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State of Alaska Epidemiology **Bulletin**

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Toxicology Findings Associated with Violent Deaths — Alaska, 2003–2012

Background

Established in 2003, the Alaska Violent Death Reporting System (AKVDRS) is an active surveillance system that supports development, implementation, and evaluation of programs and policies designed to reduce and prevent violent deaths and injuries.[1] CDC funds 31 states to collect detailed violent death risk factor information that compiles the National Violent Death Reporting System (NVDRS). The NVDRS case definition for violent deaths encompasses deaths resulting from intentional self-harm or harm to another, legal intervention, unintentional firearm deaths, and deaths from an undetermined cause.[2] This *Bulletin* summarizes toxicology findings from AKVDRS during 2003–2012.

Methods

AKVDRS data obtained during 2003–2012 were collected from state and military medical examiner reports and hospital records, and were reviewed for toxicology findings related to substances of abuse. The data were divided into two 5-year subsets. Positive toxicology findings were analyzed by toxicology variables (substance category) and the decedent's assigned manner of death. Percentages were calculated using the number of decedents tested as the denominator in each category. AKVDRS data were then compared with national estimates, as reported by NVDRS.[3]

Results

During 2003–2012, 2,327 violent deaths were identified. Analyses for alcohol and other frequently abused drugs were conducted on clinical samples obtained from 1,280 (55%) of the decedents (Table). At least one positive toxicology result was found in 66% (841/1,280) of decedents tested; of whom, 46% (n=389) died from self-harm, 32% (n=273) died from homicide or legal intervention, 19% (n=160) died from an undetermined intent, and 2% (n=19) died from an unintentional firearm injury. Demographic characteristics of these 841 decedents are as follows: 615 (73%) were male; 44 (5%) were aged ≤17 years, and 795 (95%) were aged ≥18 years; 469 (56%) were White, 258 (31%) were Alaska Native, 36 (4%) were Black, and 78 (9%) were other/unknown.

As was true during 2003–2007, during 2008–2012, the most common positive toxicologic finding among decedents was alcohol (46%), followed by marijuana (23%), and opiates (15%; Table). Differences in positivity rates by substance during the two time periods were small overall (Table).

A comparison of AKVDRS to NVDRS data indicated that the percentage of decedents with a blood alcohol concentration (BAC) ≥0.08 g/dL or who used marijuana prior to death were substantially higher among Alaska decedents during 2008–2012 compared to all NVDRS decedents reported in 2010 (Table). While the proportion of decedents testing positive for opiates (including heroin and prescription drugs such as oxycodone and hydrocodone) has increased in recent years, the proportion of Alaska decedents who used opiates just prior to death during 2008–2012 were substantially lower than for all NVDRS decedents in 2010.

Precipitating circumstances were identified for 774 (92%) of the 841 decedents with positive toxicology results, and included the following:

- 173 (22%) had a known intimate partner problem;
- 146 (19%) had a known mental health problem;
- 141 (18%) had a history of mental health treatment, of whom, 128 (91%) were currently in treatment;
- 105 (14%) had been diagnosed with depression or dysthymia;
- 102 (13%) had a known physical health problem; and
- 35 (5%) died due to homicide/legal intervention while another crime was in progress, including 22 (63%) that involved physical or sexual assault, 16 (46%) that involved robbery or burglary, and 5 (14%) that involved illicit drug trade (note: some of these deaths were associated with more than one of the aforementioned crimes).

Discussion

Alcohol remains by far the most commonly identified substance of abuse in Alaska violent death victims, followed by marijuana and opiates. Moreover, a much higher proportion of Alaska decedents who tested positive for alcohol were found to have a BAC ≥0.08 g/dL than U.S. decedents overall (82% vs. 63%, respectively); however, this could be due in part to detection bias, as a much lower proportion of Alaska decedents received a BAC test compared to U.S. decedents (52% vs. 70%, respectively). Finally, the proportion of Alaska violent death decedents with a positive opioid toxicologic finding increased from 11% to 15% over the two time-periods.

Recommendations

1. Medical examiners should routinely test violent death decedents for alcohol and other drugs of abuse and determine if toxins identified were intoxicating or lethal.
2. Health care providers should enroll in Prescription Drug Monitor Programs to reduce misuse, abuse, and diversion of opioids and other controlled substances.

References

1. CDC, Injury Center, National Violent Death Reporting System. Available at: http://www.cdc.gov/violenceprevention/nvdrs/
2. Section of Epidemiology. Summary of Violent Deaths Update — Alaska, 2007–2011. *Bulletin* No 2, January 14, 2013. Available at: http://www.epi.alaska.gov/bulletins/docs/b2013_02.pdf
3. CDC. Surveillance for Violent Deaths — National Violent Death Reporting System, 16 States, 2010. *MMWR* 2013;63(1):1-33. Available at: http://www.cdc.gov/mmwr/pdf/ss/ss6301.pdf.

Table. Toxicology Findings Associated with Violent Deaths by Toxicology Variable — Alaska 2003–2012 and NVDRS 2010

	AKVDRS				NVDRS[3]	
	2003–2007 (N=1,064)		**2008–2012** (N=1,263)		**2010** (N=16,186)	
Substance Tested	Tested # (%)	Positive # (%)*	Tested # (%)	Positive # (%)*	Tested # (%)	Positive # (%)*
Blood Alcohol Concentration (BAC)	587 (55%)	271 (46%)	659 (52%)	305 (46%)	11,295 (70%)	3,781 (34%)
BAC ≥0.08 g/dL	–	233/271 (86%)†	–	250/305 (82%)†	–	2,386/3,781 (63%)†
BAC positive, level unknown	–	0 (0%)	–	0 (0%)	–	163/3,781 (4%)†
Amphetamines	501 (47%)	23 (5%)	634 (50%)	43 (7%)	8,593 (53%)	348 (4%)
Cocaine	512 (48%)	57 (11%)	636 (50%)	37 (6%)	8,732 (54%)	678 (8%)
Marijuana	508 (48%)	123 (24%)	627 (50%)	145 (23%)	5,978 (37%)	908 (15%)
Opiates	511 (48%)	55 (11%)	633 (50%)	98 (15%)	8,731 (54%)	2,098 (24%)

**Percentages based on number of decedents tested. †Percentage of BAC ≥0.08 g/dL based on number of decedents that tested positive for blood alcohol.*

(Contributed by Deborah Hull-Jilly, MPH, and Scott Saxon, Injury Surveillance Program, Section of Epidemiology.)