Alcohol Involvement in Snowmobile Operator Fatalities in Canada

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Over the past several decades, research has clearly established that the use of alcohol by drivers increases the risk of death and injury from motor vehicle crash involvement. However, research and programs have focused primarily on alcohol-related highway crashes while the role of alcohol in crashes involving vehicles intended primarily for off-road use has received little attention. The objective of this paper is to document the incidence of alcohol involvement in snowmobile operator fatalities in Canada from 1987 through 1998.

METHOD

The primary data on snowmobile fatalities were obtained from the Fatality Database of the Traffic Injury Research Foundation*.^{1,2} These data, collected from all provinces and territories in Canada, include information from coroners' files on the results of toxicological tests for the presence and amount of alcohol among persons fatally injured in motor vehicle crashes.

RESULTS

Over the 12-year period examined, a total of 1,046 persons died in snowmobile crashes in Canada. Vehicle operators accounted for 82.8% (866) of the fatalities, while passengers represented 12.8% (134). The remaining 46 (4.4%) fatalities were either pedestrians (33) or of undetermined status (13).

Table I presents information on alcohol involvement among snowmobile operator fatalities according to sex, age, time of day, and day of week. The overall testing rate of 80.6% among fatally injured snowmobile

operators is comparable to that among fatally injured drivers of highway vehicles (i.e., 80.5%).¹ Given a high rate of testing, estimates of the magnitude of alcohol involvement are not seriously biased by using only tested cases.³

The number (and percent) of operator fatalities, the number tested and the number of tested drivers who were found to have been drinking are displayed for each category in the first three columns of Table I. Odds ratios within each category and confidence intervals are presented in the columns on the far right. For example, the odds ratios indicate that fatally injured snowmobile operators between 26 and 35 years were about seven times more likely to have been drinking than those over 55. Night-time fatal crashes were 6.7 times more likely than daytime crashes to have involved a drinking operator. Crashes that occurred on the weekend (i.e., Friday night through Sunday) were almost twice as likely to have involved alcohol than crashes that occurred during the week.

Figure 1 shows the incidence and level of alcohol use among fatally injured snowmobile operators. The left side of the figure indicates that 70.6% of tested cases were found to have alcohol present. The bar on the right of the figure shows the

alcohol level among positive cases. About one in five (21.3%) fatally injured snowmobile operators who had been drinking had a blood alcohol concentration (BAC) below the statutory limit (i.e., ≤ 80 mg/dl); 25.8% had a BAC between 81 and 150 mg/dl. By far the largest single group of fatally injured drinking drivers were those with a BAC in excess of 150 mg/dl. This high-BAC group comprised 52.9% of all fatally injured snowmobile operators who tested positive for alcohol.

DISCUSSION

The data presented in this paper are consistent with the results from regional studies of snowmobile operator fatalities^{4,5} and highlight the fact that the impaired driving problem does not stop where the road ends. The incidence of alcohol use by fatally injured snowmobile drivers (i.e., 70.6%) was considerably higher than that among fatally injured drivers of highway vehicles in Canada (i.e., 46.0%) over the same period of time.¹ The high incidence of alcohol involvement in snowmobile operator fatalities, combined with the known impairing effects of alcohol, suggest that the operation of a motorized snow vehicle after drinking is an extremely dangerous activity.

Figure 1. Alcohol use among fatally injured snowmobile operators 1987-1998.

* The TIRF Fatality Database is jointly sponsored by the Canadian Council of Motor Transport Administrators and Transport Canada.

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TABLE I
Alcohol Use Among Fatally Injured Snowmobile Drivers Canada: 1987-1998

		DRIVERS*	NUMBER TESTED (% of drivers)	ALCOHOL POSITIVE (% of tested)	ODDS	ODDS RATIO	95 % C.I.
Sex	Female	42	25	14	1.27	1.00	
	Male	824	673	479	2.47	1.94†	0.87 - 4.35
		(4.8)	(59.5)	(56.0)			
		(95.2)	(81.7)	(71.2)			
Age	> 55	66	47	18	0.62	1.00	
	46-55	75	57	34	1.48	2.38‡	1.08 - 5.25
	36-45	137	114	78	2.17	3.49	1.72 - 7.09
	26-35	294	250	203	4.32	6.96	3.57 - 13.57
	18-25	226	194	149	3.31	5.33	2.71 - 10.49
	< 18	68	36	11	0.44	0.71	0.28 - 1.78
	Day/Night						
	Day (6:00-17:59)	241	201	88	0.78	1.00	
		(34.2)	(83.4)	(43.8)			
		(65.8)	(95.3)	(83.9)			
					5.23	6.71¶	4.60 - 9.78
Day of Week	Weekday	298	256	161	1.70	1.00	
	Weekend	491	441	332	3.05	1.80§	1.29 - 2.51
	Total	866	698	493			
		(37.8)	(85.9)	(62.9)			
		(62.2)	(89.8)	(75.3)			
			(80.6)	(70.6)			

* There were 11 crashes in which two snowmobile operators died. In 8 of these cases, both operators tested positive for alcohol; in the other 3 cases, one operator had been drinking and the other had not.

† Relative to Females

¶ Relative to Day

‡ Relative to > 55 years age group

§ Relative to Weekday

In recognition of the inherent dangers, the *Criminal Code* of Canada makes it an offence to operate a motorized snow vehicle while impaired or with a BAC in excess of 80 mg/dl. The isolated areas in which snowmobiling tends to occur render enforcement efforts difficult and inefficient. Hence, relatively few impaired operators are apprehended and charged. Community interventions using specially trained volunteers to assist in enforcement and safety efforts is one approach that shows potential.⁶

Further research on snowmobile crashes and the social and behavioural characteristics of the operators involved is required to gain greater insight into the circumstances and specific behaviours contributing to alcohol-related snowmobile crashes. Exposure data documenting the amount of snowmobile travel and the conditions under which it occurs would be of particular value in determining the risk of crash involvement. In addition, greater understanding of the relatively common practice

of consuming alcohol in combination with recreational snowmobiling would also assist in the development of new counter-measure programs.

Prevention programs incorporating technological innovations such as alcohol ignition interlock devices, which have been shown to have a beneficial impact on the behaviour of convicted drinking drivers,^{7,8} may also be of value in reducing the number of alcohol-related snowmobile crashes.

ACKNOWLEDGEMENTS

The author wishes to acknowledge Katharine Desmond for the data analytic work and Herb Simpson for comments on an earlier version of this manuscript.

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Received: October 12, 2000

Revise/Resubmit: December 20, 2000

Revised MS Received: June 4, 2001

Accepted: June 14, 2001