treatment approaches for cocaine abuse.²⁹ But, there are some aspects of methamphetamine-related disorders that are specific to the consequences of using this drug.³⁰ Given the cognitive problems seen in some methamphetamine users, law enforcement agencies and treatment providers should make specific efforts with methamphetamine users. For

example, they should see that all interested parties, including the user, understand what counts as compliance, what help is available, and the consequences for failing to comply. Physicians and other health professionals should ensure that medical advice is not only understood, but that the patient will have a method for remembering to take medications and to follow suggested medical procedures. Treatment providers need to provide concrete and specific information.

The development of treatments is particularly critical for a number of user groups, including those who experience persistent psychosis, pregnant women and women with children, gay and bisexual men, and users involved in the criminal justice system.³¹ Similarly, rural populations, Hispanics, and youths are groups of individuals particularly in need of special consideration. A randomized controlled trial of methamphetamine-dependent gay and bisexual males found that treatment that focused on both drug use and risky sexual behaviors in a gay-friendly setting produced significant reductions in methamphetamine use and sexual risk behaviors.³² Drug treatment merits consideration as a primary HIV prevention strategy for this population.³³

The Matrix Model is a comprehensive package that provides substance abuse treatment professionals with a year-long intensive outpatient model for clients and their families.³⁴ This model calls for 16 weeks of structured programming and 36 weeks of continuing care. Clients receive information, assistance in structuring a substance-free lifestyle, and support to achieve and maintain abstinence from drugs and alcohol. The program specifically focuses on clients who are dependent on

methamphetamine and cocaine as well on the families of these clients.

The Matrix Model includes follow-ups at 17, 26, and 52 weeks. The percentages of the urine samples that were methamphetamine-free at the discharge interview were 66% for Matrix and 69% for clients in treatment-as-usual (non-Matrix) programs. At the 6-month follow-up, clients in both types of programs had 69% methamphetamine-free urine samples. The evaluations continue to support the value of integrated treatment for co-occurring conditions and, especially, the importance of training counseling staff to handle psychotic symptoms when needed.³⁵

The Matrix Approach was developed by the Matrix Institute in Los Angeles and adapted by the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT). Copies of the treatment package are available free of charge from SAMHSA's National Clearinghouse for Alcohol and Drug Information (NCADI) at 800-729-6686 or electronically through www.ncadi.samhsa.gov.

Conclusion

Rigorous evaluations have shown that treatment works, but the cognitive difficulties that many users exhibit after ceasing methamphetamine use can affect treatment progress. During the early stages of treatment, these deficits must be understood and therapy adjusted for these deficits. In addition, special programs should be developed for high risk populations such as women, people who are dually addicted to methamphetamine and sex, and adolescents.

Prepared by Jane C. Maxwell, PhD, Addiction Research Institute Center for Social Work Research, the University of Texas at Austin.

References

- ¹ Maxwell JC. Emerging research on methamphetamine. *Current Opinion in Psychiatry* 2005;18:235–242.
- ² Greenwell L, Brecht M. (2003). Self-reported health status among treated methamphetamine users. *The American Journal of Drug and Alcohol Abuse*; 29(1): 75–104.
- ³ Degenhardt L, Topp L. (2003). “Crystal meth” use among polydrug users in Sydney’s dance party subculture: Characteristics, use patterns and associated harm. *International Journal of Drug Policy*; 14: 17–24.
- ⁴ Breen C, Degenhardt L, White B et al. (2004). Australian party drug trends (Monograph No. 52). Sydney, Australia: National Drug and Alcohol Research Centre, University of New South Wales.
- ⁵ Breen C, Roxburgh A, Degenhardt L. Crystalline Methamphetamine (Ice) Use in the 2003 IDRS. *Drug Trends Bulletin*. April 2004. Sydney: National Drug and Alcohol Research Centre.
- ⁶ Zweben, J, Cohen J, Christian D et al. Psychiatric symptoms in methamphetamine users. *American Journal of Addiction* 2004;13(2):181–190.
- ⁷ Cohen JB, Dickow A, et al. Abuse and violence history of men and women in treatment for methamphetamine dependence. *The American Journal on Addictions* 2003;12,377–385.
- ⁸ Id.
- ⁹ Cretzmeyer M, Sarrazinr M, et al. Treatment of amphetamine abuse: research findings and clinical directions. *Journal of Substance Abuse Treatment* 2003;24:267–277.
- ¹⁰ Maxwell JC. Implications of Research for Treatment: Methamphetamine, Gulf Coast Addiction Technology Transfer Center, 2005. Available at: <http://www.utexas.edu/research/cswr/gcattc/Methamphetamine.pdf>.
- ¹¹ Boles S, Miotto K. Substance abuse and violence: A review of the literature. *Aggression and Violent Behavior* 2003;8:155–174.
- ¹² London E, Simon S, et al. Mood disturbances and regional cerebral metabolic abnormalities in recently abstinent methamphetamine abusers. *Arch Gen Psychiatry* 2004;61:73–84.
- ¹³ Nordahl T, Salo R, Leamon M. Neuropsychological effects of chronic methamphetamine use on neurotransmitters and cognition: A review. *Journal of Neuropsychiatry and Clinical Neurosciences* 2003; 15(3):317–325.
- ¹⁴ London E, Simon S, et al. Mood disturbances and regional cerebral metabolic abnormalities in recently abstinent methamphetamine abusers. *Arch Gen Psychiatry* 2004; 61:73–84.
- ¹⁵ Kalechstein A, Newton T, Green M. Methamphetamine dependence is associated with neurocognitive impairment in the initial phases of abstinence. *Journal of Neuropsychiatry & Clinical Neurosciences* 2003;15(2): 215–220.
- ¹⁶ Newton T, Cook I, Kalechstein A et al. Quantitative EEG abnormalities in recently abstinent methamphetamine dependent individuals. *Clinical Neurophysiology* 2003;114(3): 410–415.
- ¹⁷ Nordahl T, Salo R, Leamon M. Neuropsychological effects of chronic methamphetamine use on neurotransmitters and cognition: A review. *Journal of Neuropsychiatry and Clinical Neurosciences* 2003;15(3), 317–325.
- ¹⁸ Wang G, Volkow N, et al. Partial recovery of brain metabolism in methamphetamine abusers after protracted abstinence. *American Journal of Psychiatry* 2004;161(2):242–248.
- ¹⁹ Johnson CE, Frey K, et al. Cognitive function and nigrostriatal markers in abstinent methamphetamine abusers. *Psychopharmacology* 2006;185:327–338
- ²⁰ Thompson P, Hayashi K, et al. Structural abnormalities in the brains of human subjects who use methamphetamine. *Journal of Neuroscience* 2004;24(26):6028–6036.
- ²¹ Chen C, Lin S, Sham P, et al. Pre-morbid characteristics and co-morbidity of methamphetamine users with and without psychosis. *Psychological Medicine* 2003; 33(8): 1407–1414.
- ²² Smith L, Yonekura M, et al. Effects of prenatal methamphetamine exposure on fetal growth and drug withdrawal symptoms in infants born at term. *Journal of Developmental Behavior Pediatrics* 2003;24(1): 17–23.
- ²³ Arria AM, Derauf C, et al. Methamphetamine and other substance use during pregnancy: preliminary estimates from the Infant Development, Environment, and Lifestyle study. *Maternal And Child Health Journal* 2006;10(3):293–302.
- ²⁴ Woulde T, LaGasse L, et al. Maternal methamphetamine use during pregnancy and child outcome: what do we know? *New Zealand Medical Journal* 2004;117(1206):1–10.
- ²⁵ Arria A, Derauf C, et al. Methamphetamine and other substance use during pregnancy: preliminary estimates from the infant development, environment, and lifestyle (IDEAL) study. *Maternal and Child Health Journal* 2006;10(3):293–302.

- ²⁶ Maxwell, JC. Implications of Research for Treatment: Methamphetamine, Gulf Coast Addiction Technology Transfer Center, 2005. Downloaded from <http://www.utexas.edu/research/cswr/gcattc/Methamphetamine.pdf>.
- ²⁷ Hohman M, Oliver R, Wright W. Methamphetamine abuse and manufacture: The child welfare response. *Social Work* 2004;49(3):373–381.
- ²⁸ Brecht, M-L, Greenwell, L, Anglin, MD. Methamphetamine treatment: Trends and predictors of retention and completion in a large state treatment system (1992-2002). *Journal of Substance Abuse Treatment* 2006;29:295–306.
- ²⁹ Cretzmeyer M, Sarrazinr M, Huber D, Block R, Hall J. (2003). Treatment of amphetamine abuse: research findings and clinical directions. *Journal of Substance Abuse Treatment*; 24: 267–277.
- ³⁰ Simon S, Domier C, et al. Cognitive performance of current methamphetamine and cocaine abusers. *Journal of Addictive Diseases* 2002; 21(1):61–74.
- ³¹ Rawson R, Gonzales R, Brethen P. Treatment of methamphetamine use disorders: an update. *Journal of Substance Abuse Treatment* 2003; 23: 145–150.
- ³² Shoptaw S, Reback C, et al. Behavioral treatment approaches for methamphetamine dependence and HIV-related sexual risk behaviors among urban gay and bisexual men. *Drug and Alcohol Dependence* 2005; 78(2):125–134
- ³³ Reback C, Larkins S, Shoptaw S. Changes in the meaning of sexual risk behaviors among gay and bisexual male methamphetamine abusers before and after drug treatment. *AIDS Behavior* 2004; 8(1): 87–98.
- ³⁴ Rawson R, Marinelli-Casey P, et al. A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. *Addiction* 2004; 99, 708–717.
- ³⁵ Zweben J, Cohen J, et al. Psychiatric symptoms in methamphetamine users. *American Journal of Addiction* 2004; 13(2): 181–190.

Prevalence of Alcohol Consumption in Texas and Selected Consequences

Abstract

The Texas Department of State Health Services received a grant from the Substance Abuse and Mental Health Agency (SAMHSA) to implement the Strategic Prevention Framework (SPF). Unlike other prevention grants focused in reducing risk factors among individuals, the SPF grant focuses mainly on environmental change. SPF states were encouraged to conduct a needs assessment of their communities, taking into consideration epidemiological data on consumption and consequences of substance abuse. In Texas, the needs assessment conducted was used to prepare the State Prevention Plan. This article is a development of the needs assessment and presents statistics and analyses on prevalence rates of alcohol and selected alcohol-related consequences.

Introduction

The purpose of this article is to present a review of the prevalence of alcohol consumption in Texas and present information on alcohol-related mortality and motor vehicle fatalities. The Texas Department of State Health Services (DSHS) applied for and received a grant from the Substance Abuse and Mental Health Agency (SAMHSA) to implement the Strategic Prevention Framework (SPF). Unlike other prevention grants focused in reducing risk factors among individuals, especially youth, the SPF grant focuses mainly on environmental change.¹ As the first activity, SPF states were encouraged to conduct a needs assessment of their communities, taking into consideration epidemiological data on consumption and consequences of substance abuse. The needs assessment conducted in Texas was used to prepare the State Prevention Plan. With the SPF funding, DSHS has selected community coalitions to implement environmental strategies aimed at reducing the consumption of alcohol and other drugs to reduce the number of motor vehicle fatalities. This article is a development of the needs assessment mentioned above. We will present statistics and analyses on prevalence rates of alcohol and

selected alcohol-related consequences. The statistics presented below are part of the baseline that DSHS will use to monitor progress and continue planning the deployment of state resources.

Alcohol Consumption Prevalence

The results of the National Survey on Drug Use and Health (NSDUH)² shows that a greater percent of individuals use alcohol than tobacco or any illicit drugs. Table 1 compares the past month prevalence rates for alcohol, illicit drugs and tobacco. Past month use is a variable used in substance abuse studies to measure the prevalence of current users.³

Table 1 shows that alcohol was the most prevalent substance used by the population 12 years of age and older, 46.8%. It also shows that approximately 24% of the population reported drinking 5 or more drinks on at least one occasion during the past month. Binge drinking is a high-risk behavior due to the consequences on health and the potential danger to self and others in the community. For example, high-level alcohol consumption is associated with aggression and impaired driving. The reported rates of alcohol consumption, binge drinking, cigarette use, and the

Table 1. Percent of Current Users among the population 12 years of age and older

Measures	% Texas	% United States
Past month alcohol use	46.8	50.2
Past month binge drinking	23.6	22.7
Past month cigarette use	26.2	25.2
Past month, any illicit drug use ⁴	7.0	8.1
Past month use of illicit drugs other than marijuana	3.8	3.6

Source: NSDUH 2003-2004. Table 87. Percentages, Annual Averages Based on 2003 and 2004 NSDUHs.

use of illicit drugs in Texas are comparable to the United States rates.

Alcohol consumption patterns vary by age group (Table 2). The consumption pattern reported for Texas is similar to that reported for the United States. Drinking begins at an early age and the percentage of drinkers is higher among individuals in the 18 – 25 years of age group. As the population matures, the consumption rates decrease.

DSHS epidemiologists think that the NSDUH prevalence rates for the 12 – 17 years of age group may be an underestimation. Using a different survey methodology, the Texas School Survey of Substance Use Among Students Grades 7 – 12 results were higher, 32% for past month alcohol use and 22% for past-month binge drinking.

Approximately 53% of the youth surveyed in the Texas School Survey reported that they had already experimented with alcohol by the time they were 13 years old. This is an important statistic because the scientific

evidence shows that individuals who begin drinking before 15 years of age have a 41% greater chance of future alcohol dependence than those who begin drinking at older ages.⁵ Age of onset is one of the variables that are targeted by the SPF. The community coalitions will implement strategies to try to reduce the percentage of children who begin drinking alcohol by 13 years of age.

The comparison of the Texas alcohol prevalence rates with the rest of the nation shows that Texas ranks toward the middle of the distribution, in both past month and binge drinking. However, due to the large population of the state, Texas would rank high among all the states.

Another variable measured by the NSDUH is perceptions of harm. Respondents were asked their opinions regarding how harmful they thought would be to drink 5 or more drinks during one occasion, at a frequency of once or twice a week. Table 3 shows the NSDUH results for this behavior.

Table 2. Prevalence Rates of Past-Month Alcohol Consumption and Past Month Binge Drinking by Age Groups: Percentages for Texas and Totals for The United States

Age Group- years	Texas Past Month Alcohol Use%	Texas Past month binge drinking%	United States Past Month Alcohol Use %	United States Past month binge drinking%
12 to 17	16.7	9.53	17.7	10.9
18 to 25	55.5	37.7	61.0	41.4
26 and older	49.8	23.0	52.8	21.1
12 and older	46.8	23.6	50.2	22.7

Source: NSDUH 2003- 2004 Results.

Table 3. Perceptions of Great Risk of Drinking 5 or More Drinks Once or Twice a Week, by Age Groups for Texas and National Estimates.

Age Group-years	Texas %	United States %	Maximum %	Minimum %
12 to 17	40.50	38.26	46.62	29.13
18 to 25	35.40	31.73	39.46	19.40
26 and Older	46.54	43.40	49.51	35.02
12 and Over	44.21	41.30	49.16	32.28

Source: NSDUH, 2003-2004

Note: Percentages indicate perception of risk. Higher percentages are the desired response.

This table includes the national statistics as a reference. We also included the minimum and maximum values from all the states and District of Columbia.

SAMHSA has selected perceptions of harm for alcohol, tobacco, and illicit drugs as a national outcome to be monitored by the states. The basic assumption is that there is an indirect relationship between drinking prevalence and perceptions of harm. The greater the percentage of individuals who think that binge drinking is 'very dangerous,' the lesser the likelihood that binge drinking would occur. The prevention strategies implemented in the state inform participants of the consequences of excessive alcohol drinking.

Selected Consequences of Alcohol Consumption

The excessive and/or prolonged use of alcohol, tobacco, and drugs may be a direct cause of death, or a contributing factor to physiological disorders that result in illness and death. To study alcohol-related consequences in the state, we selected three underlying causes of deaths: chronic liver disease, suicide and homicides, and motor vehicle fatalities. The mortality rates for the causes of death selected are associated with consumption of alcohol. Therefore, it is likely that reductions in the levels of consumption will lead to

reductions in these rates. DSHS is implementing prevention strategies that target consumption of alcohol and suicide as a serious community problem. It is expected that, in the long run, the efforts will show a positive impact on the mortality statistics presented below.

Mortality Rates

1. Chronic Liver Diseases

Long term, heavy alcohol consumption is the leading cause of chronic liver disease, in particular cirrhosis, one of the 12 leading causes of death. The underlying causes of death selected to measure chronic liver diseases were alcoholic liver disease, chronic hepatitis, and fibrosis and cirrhosis.

Of the 2,309 deaths recorded in this category, over 93% were included in these 4 causes of death:

Alcoholic cirrhosis of the liver:
(K70.3)⁶ 7,951 (28.9%)
Alcoholic hepatic failure:
(K70.4) 1,461 (5.3%)
Alcoholic liver disease, unspecified:
(K70.9) 1,898 (6.9%)
Cirrhosis of the liver, unspecified:
(K74.6) 14,461 (52.8%)

Table 4 shows a comparison of mortality rates for Texas vs. United States.

The Texas rate (10.45) for the causes of death classified as chronic liver

Table 4. Number of Chronic Liver Diseases Deaths, Corresponding State Population, and Rate per 100,000 population

Chronic Liver Diseases	Texas	United States
Number of deaths	2,309	27,503
Population	22,103,374	290,810,789
Rate per 100,000 population	10.45	9.45

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

Table 5. Number of Deaths Caused by Chronic Liver Diseases and Rate Per 100,000, by Age Group, Gender, and Race

Chronic Liver Diseases	Number of Deaths	Population	Rate per 100,000 population
Age Group- years			
20 – 34	34	4,979,211	0.7
35 – 44	262	3,323,250	7.9
45 – 54	659	2,893,714	22.8
55 – 64	506	1,853,682	27.3
65 – 74	465	1,190,660	39.1
75 – 84	306	744,081	41.1
85 +	77	244,377	31.5
Gender			
Males	1,575	11,100,704	14.2
Females	734	11,002,670	6.7
Race			
African-American	166	2,635,319	6.3
Other Races	20	908,980	2.2
White	2,123	18,559,075	11.4

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

diseases was higher than the national rate in 2003.

Demographic differences

Table 5 presents the mortality statistics by age group, gender and race.

Over 98% of the deaths recorded under this set of codes were reported in the population over 35 years of age.

In Texas, chronic liver disease afflicts a greater percent of males than females. Of the 2,309 deceased individuals, the death per 100,000 rate for women was 6.6, but 14.3 for males. The difference may be explained by differences in drinking prevalence by gender. Although males and females have

approximately equal prevalence rates among the 12 –25 years of age group, women's prevalence rates begin to drop sharply among the 26 years of age and older group.

According to race, Whites had a higher prevalence rate per 100,000, 11.4, than the other two groups considered, African American (6.3) and Other Race (2.2).

2. Suicide

The selection of this indicator was based on information that 20% of all suicides are attributable to alcohol. Suicidal individuals have high rates of alcohol use and abuse, and alcohol abusers have high rates of suicidal

Table 6. Total Number of Suicide Deaths, State Population, and Rate Per 100,000

Suicides	Texas	United States
Number of deaths	2,363	31,484
Population	22,103,374	290,810,789
Rate per 100,000 population	10.69	10.82

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

Table 7. Number of Suicides and Rate per 100,000 population by Age Groups, Gender, and Race

	Number of Suicides	Population	Rate per 100,000 population
Age Group- years			
10 – 19	185	3,393,678	5.45
20 – 64	1,847	13,049,857	14.15
65 – 85	330	2,179,118	15.14
Gender			
Males	1,854	11,100,704	16.9
Females	509	11,002,670	4.6
Race			
African- American	125	2,635,319	4.7
Other Races	49	908,980	5.4
White	2,189	18,559,075	11.8

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

behaviors. It is also noteworthy that approximately 14% of all cases classified as suicides were caused by the ingestion of an inappropriately consumed medication or chemical compound. According to the causes of deaths recorded, the instrument used to commit the act was classified as follows:

Use of firearms:	1,822	77.0%
Use of a chemical:	331	14.0%
Drowning:	13	0.5%
Other:	197	8.3%

Curiously, only two cases were recorded where alcohol was the means to commit the act.

The underlying cause of death selected for this classification was intentional self-harm and the ICD-10 codes queried were X-60 to X-84, and Y87.0.

Table 6 presents the comparison of frequency of 2003 suicides and the population rates for Texas and the United States. The rate for suicides in Texas is comparable to the national rate.

Demographic differences

Table 7 shows statistics regarding the number of deaths classified as suicides by age group, gender and race

For the 10 – 19 years of age group, 185 deaths were recorded as suicides. This was 7.8% of the 2363 suicides recorded. The rate of suicide deaths per 100,000 population for this group was 5.5. It is important to mention that suicide is one of the leading causes of death for

Table 8. Number of Deaths due to Homicide for Texas and the United States, Population Counts, and Rates per 100,000 population

Homicides	Texas	United States
Number of deaths	1,525	17,732
Population	22,103,374	290,810,789
Rate per 100,000 population	6.9	6.1

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

the population under 20 years of age. The adult population was classified into two groups, 20 to 64, and 65 and over. The suicide per 100,000 for these groups was 14.15 and 15.14, respectively.

The rates of suicide vary by gender in Texas. While 1,854 (78.5%) males committed suicide, only 509 (21.5%) females did so. The suicide rates per 100,000 for the groups were 16.9 and 4.6, respectively.

The suicide rates for the Texas population were considerably different when grouped by race. Of the 2,363 suicidal deaths in Texas, 2,189 (11.8%) were recorded for Whites, 49 (5.4%) for Other Races, and 125 (4.7%) for African-Americans.

3. Homicide

Recent data from the United States suggests that about 30% of assaults involve alcohol (without other drugs) and 40 to 50% of violent crimes involve alcohol or a combination of alcohol and drugs (Beck et al., 1993; Harlow, 1998).

We selected ICD-10 codes X85-Y09 and Y87.1 as underlying cause of deaths. These codes are classified as external causes of mortality and morbidity. All the codes indicate that the deceased individual died due to an assault by another person. The difference among codes relate to the

materials used to kill, such as firearms, chemicals, or blunt objects.

The Texas homicide rate per 100,000 deaths, 6.9, is somewhat higher than the rate for the United States. These statistics are supported by the violent crime rates obtained from the Federal Bureau of Investigations (FBI). The state's statistics related to violent offenses reported to the police shows that the violence rate in Texas per 100,000 population is higher than the national rate (Table 8). Violence rate includes aggravated assault, murder, rape, and robbery. Although rates of violence are declining nationally and in this state, the Texas violent rate, 529.7 is higher than the national rate, 469.2

Demographic differences

Table 9 shows statistics regarding the number of deaths due to homicides by age group, gender and race.

Individuals in the 20–34 years of age group were at greatest risk of being victims of homicides. This group had the highest mortality rate per 100,000 population, 10.2. This age group also reported the highest prevalence rates of binge drinking according to the NSDUH's statistics, 37.69 for the 18 – 25 years of age group. Individuals in the 35 – 54 years of age group had a high risk of death by assault, 7.2 per 100,000.

Table 9. Number of Homicide Deaths, Corresponding Estimated State Population, and Rate per 100,000 population

Homicides	Number of Deaths	Population	Rate per 100,000 population
Age Group- years			
1 – 9	116	3,480,721	3.3
10 – 19	165	3,393,678	4.9
20 – 34	632	4,979,211	10.2
35 – 54	450	6,216,964	7.2
55 and Older	159	4,032,800	3.9
Gender			
Males	1,148	11,002,670	10.4
Females	377	11,100,704	3.4
Race			
African-American	413	2,635,319	15.7
Other Races	35	908,980	3.9
White	1,077	18,559,075	5.8

Source: Compressed Mortality File compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.

Table 10. Number of Motor Vehicle Fatalities in Texas and Rates per Blood Alcohol Content (BAC).

Crash Year	Total Fatalities	Alcohol Related Fatalities (BAC = .01 +)		Alcohol Related Fatalities (BAC = .08 +)	
		Number	Percent-%	Number	Percent-%
2001	3,736	1,807	48	1,587	42
2002	3,823	1,810	47	1,610	42
2003	3,821	1,771	46	1,551	41
2004	3,699	1,704	46	1,481	40
2005	3,504	1,569	45	1,371	39

Source: FARS 2001 – 2004 Final and FARS 2005 ARF

Men were more likely to die as a consequence of an aggression than women, 1,148 (75.3%) males died as a consequence of an assault, but only 377 (24.7%) females were victimized. The homicide rates by gender were 10.4 for males and 3.4 for females.

In Texas, the homicide statistics reveal a disparity in homicide rates by racial groups. African-Americans have higher rates of homicides than other groups, although they have lower prevalence rates of alcohol and other substance use than other ethnic or racial groups. The homicide rate per 100,000 population was 15.7 for African-

American, compared to 3.9 for Other Races and 5.8 for Whites. This is not only a Texas phenomenon; this finding has also been established at the national level.⁷

Motor Vehicle Crashes

Alcohol impairs the ability of individuals to drive motor vehicles and may result in alcohol-related fatalities. The Fatality Analysis Reporting System (FARS) statistics show that in 2005, there were 39,189 fatalities in the United States. Of these, 15,238 (39%) corresponded to high-alcohol crashes. Of the 3,504

Table 11. Rates per 100,000 Population for the Total Population of Texas and for Youth and Young Adults.

Crash Year	Total Fatalities	Total Population	Total Pop. 100,000 Rate	Fatalities among 16 to 20 Years of Age	Population for 16 to 20 Years of Age	Youth Rate per 100,000
2001	3,736	21,333,606	17.5	586	1,656,617	35.3
2002	3,823	21,722,394	17.6	579	1,666,206	34.7
2003	3,821	22,099,136	17.3	578	1,671,284	34.5
2004	3,699	22,471,549	16.5	497	1,675,839	29.6
2005	3,504	22,859,968	15.3	481	1,693,047	28.4

Source: Source: FARS 2001 – 2004 Final and FARS 2005 ARF

motor vehicle fatalities in Texas in 2005, 1,371 (39%) were high alcohol-involved [with a blood alcohol level (BAC) equal to or greater than 0.08].⁸

The number and percent of alcohol-involved fatalities in Texas has been decreasing. This trend is happening at the national level also. Table 10 shows the historical trend.

Youth and young adults were nearly twice as likely to die from motor vehicle fatalities as the general population. Table 11 shows the rate per 100,000 population for the population in general and for the group of 16 – 20 years of age group.

Motor vehicle fatalities are preventable. Many public health interventions have helped to reduce the count of fatalities. Among the most notable was the increase of the legal age to purchase alcohol to 21 years of age. Other measures that have

Footnotes

¹ Activities included in this type of prevention strategy are aimed at changing societal norms, institutionalized policies and procedures, and community laws.

² The National Survey on Drug Use and Health is federally funded. The survey is conducted annually and is administer to a random sample of households in the nation. The Texas sample is large enough to make inferences to the general population. Although implemented once a year, statistical reports aggregate the results of the latest two years to increase the number of respondents. Participants receive a monetary compensation for reporting. For references, see the Sources of Information section at the end of the paper.

³ Current (past-month) use: At least one drink in the past 30 days (includes binge and heavy use).

Binge use: Five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days (includes heavy use).

⁴ Illicit drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics not used medically.

⁵ Hingson and Kenkel, 2004.

⁶ These are International Classification of Diseases codes (ICD-10).

⁷ The National Institute on Drug Abuse's (NIDA) published *Drug Abuse Among Racial/Ethnic Minorities*. This is an important resource to understand the complexity of this issue. It is available on the web at www.drugabuse.gov/pdf/minorities03.pdf.

⁸ The proportion of alcohol to blood in the body is expressed as the blood alcohol concentration (BAC). In the field of traffic safety, BAC is expressed as the percentage of alcohol in deciliters of blood—for example, 0.10 percent (i.e., 0.10 grams per deciliter) (Alcohol Alert, 1996).

shown to be effective are the laws to require the use of seat belts, child passenger safety seats and airbags, safer vehicles and roadways, the graduated licensing of minors, and the legislation of blood alcohol concentration levels per se laws establishing 0.08 as the legal limit.

Final Comments

DSHS, through its participation in the Strategic Prevention Framework, is implementing environmental interventions to reduce the consumption of alcohol, tobacco, and illicit drugs in the state. Youth and young adults in particular will continue to be targets of intervention by implementing education and skill building programs. However, a greater proportion of state resources will be deployed to enhance the implementation of evidence-based environmental strategies. The state will continue to monitor epidemiological data to gauge the impact of the interventions. In the short-term, DSHS anticipates reductions in alcohol consumption and in motor-vehicle fatalities. Finally, though reductions are not expected in the short run, DSHS expects to see reductions in substance abuse related mortality rates.

References

Sources of Information

- Consumption of Alcohol, Tobacco and Illicit Drugs:
2003 – 2004 National Survey on Drug Use and Health (NSDUH), Substance Abuse and Mental Health Service Administration (SAMHSA), U.S. Department of Health and Human Services (DHHS).
2006 Texas School Survey of Substance Use Among Students: Grade 7 – 12, 2006 (preliminary Finding), Community Mental Health and Substance Abuse Services, Texas Department of State Health Services
- Mortality:
United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Office of Analysis and Epidemiology(OAE), Compressed Mortality File (CMF) compiled from CMF 1999-2003, Series 20, No. 21 2006 on CDC WONDER On-line Database.
- Motor Vehicle Fatalities:
Data on traffic fatalities are from the Fatality Accidents Reporting System (FARS), National Highway Traffic Safety Administration (NHTSA). United States Department of Transportation. Their population estimates are from the U. S. Bureau of the Census. The report located at this web page was most useful: http://www-nrd.nhtsa.dot.gov/departments/nrd30/ncsa/STSI/48_TX/2005/48_TX_2005.HTM.
- Crime:
Crime in the United States, 2005, Uniform Crime Reporting Program, Federal Bureau of Investigation. United States Department of Justice

Federal and State Publications

Drug Abuse Among Racial/Ethnic Minorities. National Institute on Drug Abuse United States Department of Health and Human Services, NIH Publication No. 03-3888, 2003 Publication.

National Drug Use and Health, 2004 State Estimates of Substance Use. Office of Applied Studies, Substance Abuse and Mental Health Agency, available online at: www.samhsa.gov/statistics.

State Epidemiological Data System (SEDS), Data Coordinating Center, Center for Substance Abuse Prevention, SAMHSA, United States Department of Health and Human Services, available on line at: www.epidcc.samhsa.gov. State Estimates of Substance Abuse from the 2003 – 2004 National Surveys on Drug Use and Health, DHHS Publication No. SMA06-4142, NSDUH Services H29. 2006.

Texas Strategic Plan. Strategic Prevention Framework State Incentive Plan. Community Mental Health and Substance Abuse Services, Texas Department of State Health Services, approved by SAMHSA/CSAT, December 2004.

Traffic Safety Facts, Crash*Stats, Published by NHTSA's National Center for Statistics and Analysis, August 2005.

What You Should Know About Alcohol Problems, Substance Abuse in Brief, U. S. Department of Health and Human Services, Center for Substance Abuse Treatment. April 2003, Volume 2 Issue 1.

Published Journal Articles

Beck A, Gilliard D, et al. Survey of state prison inmates, 1991. Bureau of Justice Statistics, Special Report, March 1993, NCJ-136949. Washington, DC: US Department of Justice.

Birckmayer J, Holder H, et al. A General Causal Model To Guide Alcohol, Tobacco, and Illicit Drug Prevention: Assessing the Research Evidence. *Journal of Drug Education* 2004;34(2):121–153.

Fox K, Merrill J, et al. Estimating the Costs of Substance Abuse to the Medicaid Hospital Care Program. *American Journal of Public Health*, January 1995;85(1).

Harlow, C. Profile of jail inmates, 1996. Bureau of Justice Statistics. Special Report, April 1998. 1998. NCJ 164620. Washington, D.C.: U.S. Department of Justice.

Hingson RW, Kenkel D. Social, health, and economic consequences of underage drinking. In: National Research Council and Institute of Medicine, *Reducing Underage Drinking: A collective responsibility*, background paper. Committee on Developing a Strategy to Reduce and Prevent Underage Drinking, Division of Behavioral and Social Sciences and Education. Washington DC: The National Academies Press.

Acknowledgment

I would like to thank Joyce Wang and Patricia Griffin for their assistance in compiling the mortality statistics.

Prepared by Martín Arocena, PhD, Community Mental Health and Substance Abuse Services, Texas Department of State Health Services.

Unintentional Poisoning Deaths- United States- 1999-2004

Morbidity and Mortality Weekly Report. February 9, 2007 / 56(05);93-96.

In 2004, poisoning was second only to motor-vehicle crashes as a cause of death from unintentional injury in the United States¹. Nearly all poisoning deaths in the United States are attributed to drugs, and most drug poisonings result from the abuse of prescription and illegal drugs². Previous reports have indicated a substantial increase in unintentional poisoning mortality during the 1980s and 1990s^{2,3}. To further examine this trend, CDC analyzed the most current data from the National Vital Statistics System. This report summarizes the results of that analysis, which determined that poisoning mortality rates in the United States increased each year from 1999 to 2004, rising 62.5% during the 5-year period. The largest increases were among females (103.0%), whites (75.8%), persons living in the southern United States (113.6%), and persons aged 15—24 years (113.3%). Larger rate increases occurred in states with mostly rural populations. Rates for drug poisoning deaths increased 68.3%, and mortality rates for poisonings by other substances increased 1.3%. The largest increases were in the “other and unspecified,” psychotherapeutic, and narcotic drug categories. The results suggest that more aggressive regulatory, educational, and treatment measures are necessary to address the increase in fatal drug overdoses. Mortality data for 2004 were collected from the National Vital Statistics System¹. Unintentional poisoning deaths that occurred during 1999—2004 were defined as those with underlying cause-of-death codes X40—X49 from the *International Classification of Diseases, Tenth Revision* (ICD-10). This category included overdoses of illegal drugs and

legal drugs taken for nonmedical reasons, poisoning from legal drugs taken in error or at the wrong dose, and poisoning from other substances (e.g., alcohol, pesticides, or carbon monoxide). Adverse effects of legal drugs taken in the proper doses and as directed are coded elsewhere in ICD-10 and were not included in this analysis. Rates were age adjusted to the 2000 U.S. Census population using bridged-race* population figures. Information on the percentage of the population that was rural, defined as the percentage living in census blocks below a certain population density, was derived from U.S. Census data for 2000⁴.

The number of unintentional poisoning deaths increased from 12,186 in 1999 to 20,950 in 2004. The annual age-adjusted rate increased 62.5%, from 4.4 per 100,000 population in 1999 to 7.1 in 2004. The increase among females, from 2.3 to 4.7 per 100,000 population (103.0%), was twice the increase among males, from 6.5 to 9.5 per 100,000 population (47.1%) (Table 1). Among males, rates among whites, American Indians/Alaska Natives, and Asians/Pacific Islanders all increased approximately 50%. Rates among black males were highest in 1999 but did not increase. Among females, rates among whites more than doubled, whereas nonwhites had smaller increases or decreased. Overall, rates increased 75.8% among whites, 55.8% among American Indians/Alaska Natives, 27.4% among Asians/Pacific Islanders, and 11.2% among blacks. Rates among non-Hispanics increased more than rates among Hispanics for both sexes. Among all sex and racial/ethnic groups, the largest increase (136.5%) was among

TABLE 2. Number of deaths and mortality rates* attributed to unintentional poisoning, by type of substance — United States, 1999 and 2004

Type of substance	ICD-10 ^a code	1999		2004		Rate change
		No.	Rate	No.	Rate	(%)
Drugs	X40–X44	11,155	4.0	19,838	6.7	68.3
Nonopioid analgesics [§]	X40	168	0.1	212	0.1	18.1
Psychotherapeutic drugs [¶]	X41	671	0.2	1,300	0.4	83.5
Narcotics and hallucinogens**	X42	6,009	2.1	9,798	3.3	54.6
Other drugs acting on the central nervous system	X43	21	0.0	22	0.0	-0.5
Other and unspecified drugs ^{††}	X44	4,286	1.5	8,506	2.9	87.3
Other substances	X45–X49	1,031	0.4	1,112	0.4	1.3
Alcohol	X45	320	0.1	358	0.1	6.0
Organic solvents and halogenated hydrocarbons	X46	63	0.0	67	0.0	2.0
Carbon monoxide and other gases	X47	534	0.2	562	0.2	-1.7
Pesticides	X48	12	— ^{§§}	3	— ^{§§}	— ^{§§}
Other and unspecified chemicals ^{¶¶}	X49	102	0.0	122	0.0	10.6
Total	X40–X49	12,186	4.4	20,950	7.1	62.5

* Age-adjusted rates per 100,000 population.

[†] *International Classification of Diseases, Tenth Revision.*

[§] Includes painkillers such as aspirin and acetaminophen and other antipyretic or antirheumatic drugs, both prescription and over-the-counter drugs.

[¶] Includes antiepileptic, sedative-hypnotic, antidepressant, antipsychotic, and other psychotherapeutic drugs.

** Includes heroin, opioid analgesics (e.g., oxycodone), and cocaine.

^{††} Category used to classify deaths attributed to drugs from more than one of the other categories (e.g., deaths attributed to both an opioid analgesic and a sedative) and deaths attributed simply to "drug overdose."

^{§§} Rates based on fewer than 20 deaths are not included.

^{¶¶} Includes corrosives, metals, plants, and detergents.

non-Hispanic white females. Among all age groups, the largest increase occurred among persons aged 15–24 years (113.3%). In 2004, the highest rates were among persons aged 35–54 years, who accounted for 59.6% of all poisoning deaths that year.

From 1999 to 2004, rates increased by less than one third in the Northeast and West but more than doubled in the South and nearly doubled in the Midwest.[†] Delaware, Maryland, New York, and Rhode Island had decreases in rates, and California had the smallest increase (4.0%) (Figure). States with the largest relative increases were West Virginia (550%), Oklahoma (226%), Maine (210%), Montana (195%), and Arkansas (195%). Increases of 100% or more occurred in 23 states: 11.8% (2 of 17) of states[§] in the most urban tertile, 41.2% (7 of 17) of those in the middle tertile, and 82.4% (14 of 17) of those in the most rural tertile (extended Mantel-Haenszel chi-square for linear trend across the tertiles = 15.4, $p < 0.001$). The increase in poisoning mortality occurred almost exclusively among persons whose deaths were coded as unintentional drug poisoning (X40–X44), for which the rate increased

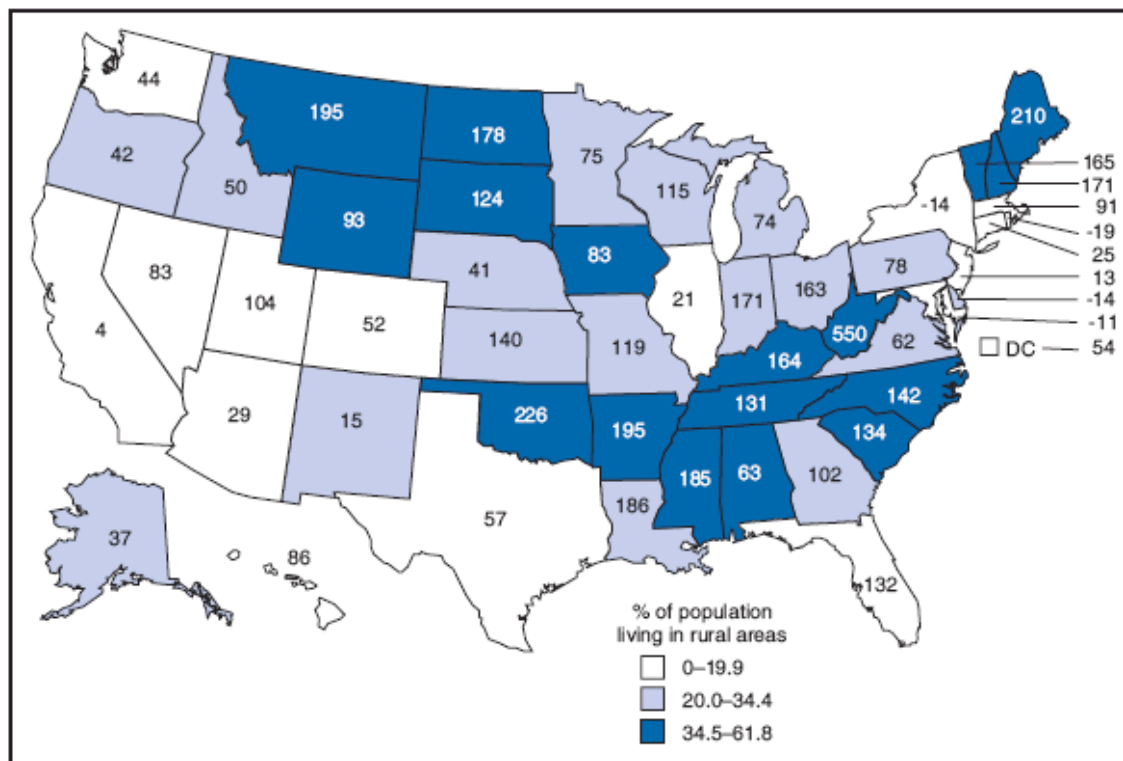
68.3% (Table 2). The rate for poisoning deaths attributed to other substances (X45–X49) increased 1.3%. By 2004, drug poisoning accounted for 19,838 deaths, 94.7% of all unintentional poisoning deaths. Among types of drug poisoning, the greatest increases were in the "other and unspecified" drug, psychotherapeutic drug, and "narcotic and hallucinogen" drug categories.

Reported by: *L Paulozzi, MD, Div of Unintentional Injury Prevention; J Annett, PhD, Office of Statistics and Programming, National Center for Injury Prevention and Control, CDC.*

Editorial Note:

Unintentional drug poisoning mortality rates increased substantially in the United States during 1999–2004. Previous studies, using multiple cause-of-death data, have indicated that the trend described in this report can be attributed primarily to increasing numbers of deaths associated with prescription opioid analgesics (e.g., oxycodone) and secondarily to increasing numbers of overdoses of cocaine and prescription psychotherapeutic drugs (e.g., sedatives), and cannot be attributed to

FIGURE. Percentage change in unintentional poisoning mortality rates,* by rural status of state† — United States, 1999–2004



* Age-adjusted rates per 100,000 population.

† Defined as the percentage of the population living in census blocks below a certain population density, based on U.S. Census data for 2000 (4).

heroin, methamphetamines, or other illegal drugs^{3,5}.

The mortality increases might be the result of greater use and abuse of potentially lethal prescription drugs in recent years, behaviors that are more common among whites than nonwhites^{6,7}. The substantial increase in deaths among persons aged 15–24 years is consistent with substantial recent increases in recreational prescription drug and cocaine use among adolescents and young adults⁸.

Studies by state health agencies have reported recent increases in prescription-drug—poisoning mortality in rural communities^{9,10}, despite historically higher rates in urban areas. The South and Midwest regions, which had the largest relative and absolute

increases among regions in this study, are the most rural regions of the country⁴. Further research is needed to determine how differences in drug use, drug-abuse—control measures, and demographic characteristics (e.g., race/ethnicity) contribute to this pattern.

The findings in this report are subject to at least three limitations. First, mortality coding assigns the underlying cause of death to broad drug categories rather than to specific drugs. Second, death certificates do not reveal the circumstances of drug use. Third, determining the intent of a person who took a drug is often difficult for a coroner or medical examiner and might result in misclassification; some of these deaths might have been suicides, although not classified as such, and some deaths

categorized as suicides or of undetermined intent might have been unintentional and therefore not analyzed in this study. The extent of this error is not known. Effective response to increasing fatal drug overdoses requires strengthening regulatory measures to reduce unsafe use of drugs, increasing physician awareness regarding appropriate pharmacologic treatment of pain and psychiatric problems, supporting best practices for treating drug dependence, and potentially modifying prescription drugs to reduce their potential for abuse. State agencies that manage prescription-monitoring programs should use such systems to proactively identify 1) patients who abuse drugs and fill multiple prescriptions from different health-care providers and 2) providers whose prescribing practices are outside the standards of appropriate medical care. Both federal and state prevention measures should be evaluated periodically to determine their effectiveness.

References

1. CDC. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. Available at <http://www.cdc.gov/ncipc/wisqars>.
2. Paulozzi LJ, Ballesteros MF, Stevens JA. Recent trends in mortality from unintentional injury in the United States. *J Safety Res* 2006; 37:277—83.
3. Paulozzi LJ, Budnitz DS, Xi Y. Increasing deaths from opioid analgesics in the United States. *Pharmacoepidemiol Drug Safety* 2006;15:618—27.
4. US Department of Commerce, Census Bureau. 2000 Census: summary file 3, table P.5 urban and rural. Available at <http://www.nemw.org/poprural.htm>.
5. Fingerhut LA. Increases in methadone-related deaths: 1999—2004. *Health E-Stats*. Hyattsville, MD: National Center for Health Statistics; 2006. Available at <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/methadone1999-04/methadone1999-04.htm>.
6. Simoni-Wastila L. The use of abusable prescription drugs: the role of gender. *J Womens Health Gen Based Med* 2000;9:289—97.
7. Simoni-Wastila L, Ritter G, Strickler G. Gender and other factors associated with the nonmedical use of abusable prescription drugs. *Subst Use Misuse* 2004;39:1—23.
8. US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration Office of Applied Studies. Results from the 2005 National Survey on Drug Use and Health: national findings. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2006. Available at <http://www.oas.samhsa.gov/nsduh/2k5nsduh/2k5results.htm>.
9. CDC. Increase in poisoning deaths caused by non-illicit drugs—Utah, 1991—2003. *MMWR* 2005;54:33—6. CDC. Unintentional deaths from drug poisoning by urbanization of area—New Mexico, 1994—2003. *MMWR* 2005;54:870—3.

TABLE 1. Unintentional poisoning mortality rates,* by selected characteristics — United States, 1999 and 2004

Characteristic	1999	2004	Rate change (%)
Sex and race/ethnicity			
Males	6.5	9.5	47.1
White	6.3	10.0	58.6
Hispanic	8.5	7.1	-16.3
Non-Hispanic	6.0	10.7	79.0
Black	9.8	9.9	1.0
American Indian/Alaska Native	6.7	10.6	57.5
Asian/Pacific Islander	1.1	1.7	50.5
Females	2.3	4.7	103.0
White	2.3	5.0	121.8
Hispanic	1.7	2.4	40.8
Non-Hispanic	2.3	5.4	136.5
Black	3.2	4.5	40.3
American Indian/Alaska Native	4.3	6.6	54.8
Asian/Pacific Islander	0.6	0.5	-10.3
Age group (yrs)			
0–14	0.1	0.1	0.0
15–24	2.5	5.3	113.3
25–34	5.9	9.1	54.8
35–44	10.1	14.5	43.8
45–54	7.8	14.5	87.0
55–64	2.8	5.4	91.1
65–74	1.6	2.3	39.3
≥75	2.5	2.7	7.2
Region†			
Northeast	4.5	5.9	31.7
Midwest	3.3	6.1	85.5
South	3.7	7.9	113.6
West	6.4	7.9	22.7
Total	4.4	7.1	62.5

* Age-adjusted rates per 100,000 population.

† *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Program Spotlight

Project InSight™: Screening and Brief Intervention for Alcohol and Drugs in the Public Healthcare System

Project InSight: Screening and Brief Intervention for Alcohol and Drugs in the Public Healthcare System

Alcohol and drugs affect medical care at every level, and have been called America's number one public health challenge. Misuse of alcohol and drugs places a substantial burden on the Texas healthcare system. A 2001 study found that states spent 25% of their healthcare budgets on the consequences of alcohol and drug use, almost 2.5% of their total expenditures. Alcohol and drugs are linked to increased risk for unintentional injuries, cardiovascular disease, stroke, cancer, HIV/AIDS, and other sexually transmitted infections, and to a variety of adverse pregnancy outcomes. They also mask symptoms, confound diagnosis, complicate medical treatment, and cause dangerous drug interactions.

In comparison to moderate and non-drinkers, individuals with a history of heavy drinking have higher healthcare costs, and research suggests that a disproportionate number of people with substance use problems present for medical care. In primary care settings, 10 to 25% of patients screen positive for alcohol misuse, and data suggests that 25 to 40% of all patients in general hospital beds are being treated for complications of alcohol-related problems.

Problem drinkers have twice as many injury events per year and 4 times as many hospitalizations for injury per year than moderate drinkers and non-drinkers. Alcohol and drug use is

directly or indirectly responsible for one third of all emergency room visits. Half of all trauma cases screen positive for one or more intoxicants, as do 70% of patients with severe injuries requiring inpatient trauma care. Emergency room patients with alcohol or drug problems are 81% more likely to be hospitalized during an emergency room visit, and almost half return to the emergency room within 12 months.

Screening and brief intervention (SBI) for substance use problems is a widely recommended best practice that leads to reductions in alcohol- and drug-related health outcomes, including mortality. Leading medical groups, including the American Medical Association, the American College of Emergency Physicians, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, the Veterans Health Administration, and the United States Preventive Services Task Force, recommend SBI. SBI is also endorsed by federal agencies responsible for public health and safety. In addition, the American College of Surgeons announced that beginning in 2007 all Level I and II Trauma Centers will be required to perform alcohol screening and brief intervention in order to maintain certification. Level III Trauma Centers will be required to provide screening and referral services.

Project InSight is a 5-year \$17.5 million national demonstration program funded by a grant from the Department of Health and Human Services Substance Abuse and Mental Health Services Administration (SAMHSA). The Texas Department of State Health Services has joined forces with the Harris County

Hospital District, the Houston Council on Alcohol and Drugs, and 3 universities to integrate screening and brief intervention for substance use problems into the routine delivery of medical care and to create a bridge between the general medical system and the substance abuse service delivery system.

Project InSight provides screening and brief intervention in emergency departments, inpatient units, community health clinics, and school-based clinics. The idea is simple: train primary care practitioners to screen patients for substance use problems, and then provide identified patients with the services they need to make healthy choices and change their lives. The program places special emphasis on individuals who are misusing or abusing substances, but have not yet become dependent. Those who engage in risky or harmful use of alcohol or other drugs receive brief intervention in conjunction with their other healthcare services, while patients who are abusing substances receive brief treatment from a licensed mental health professional. Dependent patients are linked with appropriate treatment services in the community.

InSight screening was designed to be simple, and to fit seamlessly into routine medical practice. InSight trains doctors, nurses and other providers to incorporate a simple screening protocol into their routine patient encounters. Generalist health care providers are trained to ask such questions as:

- Do you smoke or use tobacco products?
- When is the last time you had more than four drinks in one day?
- Do you use marijuana, cocaine, or other drugs?

InSight screening was designed to...fit seamlessly into routine medical practice. InSight trains doctors, nurses and other providers to incorporate a simple screening protocol into their routine patient encounters.

Patient responses are captured in the routine documentation process, with documentation of a positive result triggering a referral for further assessment by an InSight specialist who conducts a brief intervention using Motivational Interviewing (MI) techniques. Patients who need additional follow-up care are linked with the Houston Council on Alcohol and Drugs for further assessment and placement in State licensed outpatient counseling or inpatient care.

In 3 years, Project InSight has exceeded most of its initial targets. Over 55,000 individuals have been screened, and more than 10,000 have received services. Patients who received InSight services during 2005 report the following at 6 month follow-up:

- 89% reduced the number of days they used drugs in the previous 30 days
- 80% of previous drug users reported no drug usage
- 71% reduced the number of days they drank alcohol in the previous 30 days
- 68% of heavy drinkers reported no heavy drinking in the previous 30 days

A cost analysis of 853 patients revealed significant reduction in utilization of emergency and inpatient services, resulting in a total cost reduction of more than \$4 million dollars for the Harris County Hospital District in the year following the delivery of InSight services (not including the costs of related physician services).

Presently the pilot project continues, with a large focus on sustainability and dissemination of the technology across the state. The idea is to implement a pilot to learn to implement this modality in the "real world" rather than a controlled research environment, and

then to use the lessons learned to address policy and systems issues necessary to support more widespread implementation across the state.

For more information about InSight, contact: Tamara Allen, Policy Advisor, Mental Health and Substance Abuse Services, at 512-206-5897 or Tamara.allen@dshs.state.tx.us. You can also visit the website: www.insightforhealth.org

Botulism in a Heroin Addict

The patient was a male in his late 40s with a 25-year history of heroin use. One evening in July, he injected himself with heroin, as he did every day for the preceding week. The next morning, he felt lethargic and had trouble keeping his balance on standing and had trouble speaking. He drank some methadone later in an effort to relieve the symptoms. That evening, the patient went to a local emergency room and presented with weakness, dry mouth, blurry vision, difficulty swallowing, and slurred speech. He was sent home and told that his symptoms were due to heroin withdrawal. A few hours later, the patient returned to the emergency room because he could not keep his head erect. He was admitted. A few hours later, he went into cardiopulmonary arrest, but was resuscitated.

About a week later, the state and local health departments were notified by the patient's neurologist of a possible case of botulism. By this time, the patient had muscle use of his thumbs but was otherwise completely paralyzed and on a ventilator. The state health department contacted the Centers for Disease Control and Prevention (CDC) and botulism antitoxin was released, shipped to the hospital the same evening, and administered to the patient. Blood collected from the patient was tested and found to contain botulinum toxin A.

Several days later, an epidemiologist from the state health department went with a nurse from the local health department to visit the patient in the hospital. They talked with the patient's nurses and learned that he had made only slight progress since the antitoxin had been administered. The patient

could make some eye movements and very limited movements of his head and extremities. His sensory and mental functions were essentially intact. He was alert and responsive. The epidemiologist held the patient's hand and asked him to squeeze her hand once for "yes" responses and twice for "no" responses. They proceeded to hold three 1-2 hour "discussions" using this technique, with breaks for the patient to rest, receive nursing care, and receive inhalation therapy.

The epidemiologist told the patient at length about his condition - wound botulism. She explained the resiliency of the *Clostridium botulinum* spores, how the spores germinate into vegetative cells, and the toxin that the vegetative cells produce. She told him about canned food, infant botulism, and wound botulism and heroin. She explained the mechanism of action of the toxin. She told him about antitoxin and testing for botulism. The patient was interested; he squeezed the epidemiologist's hand three times on occasion to request clarification. He also interrupted the conversation several times to request being moved and/or having his pillows rearranged.

After a break, the epidemiologist and the patient moved on to a discussion of heroin, his own use, and where he obtains it. Many of the patient's responses had to be spelled out; with the epidemiologist reciting the alphabet slowly until a letter was reached that elicited a "yes" hand squeeze. They determined that the patient uses heroin known as "Mexican Brown," which he acquires in a solid form, wrapped in plastic. He mixes the brown heroin with water, and then heats the mixture to

He had had inflammation at two injection sites that began prior to the onset of the neurological symptoms. Most likely, the patient got a local infection in which C. botulinum grew and elaborated toxin.

boiling. It is not kept boiling for any amount of time. The mixture is allowed to cool and then injected. The patient reuses his needle, without sterilization, but does not share it with anyone else. He administers the heroin by a subcutaneous injection, also known as “skin-popping;” this is done by long-term addicts because they can no longer access their peripheral veins. He had had inflammation at two injection sites that began prior to the onset of the neurological symptoms. Most likely, the patient got a local infection in which *C. botulinum* grew and elaborated toxin.

During the afternoon, a relative of the patient and his housemate visited. The conversations, which were very slow going, continued into the afternoon. The patient asked a lot of questions. The patient responded with a strongly positive hand squeeze to any and all questions about being “trapped” in a body that will not “work.” It was ascertained that he would like to have the country music TV station left on. He expressed the desire to help others, particularly young people, to avoid the perils of drug use. His helplessness was severe and profoundly impressive.

About one year later, the patient was contacted for follow up. He had recovered nearly completely. Unfortunately, he had also returned to his nearly life-long habit of heroin injection.

Editorial Note:

Botulism is a rare, but serious paralytic illness caused by a nerve toxin that is produced by the bacterium *Clostridium botulinum*. There are three main kinds of botulism. Foodborne botulism is caused by eating foods that contain the botulism toxin. Wound botulism is caused by toxin produced from a wound infected with *Clostridium botulinum*. Infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin. All forms of botulism can be fatal and are considered medical emergencies. Foodborne botulism can be especially dangerous because many people can be poisoned by eating a contaminated food.

The classic symptoms of botulism include double vision, blurred vision, drooping eyelids, slurred speech, difficulty swallowing, dry mouth, and muscle weakness. Infants with botulism appear lethargic, feed poorly, are constipated, and have a weak cry and poor muscle tone. These are all symptoms of the muscle paralysis caused by the bacterial toxin. If untreated, these symptoms may progress to cause paralysis of the arms, legs, trunk and respiratory muscles. In foodborne botulism, symptoms generally begin 18 to 36 hours after eating a contaminated food, but they can occur as early as 6 hours or as late as 10 days.

Source: Centers for Disease Control and Prevention, accessed at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/botulism_g.htm

Prepared by Linda Gaul, PhD, MPH, Infectious Disease Surveillance and Epidemiology Branch, Texas Department of State Health Services.

EpiLink Online Bulletin

Phone: (512) 458-7676
1100 West 49th Street
Austin, TX 78756-3199

To subscribe and for general correspondence, contact us at: epilink@dshs.state.tx.us

David L. Lakey, MD, DSHS Commissioner
Nick U. Curry, MD, MPH, Deputy Commissioner and Chief Medical Officer
Dave Wanser, PhD, Deputy Commissioner for Behavioral and Community Health Services

Vincent P. Fonseca, MD, State Epidemiologist

EpiLink Staff

María T. Maldonado, Managing Editor

Tom Betz, MD, MPH, Medical Editor

EpiLink Editorial Board

Martin Arocena, PhD
Brian Castrucci, MA
Marilyn Felkner, DrPH
Philip Huang, MD, MPH
Susan C. Penfield, MD

Susan U. Neill, PhD, MBA
Aaron Sayegh, PhD, MPH
Aashish Shah, MD
Lucina Suarez, PhD
David Zane, MS

DSHS Publication Number E59-12544

How to submit manuscripts for publication

The *EpiLink* welcomes the submission of articles on a variety of public health and medical topics for publication. In addition, the newsletter will focus on a different health topic each month, such as maternal and child health and border health issues. If you are interested in contributing articles for the monthly health focus, please read the chart for topics and deadlines.

Issue	Topic	Articles due by
April	Laboratory Services and Public Health Observances	April 2, 2007
May	Healthcare Associated Infections	April 30, 2007
June	Preparing for the 2007 Hurricane Season	May 28, 2007
July	Maternal and Child Health	July 2, 2007
August	Chronic Diseases	July 30, 2007
September	Mental Health	August 28, 2007
October	Influenza	October 1, 2007
November	Border Health Issues	October 29, 2007
December	Communication and Information Technology in Public Health	December 3, 2007
January	Environmental Issues and Occupational Diseases	January 2, 2008

Corrections

The article on the January 29, 2007, issue of *EpiLink*, *Methicillin Resistant Staphylococcus aureus Program*, contained several typographical errors, which have been corrected. In addition, the articles *Raising Vaccine Coverage Levels in Texas* and *Pertussis in Texas* did not provide electronic links in the *QuickLinks* features, which have been added. All corrections have been made in the electronic issue.