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Alcohol & Drug Use Among Drivers

British Columbia Roadside Survey **2010**

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ACKNOWLEDGEMENTS

This project was financially supported by:

- British Columbia Ministry of Public Safety and Solicitor General, Office of the Superintendent of Motor Vehicles
- British Columbia Ministry of Public Safety and Solicitor General, Police Services Division
- MADD Canada
- British Columbia Automobile Association Traffic Safety Foundation
- Canadian Centre on Substance Abuse
- Insurance Corporation of British Columbia
- Northern Health Authority
- Transport Canada

In addition, this project was made possible through the cooperation of and assistance from:

- Vancouver Police
- Saanich Police
- Abbotsford Police
- Royal Canadian Mounted Police (Kelowna & Prince George Detachments)

The authors also wish to thank Dr. Robert Foss of the University of North Carolina Highway Safety Research Center for his contribution to the survey design, procedures and staff training, and Krystel Carrier-Sabourin of CCSA for ongoing management and logistical support throughout the project.

Suggested citation: Beirness, D.J., & Beasley, E.E. (2011). *Alcohol and drug use among drivers: British Columbia Roadside Survey 2010*. Ottawa, ON: Canadian Centre on Substance Abuse

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This document can also be downloaded as a PDF at www.ccsa.ca

ISBN 978-1-926705-64-4

EXECUTIVE SUMMARY

In the spring of 2010, the Government of British Columbia announced new sanctions for drinking drivers. As part of an evaluation of the impact of these new sanctions, a random survey of drivers was conducted at pre-selected locations in British Columbia from Wednesday to Saturday nights in June 2010. The primary purpose was to gather information on the prevalence of alcohol use among nighttime drivers to be used as a pre-legislation baseline for the evaluation.

This study was also intended to extend the findings from a previous Roadside Survey (Beirness and Beasley 2009; 2010) to include a community in northern British Columbia as well as a community from the interior. An additional purpose of the survey was to gather information on the prevalence of drug use among drivers in the selected communities to complement and extend the information gathered as part of the 2008 Roadside Survey.

Drivers were randomly sampled from the traffic stream between 21:00 and 03:00 and were asked to provide a voluntary breath sample to measure their alcohol use and an oral fluid sample to be tested subsequently for the presence of drugs. Of the 2,840 vehicles selected, 86% of drivers provided a breath sample and 71% provided a sample of oral fluid.

Key findings include:

- 9.9% of drivers had been drinking;
- 7.2% of drivers tested positive for drug use;
- Cannabis and cocaine were the drugs most frequently detected in drivers;
- Alcohol use among drivers was most common on weekends and during late-night hours; drug use was more evenly distributed across all survey nights and times;
- Alcohol use was most common among drivers aged 19 to 24 and 25 to 34; drug use was more evenly distributed across all age groups; and,
- While driving after drinking has decreased considerably since1995, the number of drivers with blood alcohol concentrations (BACs) sufficient to be subject to provincial sanctions (i.e., over 50 mg/dL) or Criminal sanctions i (i.e., over 80 mg/dL) continues to be an area of concern.

The results show that drug use among drivers is not uncommon and that the pattern of drug use by drivers differs from that of alcohol use. For example, whereas the prevalence of alcohol use increases during late night hours, particularly on Friday and Saturday nights, drug use appears more consistent across days and times. The different patterns of alcohol and drug use by drivers suggest that driving after drug use presents a unique behaviour that differs from driving after drinking, indicating the need for a separate and distinct approach to enforcement, public education, prevention, and research.

In comparison to previous surveys conducted in British Columbia since 1995, there has been a considerable reduction in the proportion of drivers found to have been drinking. However, the proportion of drivers with BACs over 50 mg/dL and over 80 mg/dL remain high, suggesting the need for further initiatives directed specifically at these high-risk groups.

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INTRODUCTION

Background

In the spring of 2010, the Government of British Columbia announced new sanctions for drinking drivers that would come into force in September 2010. These measures included: an increase in the length of the immediate roadside suspension for drivers with blood alcohol concentrations (BACs) between 50 and 80 mg/dL from 24 hours to three days; possible vehicle impoundment for three days; an administrative penalty of $150; and a licence reinstatement fee of $200. The sanctions become more severe for repeat violations. The purpose of these new measures is to create a powerful deterrent to help reduce the prevalence of driving after drinking and the serious consequences that are often a result of such behaviour.

As part of an evaluation of the impact of these new sanctions, a random survey of drivers was conducted at pre-selected locations in British Columbia from Wednesday to Saturday nights in June 2010. The purpose of the survey was to gather information to serve as a baseline measure on the prevalence of alcohol and drug use among nighttime drivers. Five previous roadside surveys have been conducted in the lower mainland (i.e., Vancouver and Abbotsford) and capital region (i.e., Saanich) of British Columbia since 1995. The current survey extends this series of surveys and expands it by including a community in northern British Columbia as well as a community from the province's interior. The inclusion of these additional communities provides an indication of the extent of drinking and driving behaviour in other areas as well as a better assessment of drinking and driving in the province as a whole.

Previous roadside surveys in British Columbia have documented that driving after consuming alcohol is not uncommon. At the same time, these surveys have also shown that this behaviour has become less prevalent in recent years (Beirness & Beasley, 2009; 2010). For example, in 1995, 18.7% of drivers surveyed were found to have been drinking; in 2008, 8.1% had consumed alcohol. But while overall driving after drinking has decreased, recent surveys show an increase in the proportion of drivers with BACs in excess of 80 mg/dL. The proportion of drivers with BACs of this magnitude increased from 2.0% in 1995 to 2.7% in 2006. Although not necessarily alarming in itself, the trend is of some concern and runs contrary to the overall trend in drinking and driving as documented in previous surveys. The data highlight the fact that while many drivers have changed their behaviour in a positive way, many people continue to drive after consuming sufficient alcohol to impair their ability to operate a vehicle and put themselves and others at risk of serious injury or death. The new sanctions for drinking drivers in British Columbia are intended to help stem this trend and make the roads safer for all users.

In recent years, there has been increased concern about the use of drugs by drivers but little information about the extent of the problem. In response to this concern, the roadside survey conducted in 2008 included the collection of oral fluid samples from drivers to assess the prevalence of drug use. The findings revealed drug use among drivers to be of a magnitude comparable to that of alcohol use (10.4% and 8.1%, respectively). Monitoring the extent of drug use by drivers is necessary to identify the scope of the problem and to inform enforcement and prevention efforts.

Purpose of this project

The primary purpose of the roadside survey described in this report was to measure the extent of alcohol and drug use among nighttime drivers in five communities in British Columbia. This survey extends the 2008 Roadside Survey by including a northern community (Prince George) and a community from the interior (Kelowna). The data will also establish a baseline from which changes in drinking-driving behaviour can be assessed following the introduction of new impaired driving legislation in British Columbia. As well, because the current survey is the sixth since 1995 to measure the prevalence of alcohol use by drivers in British Columbia, the data can also be used to examine trends in drinking-driving behaviour.

In addition to measuring alcohol use, another purpose of the survey was to assess the extent of drug use among drivers in British Columbia. The results provide further evidence of drug use among drivers and extend the previous findings to the two additional communities.

METHODS

Sample size

Previous roadside surveys in British Columbia examining only alcohol use among drivers had a target sample size of 800 driver interviews in each city. In 2008, the additional few minutes required to collect oral fluid samples reduced the number of interviews that could be conducted to an average of 500 per community. In the expected range of drivers with positive BACs (i.e., 8% of drivers), the estimate in each community would have a 95% confidence interval of ± 2.4%.

An overall estimate of the incidence of drinking and driving as well as drug use and driving for the sampled area can be obtained by weighting the data to adjust for the disparity in the populations of the various communities. Combining the data in this manner, however, will not provide provincial estimates of driving after drug or alcohol use. An overall sample size of 2,500 would provide an estimate of the prevalence of drug or alcohol use among drivers with a 95% confidence interval of ± 1.2%.

The raw data were weighted to adjust for differences in the traffic volume at the various sites as well as for differences in the population of each community. This weighting procedure places greater emphasis on interviews from sites with higher traffic volumes and communities with larger populations. To account for the complex sampling design of the survey and provide a more accurate estimate of the variability of the point estimates, the confidence intervals were adjusted to include an estimated design effect factor of 1.44.

Site selection

Initial site selection in each city involved creating a grid on a map and numbering each section. Major roadway segments within each section were identified and numbered. Sections and roadway segments within those sections were then selected randomly. The designated roadways in the selected sections were searched for suitable locations to serve as survey sites. A suitable safe site was a parking lot or open area off the travelled portion of the roadway with a separate entrance and exit. Sufficient space was required for at least four survey lanes or bays. Ideally, the approach to the survey site was free of curves in the roadway, major intersections, obstructions to visibility and other potential safety hazards, as well as other traffic or parked vehicles during survey hours.

A total of 16 sites in each city were selected and confirmed for use in the survey. Permission to use each site was obtained from property owners and/or managers. In most cases, this required a telephone call to explain the nature of the request. In some cases a letter and/or personal visit from the project director was required.

Where possible, the same sites used for previous surveys in the original three cities were used again. Each site was visited prior to the survey to ensure it had not changed in a way that would compromise its use in the survey. In a few cases, the original site was no longer adequate or permission to use it could not be secured. In each case, an alternative site was selected.

Breath alcohol tests

Breath samples were analyzed for BAC using the Intoxilyzer 400D. This is a hand-held breath test instrument approved by the Attorney General of Canada for use by police. It is accurate to within ± 5 mg/dL.[1] For the purposes of this survey, readings below 5 mg/dL were considered to be zero. The instruments were calibrated using a standard of 50 mg/dL prior to use in the field.

To collect a breath sample, the interviewer first placed a new mouthpiece on the Intoxilyzer. The driver was instructed to blow firmly and steadily into the mouthpiece until told to stop. The device provides an auditory signal to indicate whether or not an adequate sample of breath has been collected. Within a few seconds, the device provides a digital display of the driver's BAC.[2]

[1]BAC is reported as mg alcohol per 100 ml blood, commonly abbreviated as mg/dL.
[2]When used by the police, the instruments are typically programmed to provide a digital display up to 49 mg/dL, and then display an 'A' to indicate BACs between 50–99 mg/dL and an 'F' for BACs of 100 mg/dL and over. For this survey, the devices were programmed to provide a digital display of BAC.

Oral fluid collection

The Quantisal oral fluid collection kit was used to gather samples to test for the presence of drugs. The device consists of a cellulose pad on a plastic stick. It collects a 1 ml sample of oral fluid. When a sufficient volume of fluid has been collected, a blue indicator appears on the stick. Completed samples were sealed in separate vials containing a small amount of buffer fluid.

The oral fluid samples were sent by courier to ASL Laboratories for analysis. Samples were initially screened for cannabis, cocaine, opiates, amphetamines, methamphetamine and benzodiazepines using enzyme immunoassay technology. Samples with a positive screen were confirmed by gas chromatography/mass spectrometry (GC/MS). The detection thresholds for each substance are listed in Table 1. Samples testing positive for cannabis were subjected to further analysis to quantify the concentration of cannabis (i.e., tetrahydrocannabinol, or THC) present.

It should be noted that a positive test for any substance does not necessarily imply that the driver was impaired. Rather, it indicates the presence of the substance at a concentration that exceeds the detection threshold. As well, a negative test does not necessarily confirm that the driver was drug-free. It is possible that samples with drug concentrations below the detection threshold or drugs not specifically screened for in the analysis would appear as being negative for drugs. Hence, the results should be viewed as an underestimate of the proportion of drivers who have used drugs.

Table 1: Drug Detection Thresholds

Drug	Detection Threshold
Amphetamines	25 ng/ml
Benzodiazepines	10 ng/ml
Cannabis	2 ng/ml
Cocaine	4 ng/ml
Methamphetamine	25 ng/ml
Opiates	10 ng/ml

Survey procedures

The survey was conducted using the same data collection procedures employed in previous surveys conducted in British Columbia, which were based on those outlined by Transport Canada, with a few minor modifications to improve the efficiency of the operation and to provide for the collection of oral fluid samples.

The protocol used in British Columbia dictates that drivers are to be randomly sampled from the traffic flow at locations that were pre-selected in the manner outlined previously. Interviews were conducted in four time periods (21:00 to 22:30; 22:30 to midnight; midnight to 01:30; and 01:30 to 03:00) on Wednesday, Thursday, Friday and Saturday nights throughout June 2010. Drivers were asked to voluntarily provide a sample of breath for analysis of alcohol content as well as a sample of oral fluid for subsequent analysis of drug content.

Four six-person crews carried out the survey. Each crew consisted of a crew chief, four interviewers and one traffic controller. In addition, a police officer was assigned to each crew to direct traffic safely off the roadway and into the survey site. An experienced supervisor was also on site to oversee field operations and assist the crew chief when required.

Each crew conducted interviews at two sites each night. One crew conducted interviews for 90 minutes at one site beginning at 21:00. At 22:30, this crew moved to another site and conducted interviews from midnight to 01:30. The second crew followed a similar schedule at different sites from 22:30 to midnight, and again from 01:30 to 03:00.

The primary role of the police officer was to direct vehicles into the survey site as requested by the survey crew. When signalled by a member of the crew, the officer selected the next available vehicle approaching the survey site in the specified direction and directed it into the survey site. This ensured that vehicles were randomly sampled from the traffic flow. The officer did not speak with drivers unless requested by a driver or member of the survey crew. Commercial vehicles were not included in the survey.

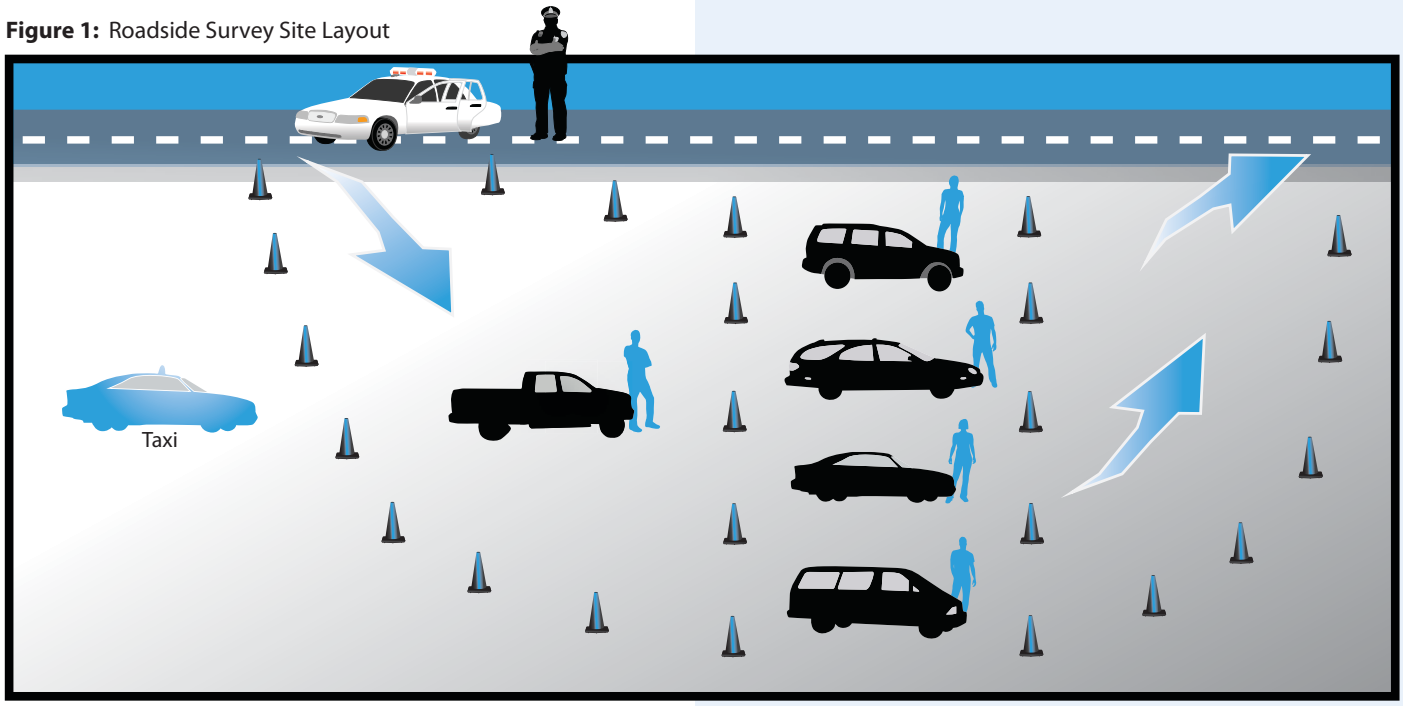
The typical site layout is illustrated in Figure 1.

Interviews

The interview process consisted of four parts: introduction, interview with the driver, breath test and the collection of an oral fluid sample. Once a vehicle was safely stopped in the survey site, the interviewer introduced him- or herself to the driver, briefly described the survey, and handed the driver a card explaining the survey and requesting his or her cooperation. (A copy of the information card is included in Appendix A.) While the driver read the card, the interviewer recorded observable information about the driver (e.g., sex), the vehicle (e.g., type) and any occupants (e.g., occupant configuration, sex).

The interviewer made it clear to the drivers that this was a voluntary and confidential survey. If the driver agreed to participate, the interview with the driver began. (A copy of the questions that comprised the roadside interview is included in Appendix B.)

Figure 1: Roadside Survey Site Layout



The third part of the survey involved the driver providing a breath sample to measure alcohol content. The interviewer introduced the Intoxilyzer and instructed the driver how to provide a proper breath sample. A new breath tube was unwrapped, attached to the device and presented to the driver to provide a breath sample.

The final step involved collecting a sample of oral fluid that would be sent to the lab for analysis of drug content. Drivers were informed that this part of the survey required a few minutes and that if they agreed to participate they would be given a coupon for $10 worth of gasoline. The interviewer explained the procedure and opened a sealed package containing the oral fluid collection device. Drivers were instructed to place the cellulose pad under their tongue for about three minutes. During this time, drivers were asked to complete a pencil-and-paper questionnaire about alcohol and drug use behaviours, as well as their opinions on various issues related to imparired driving, including the forthcoming legislation. (A copy of this questionnaire is included in Appendix C.)

Drivers with a BAC of less than 50 mg/dL were thanked for their cooperation and reminded to drive safely as they left the survey site. Drivers with BACs of 50 mg/dL or over, those who appeared intoxicated, and drivers who indicated they had a 'Learner' or 'Novice' (i.e., 'L' or 'N') licence with any positive BAC were asked to speak with the crew chief. The crew chief explained to the driver that they had consumed too much alcohol to drive safely and that they would be provided with safe transportation home.[3] A second breath test was then administered to ensure the initial positive test was not the result of mouth alcohol and to assure the driver that the initial reading was not in error. Whenever possible, passengers with a BAC under 50 mg/dL were recruited to drive their companion(s) home. When a passenger with a BAC below 50 mg/dL was not available, a taxi was provided. In this case, the driver's car was parked in an area adjacent to the survey site. In some cases, the driver called a friend or relative and was picked up.

[3]Drivers with an 'L' or 'N' licence are subject to a 'zero tolerance' restriction (i.e., it is a violation to drive with any amount of alcohol in their system). Licence status was self-reported during the interview. No attempt was made to verify licence status.

RESULTS

Response rates

A total of 2,840 vehicles were randomly sampled from the traffic flow for participation in the survey—569 in Vancouver, 708 in Saanich, 528 in Abbotsford, 500 in Prince George and 535 in Kelowna. Interviewers completed an average of 37 interviews in a 90-minute period. The number of interviews completed at each site ranged from 8 to 61 and depended on the volume and pattern of traffic, the number of refusals, the number of drivers who required transportation home, and the capacity of the survey crew to process drivers. The total number of interviews conducted was somewhat lower than in surveys conducted prior to 2008, when only alcohol samples were obtained. Much of this can be attributed to the additional 2 to 3 minutes required to collect oral fluid samples.

Among the 2,840 drivers selected, 86% provided a breath sample and 71% provided an oral fluid sample. Table 2 shows participation rates separately for each city. Participation rates for providing breath and oral fluid samples differed by community (χ^2=58.9, df=4, p<.01; χ^2=70.5, df=4, p<.01, respectively). Drivers in Vancouver were least likely to provide both breath and oral fluid samples; drivers in Prince George were most likely to provide both samples.

Table 2: Response Rates by Community

	Vehicles Selected	Provided Breath Sample	Provided Oral Fluid
Total	2840	2449 86.2%	2000 70.4%
Vancouver	569	448 78.7%	356 62.6%
Saanich	708	632 89.3%	500 70.6%
Abbotsford	528	462 87.5%	389 73.7%
Prince George	500	465 93.0%	415 83.0%
Kelowna	535	442 82.6%	340 63.6%

Drivers who refused the interview were asked to indicate a reason for not participating. The most common reasons cited were "in a hurry" (41.5%), "not interested" (27.8%), "language barrier" (8.1%), "civil rights" (10.7%) and "other" (8.9%). Fear of prosecution was mentioned by 3% of drivers who refused to participate. Many of the "other" comments included statements about not wanting to provide DNA. Some simply felt it was too invasive. Several drivers did not wish to put anything in their mouths and some claimed objections on religious grounds. The reasons for refusal did not vary according to city.

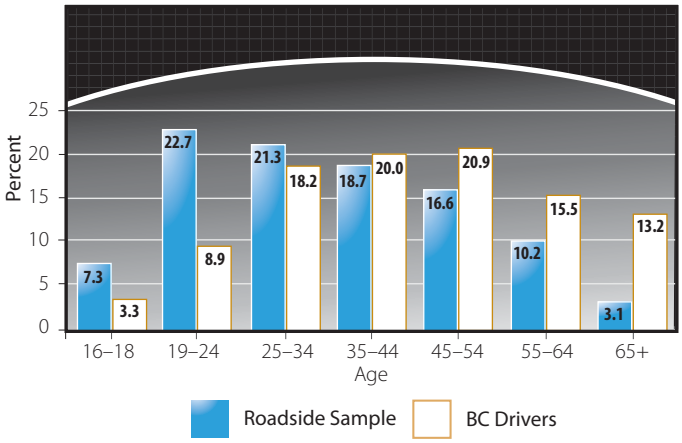
Characteristics of the sample

Driver sex: Males comprised 65.5% of all drivers interviewed, outnumbering females by almost 2 to 1. The distribution of driver sex varied by community (χ^2=17.6, df=8, p< .025). Male drivers were more common in Vancouver (71.6%) than in other communities (range 61.8% to 65.0%).

The distribution of male and female drivers did not vary according to the day of the week (χ^2=8.1, df=6, p>.23). There was, however, a significant difference in the proportion of male and female drivers according to the time of night (χ^2=27.6, df=6, p<.001). Males were more often behind the wheel later in the evening. The proportion of male drivers increased from 62.6% between 21:00 and 22:30 to 72.8% after 01:30.

Driver age: Drivers between the ages of 19 and 24 comprised 22.6% of all participants. This was followed closely by the group aged 25 to 34 (21.2%). Drivers 55 and older and those younger than 19 comprised the smallest proportions of the sample—13.6% and 7.4%, respectively. Figure 2 shows the distribution of age among drivers in the roadside sample compared to the age distribution of all drivers in British Columbia. The sample of drivers that participated in the roadside survey was considerably younger than the general population of licensed drivers in British Columbia, most likely

Figure 2: Age of Drivers in Roadside Sample and All B.C. Drivers



reflecting the fact that younger people are more likely to be on the road during late night hours.

The distribution of driver age varied by community (χ^2=85.5, df=20, p<.001). Younger drivers (age 16 to 18) were less common in Vancouver (2.1%) than in other communities. Kelowna had the highest percentage of young drivers (11.2%). Saanich had the highest proportion of drivers age 55 and over (17.1%).

The age distribution of drivers was similar among males and females (χ^2=5.3, df=5, p>.4) and did not vary significantly according to day of the week (χ^2=24, df=15, p>.06). Driver age did, however, differ according to time of night (χ^2=85.4, df=15, p<.001). There were fewer drivers over the age of 55 or under the age of 18 at later times.

Survey night: For the purposes of this report, a survey night is defined as the series of four sequential sites surveyed, beginning at 21:00 and ending at 03:00. For example, Wednesday is considered to include all interviews conducted between 21:00 Wednesday night and 03:00 Thursday morning. This convention facilitates the reporting of the results and is consistent with the reports of other roadside surveys.

The number of drivers interviewed increased progressively from 578 (20.4% of the total) on Wednesday nights to 826 (29.1%) on Saturday nights (χ^2=17.3, df=12, p=.14). More interviews were completed on Fridays and Saturdays, most likely a consequence of the higher traffic volumes on those nights. The distribution of interviews over the four nights did not differ according to community (χ^2=17.3, df=12, p=.14).

Time of night: In general, more interviews were completed at the earlier times (i.e., 21:00 to 22:30) than the later ones (i.e., 01:30 to 03:00). Overall, 28.6% of interviews were completed between 21:00 and 22:30, whereas 21.1% were completed between 01:30 and 03:00 (χ^2=32.4, df=3, p<.01). Again, this can be attributed primarily to lower traffic volumes later in the evening, particularly on Wednesdays and Thursdays. This temporal pattern did not differ among the five communities (χ^2=16, df=12, p>.19).

Vehicle type: The majority of vehicles were passenger cars (63.4%). Pickup trucks accounted for 12.3% of vehicles selected, 11.9% were sport utility vehicles (SUVs), and vans and minivans represented 5.0% and 6.1% of vehicles, respectively. Fewer than 2% of vehicles were motorcycles.

The distribution of interviews conducted according to the type of vehicle driven in each community is shown in Table 3. The distribution of vehicle types differed according to community (χ^2=163.0, df=28, p<.001). In Vancouver 70.7% of vehicles were cars compared to 65.8% in Saanich, 64.8% in Abbotsford, 52.8% in Prince George and 61% in Kelowna. Pickup trucks were more common in Prince George (20.1%), Kelowna (17.8%) and Abbotsford (12.3%) than Vancouver (3.8%) and Saanich (9.3%).

Table 3: Vehicle Type by Community

	Vancouver	Saanich	Abbotsford	Prince George	Kelowna	Total
Car	389	458	337	263	322	1769
(%)	(70.7)	(65.8)	(64.8)	(53.5)	(61.1)	(63.5)
Van	44	27	20	27	18	136
(%)	(8.0)	(3.9)	(3.8)	(5.5)	(3.4)	(4.9)
Minivan	22	42	38	47	21	170
(%)	(4.0)	(6.0)	(7.3)	(9.6)	(4.0)	(6.1)
Pickup	21	65	64	100	94	344
(%)	(3.8)	(9.3)	(12.3)	(20.3)	(17.8)	(12.4)
SUV	67	93	59	48	66	333
(%)	(12.2)	(13.4)	(11.3)	(9.8)	(12.5)	(12.0)
Motorcycle	7	11	2	7	6	33
(%)	(1.3)	(1.6)	(0.4)	(1.4)	(1.1)	(1.2)
Total	550	696	520	492	527	2785
(%)	(19.7)	(25.0)	(18.7)	(17.7)	(18.9)	(100.0)

Occupant configuration: Over half of all drivers interviewed (56.1%) were the sole occupant of the vehicle. Drivers with one passenger of either the same sex (11.8%) or different sex (18.9%) were the next most common. Vehicles containing a family, same-sex group or mixed-sex group represented 4.5%, 6.0% and 2.5%, respectively.

The distribution of occupant configurations varied according to community (χ^2=83.8, df=24, p<.001). Drivers as the only vehicle occupant were less common in Vancouver (49%) than Saanich (69.9%), Abbotsford (58.6%), Prince George (56%) or Kelowna (56%).

The distribution of occupant configurations varied by day of the week (χ^2=74.4, df=18, p<.001). Vehicles with just a sole occupant were more common on Wednesday and Thursday nights than on Friday and Saturday nights. Groups became more common on Friday and Saturday nights.

Occupant configuration also varied according to time of night (χ^2=56.4, df=15, p<.001). Vehicles with families were most commonly encountered at the earlier site times and rarely at later times. Groups of same or mixed sex occupants were more common at later site times than earlier.

Driving after drinking

The unweighted data show that 10.7% of all drivers who provided a breath sample had a positive BAC (i.e., ≥ 5 mg/dL). There were 163 drivers with a BAC below 50 mg/dL, comprising 6.7% of all drivers who provided a breath sample; 1.8% (44) of drivers had BACs between 50 and 80 mg/dL; 0.7% (17) had BACs between 81 and 100 mg/dL; 1.2% (30) of all drivers had BACs between 101 and 159 mg/dL; and, 0.3% (7) had a BAC over 160 mg/dL. The highest BAC recorded was 332 mg/dL. Over the course of this study, survey crews identified and removed from the road 98 drivers with elevated BACs, either by providing them with alternative transportation or having a passenger with a BAC below 50 mg/dL drive them home.

The raw data within each community were weighted to adjust for differences in the traffic volume at the various sites. This weighting procedure places greater emphasis on interviews from sites with higher traffic volumes. The weighted data thus provide better estimates of the extent of drinking and driving in each community than the raw (unweighted) data.

The five communities were not selected to provide a representative sample of all British Columbia drivers. Nevertheless, as a means to provide an overall estimate of the prevalence of drinking and driving in the five communities, the data were adjusted for population in each community and combined into a weighted total. This weighted total provides an estimate of the results of the survey across all five communities but should not be interpreted as a provincial estimate.

Table 4 shows the weighted distribution of the breath alcohol test results in each community. The first column (labelled "Breath Test") shows the weighted number of drivers tested in each community; the second column ("Alcohol Positive") shows the number and percentage of drivers in each community who had an alcohol-positive breath test (i.e., BAC ≥ 5 mg/dL) along with the 95% confidence interval for the estimate. The final columns in Table 4 show the number and percentage of cases in the following three BAC categories: 5 to 49 mg/dL; 50 to 80 mg/dL; and over 80 mg/dL. The final row ("Weighted Total") shows the combined results weighted for traffic volume and population in each city. Overall, 9.9% of drivers tested positive for alcohol; 2.2% had a BAC over 80mg/dL.

Table 4: Distribution of Driver BAC by Community*

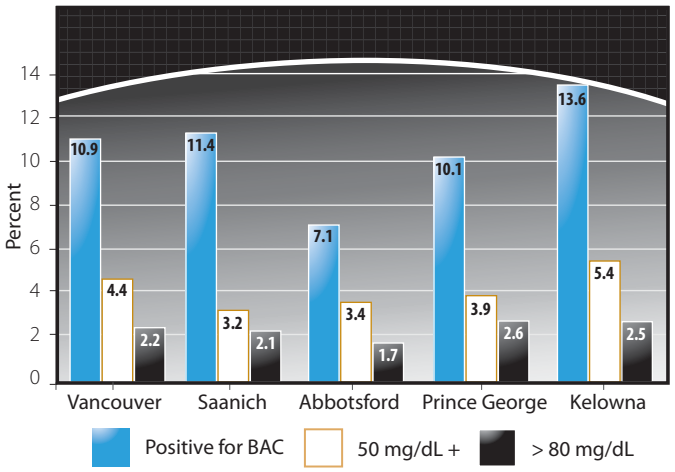
	Breath Test	Alcohol Positive	BAC Distribution (mg/dL) <50	50-80	>80
Vancouver	448	48 10.9 ± 4.1%.	29 6.5 ± 3.3%	10 2.2 ± 1.9%	10 2.2 ± 1.9%
Saanich	633	75 11.8 ± 3.6%	52 8.2 ± 3.1%	7 1.1 ± 1.2%	13 2.1 ± 1.6%
Abbotsford	462	33 7.1 ± 3.4%	17 3.7 ± 2.5%	8 1.7 ± 1.7%	8 1.7 ± 1.7%
Prince George	464	47 10.0 ± 3.9%	29 3.7 ± 3.1%	6 1.3 ± 1.5%	12 2.6 ± 3.1%
Kelowna	441	60 13.6 ± 4.6%	36 8.2 ± 3.7%	13 2.9 ± 2.2%	11 2.5 ± 2.1%
Weighted Total**	2306	229 9.9 ± 1.8%	147 6.4 ± 1.4%	33 1.4 ± 0.7%	48 2.2 ± 0.9%

* Weighted data.

** Weighted total is a combined estimate from all communities. (95% confidence intervals include an estimated design effect of 1.44.)

The percentage of drivers with a positive BAC differed by community (χ^2=15.1, df=4, p<.005). Kelowna had the highest percentage of drivers with positive BACs (13.6%) and Abbotsford had the lowest (7.1%). The distribution of BACs also differed among communities (χ^2=52.2, df=12, p<.01). Figure 3 shows the percentage of drivers with positive BACs, BACs of 50 mg/dL and over, and BACs over 80 mg/dL. Kelowna had the highest percentage of drivers that tested positive for alcohol as well the highest percentage of drivers with BACs of 50 mg/dL and over. Prince George and Kelowna had the highest percentage of drivers with BACs over 80 mg/dL (2.6% and 2.5%, respectively).

Figure 3: Drivers with BACs According to Community



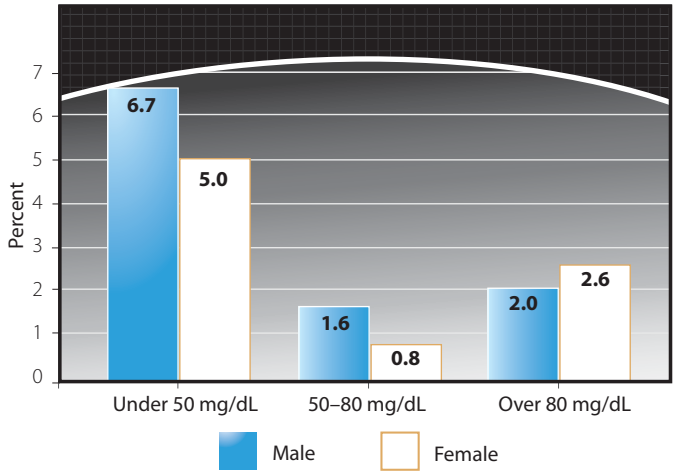
Characteristics of drinking drivers

This section examines the personal characteristics (e.g., age, sex, drinking patterns) of those drivers who were found to have a positive BAC. These characteristics can help to identify persons at greatest risk of driving after drinking. Weighted data were used for the analyses in this section.

Driver sex: Male drivers were overrepresented among drinking drivers. Although men comprised about two-thirds (65.5%) of all drivers interviewed, they accounted for 70% of all drinking drivers. Among male drivers, 10.3% were found to have been drinking; 8.3% of female drivers had been drinking (χ2=2.26, df=1, p>.12).

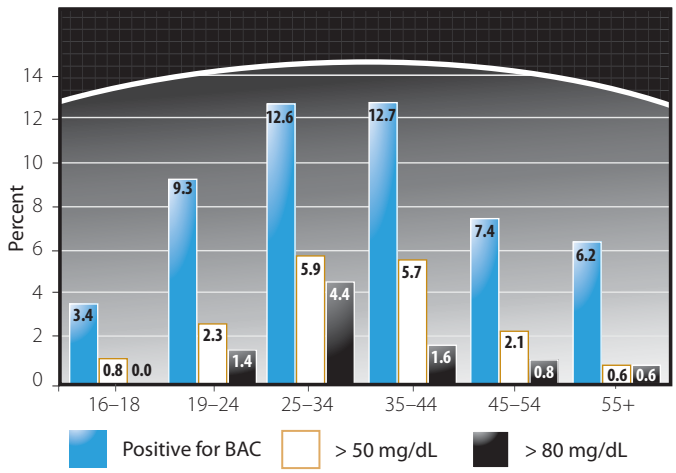
Figure 4 shows the percentage of male and female drivers according to BAC group. There was no difference in the BAC distribution between male and female drivers (χ^2=6.3, df=3, p>.05). Women were just as likely as male drivers to have a BAC greater than 80 mg/dL (2.6% versus 2.0%, respectively). Those with extremely high BACs (over 160 mg/dL) included female drivers. In fact, the driver with highest recorded BAC of 332 mg/dL was female.

Figure 4: BAC According to Driver Sex



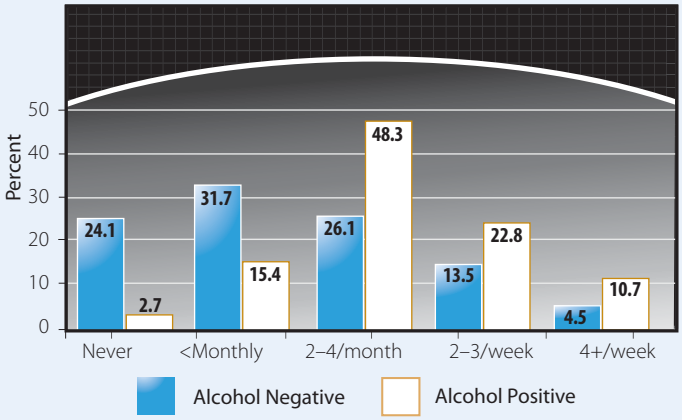
Driver age: There were significant differences in the percentage of drivers with positive BACs and BAC level according to driver age (χ^2=21.4, df=5, p<.001; χ^2=54.9, df=14, p<.001). Figure 5 displays the percentage of drivers with positive BACs, BACs of 50 mg/dL and over, and BACs over 80 mg/dL according to age. Drivers between the ages of 25 to 34 (12.6%) and 35 to 44 (12.7%) were more likely to test positive for alcohol. The highest percentage of drivers with a BAC over 80 mg/dL was among those age 25 to 34 (4.4%). Among those 16 to 18, 0.8% had a BAC over 80 mg/dL.

Figure 5: Alcohol Use According to Age



Self-reported alcohol use: Participants who provided an oral fluid sample also completed a self-report questionnaire on alcohol and drug use. Figure 6 compares the reported frequency of drinking between drivers who tested positive for alcohol and those who had not been drinking. Drinking drivers reported more frequent drinking occasions than non-drinking drivers (χ^2=21.4, df=5, p<.001).

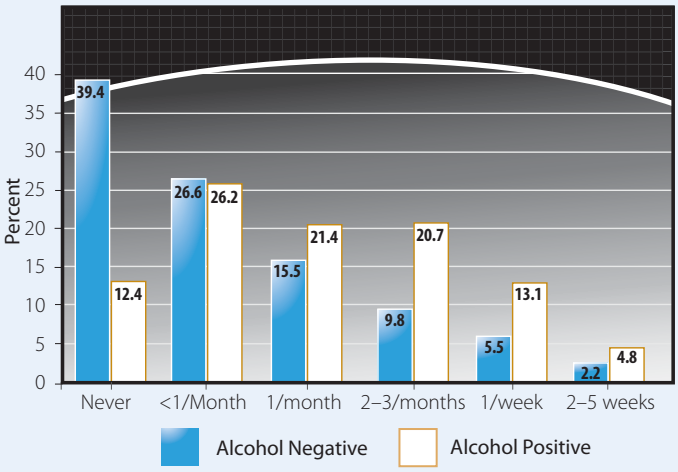
Figure 6: Frequency of Alcohol Consumption in the Past 12 Months



Drinking drivers also reported consuming a greater number of drinks per occasion (mean=3.0, sd=1.7) than drivers who had not been drinking (mean=2.4, sd=2.1) (F=9.04, df=1, p<.01).

Figure 7 shows the frequency with which drinking and non-drinking drivers report consuming four or more drinks on one occasion. It is apparent that drinking drivers consume four or more drinks more frequently than drivers who had not been drinking (χ^2=82.4, df=4, p<.001).

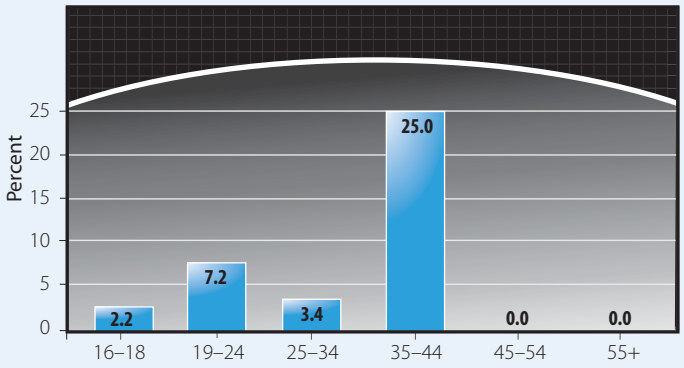
Figure 7: Frequency of Having 4+ Drinks on One Occasion in the Past 12 Months



Learner and novice drivers: Among drivers interviewed, 316 (13.3%) indicated that they had a 'Learner' or 'Novice' (i.e., 'L' or 'N') driver's license. Although there is a tendency to consider all new drivers as young, in fact, only 29.1% of 'L' and 'N' drivers were between 16 and 18 years of age; 40.8% were between the ages of 19 and 24, and the remaining 30.1% were over 25 years old.

In British Columbia, drivers with an 'L' or 'N' licence are restricted to driving with a zero alcohol level. Despite this restriction, 6.7% of these drivers tested positive for alcohol. There were no significant sex differences in alcohol positive rates. Figure 8 displays the percentage of alcohol-positive cases among 'L' and 'N' drivers according to age. Whereas alcohol use was relatively rare among young 'L' and 'N' licence holders, 25% of these drivers age 35 to 44 tested positive for alcohol. While most of drivers with this type of license had a BAC of between 5 and 49 mg/dL, there were several drivers with illegal BACs (over 80 mg/dL) and even one over 160 mg/dL.

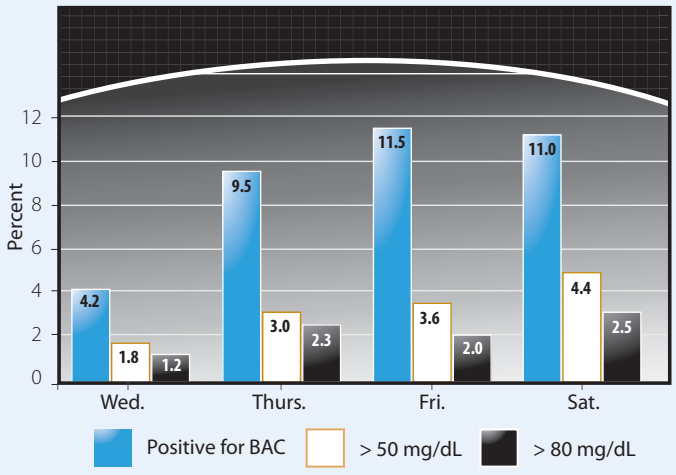
Figure 8: 'L' or 'N' Drivers Testing Positive for Alcohol According to Age



Characteristics of drinking and driving

This section examines the temporal and environmental circumstances (e.g., day of the week, time of day, type of vehicle, trip origin) surrounding drinking and driving behaviour. These characteristics can help identify circumstances under which drinking and driving is most likely to happen. Weighted data were used for the analyses in this section.

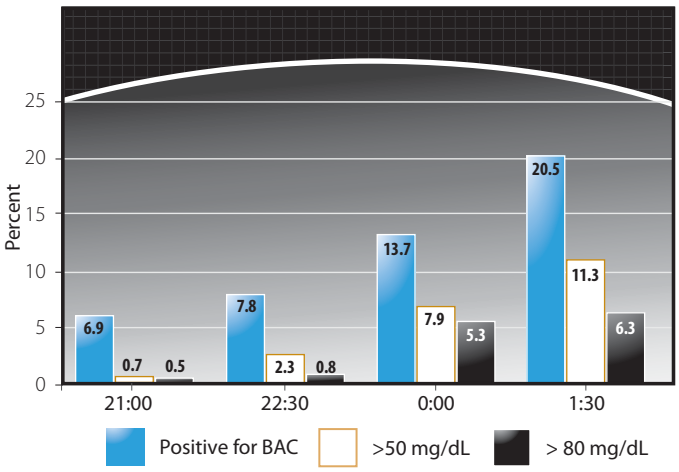
Figure 9: Percentage of Drivers According to BAC and Survey Night



Survey night: Figure 9 displays the percentage of drivers with positive BACs, the percentage with BACs of 50 mg/dL and higher, and the percentage with BACs over 80 mg/dL according to survey night. There were significant differences in positive BACs and BAC groups according to survey night (χ^2=15.1, df=3, p<.003; χ^2=18.8, df=9, p<.03). Wednesday represented the day with the lowest percentage of drivers with positive BACs (4.2%). This percentage increased on Thursday (9.5%) and again on Friday (11.5%) and Saturday (11%). There was a tendency for the percentage of drivers with BACs of 50 mg/dL and over to be higher on weekend nights (Friday and Saturday, 4.7%) than on weekday nights (Wednesday and Thursday, 3.2%) (χ^2=3.7, df=1, p=.055).

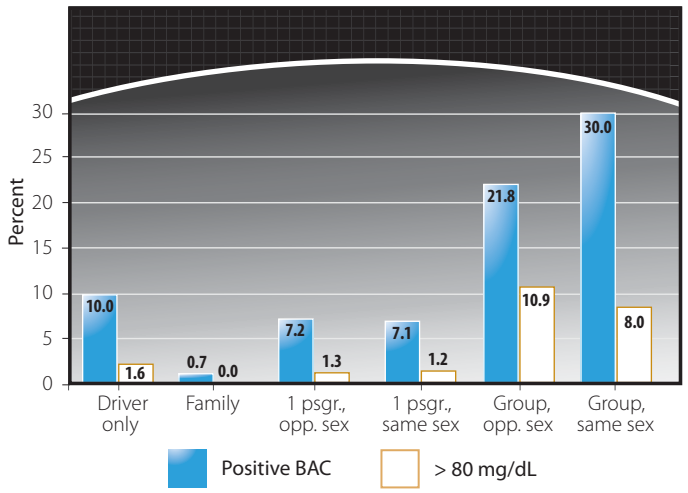
Time of night: Figure 10 displays the percentage of drivers with positive BACs, the percentage with BACs of 50 mg/dL and higher, and the percentage with BACs over 80 mg/dL according to time of night (i.e., site time). In general, the percentage of drivers who had been drinking increased over the course of the night from 6.9% at the early site time to 20.5% at the last site time. There were significant differences in positive BACs and BAC levels according to survey time (χ^2=51.2, df=3, p<.001; χ^2=18.8, df=9, p<.03). The percentage of drivers with BACs of 50 mg/dL and higher and those with BACs of 80 mg/dL and higher increased later in the night as well.

Figure 10: Percentage of Drivers According to BAC and Survey Time



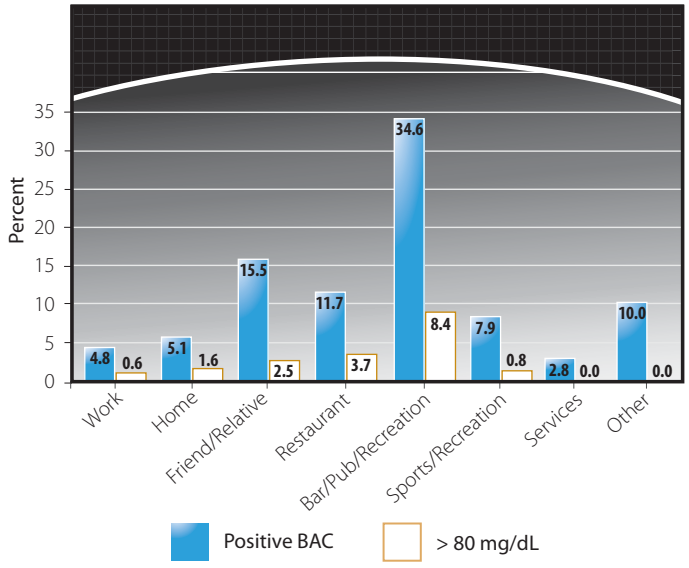
Occupant configuration: The majority of vehicles contained only a driver. However, as shown in Figure 11, the percentage of drivers with positive BACs and BACs over 80 mg/dL differed according to the number and type of other occupants in the vehicle (χ^2=61.9, df=5, p<.001; χ^2=73.4, df=5, p<.001). Vehicles with a group of same-sex or mixed-sex passengers were most likely to have a driver with a positive BAC or a BAC over 80 mg/dL. No drivers with a family in the vehicle had a BAC greater than 80 mg/dL.

Figure 11: Percentage of Drivers According to BAC and Occupant Configuration



Trip origin: Figure 12 displays the percentage of drivers with positive BACs and BACs over 80mg/dL according to the origin of the trip. There were significant differences in positive BACs and BAC levels according to where the drivers were coming from (χ^2=131, df=7, p<.001; χ^2=42.1 df=7, p<.001). The "Services" category included grocery stores, gas stations and airports; the "Other" category included people travelling to other cities, moving or visiting friends. About one-third (34.6%) of drivers leaving pubs/nightclubs/bars had been drinking; 8.4% had a BAC over 80 mg/dL. Of note, of the 4.8% of those coming from work who had been drinking, 0.6% had a BAC over 80 mg/dL, including one driver with a BAC over 160 mg/dL.

Figure 12: Percentage of Drivers According to BAC and Trip Origin



Alternatively, examining only those drivers with BACs over 80 mg/dL, 30% of those drivers were coming from the home of a friend/relative, 22.5% from a bar/pub/nightclub, 20% from restaurant, and 15.5% from home.

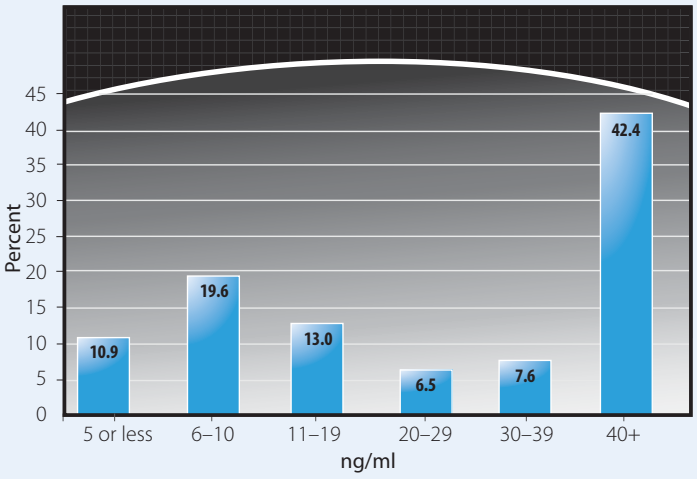
Drugs and driving

An examination of the raw (unweighted) data reveals that 166 (9.1%) of the samples collected tested positive for drugs.[4] Of these drug-positive cases, 83.2% involved a single drug and 16.8% tested positive for more than one drug. There were two individuals that tested positive for three drugs—one for cannabis, amphetamine and methamphetamine, and the other for cocaine, amphetamine and methamphetamine. Of those who tested positive for drugs, 11.0% had also consumed alcohol.

Cannabis was the most frequently found substance, accounting for 63.8% of drug-positive cases. Cocaine was detected in 31.8% of cases, opiates 11.1%, amphetamine 4.8%, methamphetamine 4.2% and benzodiazepines 2.4%. Cannabis with cocaine was the most common polydrug combination, accounting for 6.6% of all positive drug cases, followed by cocaine with opiates (2.4%).

Unique to the 2010 Roadside Survey was the quantification of the amount of cannabis (i.e., tetrahydrocannabinol, or THC) in the samples. THC is the psychoactive chemical in cannabis. Using oral fluid as the test medium provides THC concentrations that are reflective of the concentration of THC in blood and most likely reflect recent cannabis use. The minimum level detected was 2 ng/ml and the highest recorded level was "greater than 70 ng/ml". The mean level was 23.9 ng/ml (sd=15.8). The majority of samples were over 40 ng/ml. Figure 13 shows the distribution of cannabis levels detected. Experimental research shows that impairment of driving skills is evident at THC levels of 2 to 5 ng/ml and the risk of crash involvement begins to increase at THC levels of 1 ng/ml (Grotenhermen et al., 2007; Mura et al., 2003; 2006; Ramaekers et al., 2006). Caution should be used in the interpretation of THC levels over 40 ng/ml as these may reflect contamination by residual cannabis material in the mouth. While these latter readings may not necessarily be reflective of active blood-THC levels, at the very least they

Figure 13: THC Concentration Among Cannabis-Positive Samples



[4]There were 180 samples that were collected and sent but never received at the lab.

suggest very recent cannabis use (i.e., just prior to or while driving). Overall, the THC concentrations reported indicate that the vast majority of drivers who have used cannabis have consumed sufficient cannabis to impair their ability to operate a vehicle safely.

As was done with the alcohol data, the raw data within each community were weighted to adjust for differences in traffic volumes at the various survey sites. The weighted data provide better estimates of the extent of drug use by drivers in each community.

Data from the five communities can also be combined and weighted to account for population differences to estimate overall drug use by drivers across the five communities. Again, this estimate should not be interpreted as representative of the entire province.

Table 5 shows the weighted drug test results in each community as well as the overall estimate across communities. The first column ("Oral Fluid Sample") shows the weighted number of drivers in each community who provided an oral fluid sample. The second column ("Drug Positive") shows the number and percentage of drivers who tested positive for drugs along with the 95% confidence interval for the estimate. The final three columns in Table 5 present the number and percentage of cases that tested positive for cannabis, cocaine and opiates—the three most commonly found substances. Other drugs found (amphetamines, methamphetamines and benzodiazepines) are not shown. The last row ("Weighted Total") shows the combined results weighted for traffic volume and population in each city.

Table 5: Distribution of Driver BAC by Community*

	Oral Fluid Sample	Drug Positive	Drug Detected*** Cannabis	Cocaine	Opiates
Vancouver	351	23 6.6 ± 3.7%	13 3.7 ± 2.8%	8 2.3 ± 2.2%	4 1.1 ± 1.6%
Saanich	494	35 7.1 ± 3.3%	18 3.6 ± 2.4%	14 2.8 ± 2.1%	1 0.2 ± 0.6%
Abbotsford	375	37 7.2 ± 3.8%	20 5.3 ± 3.3%	5 1.3 ± 1.7%	4 1.1 ± 1.5%
Prince George	409	53 13.0 ± 4.7%	34 8.3 ± 3.8%	15 3.7 ± 2.6%	7 1.7 ± 1.8%
Kelowna	191†	28 14.7 ± 7.2%	21 11.0 ± 6.4%	10 5.2 ± 4.5%	3 1.6 ± 2.5%
Weighted Total**	1781	128 7.2 ± 1.7%	81 4.5 ± 1.4%	41 2.3 ± 1.0%	22 1.2 ± 0.7%

* Weighted data.

** Weighted total is a combined estimate from all communities. (95% confidence intervals include an estimated design effect of 1.44.)

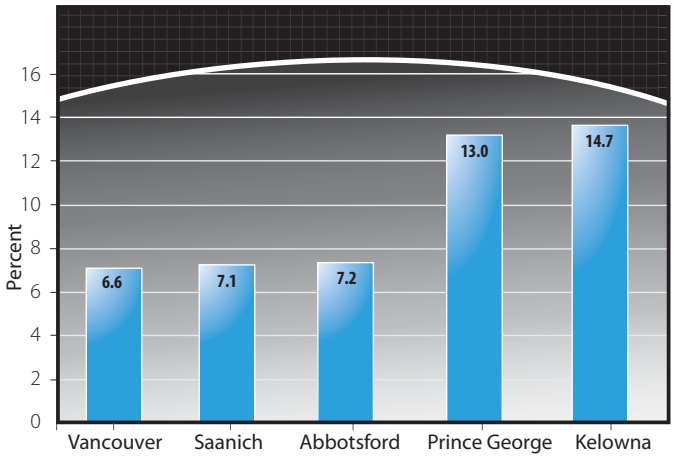
*** Some cases were positive for more than one substance. Not all drug categories included.

† Approximately half of the samples from Kelowna were lost in transit.

The weighted data show that 7.2% of drivers who provided an oral fluid sample tested positive for at least one potentially impairing substance other than alcohol. Cannabis (4.5%) and cocaine (2.3%) were the most commonly detected substances, followed by opiates (1.2%). Amphetamines, methamphetamine and benzodiazepines were detected in less than 1% of drivers (not shown).

The percentage of drug-positive cases differed significantly among the communities (χ^2=21.27, df=4, p<.001). As Figure 14 demonstrates, Kelowna and Prince George had almost double the rate of drug-positive drivers in comparison to the other communities. Although the numbers are small, there is a suggestion of differences in the types of drugs found among individuals from each community as demonstrated by Table 5.

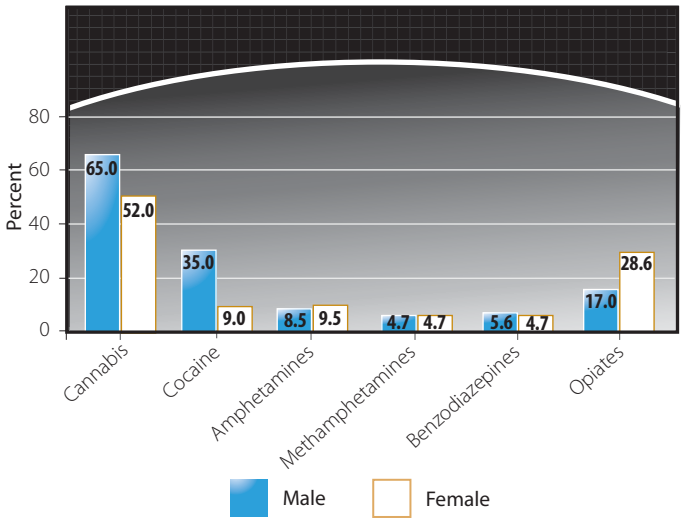
Figure 14: Percentage of Drug-Positive Drivers According to Community



Characteristics of drug-using drivers

Driver sex: Male drivers (9.5%) were more likely than females (3.3%) to test positive for drugs (χ^2=22.9, df=1, p<.001). Figure 15 shows the distribution of the types of drugs used by male and female drivers. Men were more likely to test positive for cannabis and cocaine whereas females were more likely

Figure 15: Distribution of Drug Types Among Male and Female Drivers

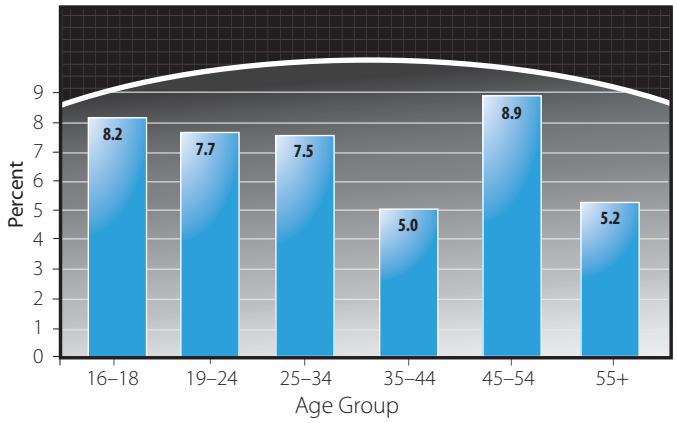


to test positive for opiates. In light of the small numbers within the drug-driver category, caution is warranted in the interpretation of these findings.

The mean cannabis concentration among male drivers was 22.3 ng/ml (sd=15.1) and did not differ significantly from that among females who had a mean of 28.8 ng/ml (sd=21.4) ($F=1.6$, $df=1$, $p>.21$).

Driver age: Figure 16 shows the percentage of each age group of drivers that tested positive for drugs. The proportion of drivers who tested positive for drug use was similar across all age groups ($\chi^2=3.64$, $df=5$, $p>.6$).

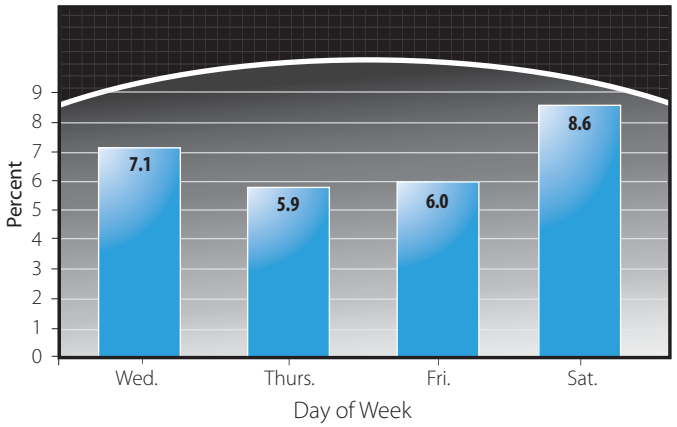
Figure 16: Percentage of Drug-Positive Drivers According to Age



Characteristics of drug use and driving

This section examines the temporal and environmental circumstances of drug-driving behaviour (e.g., day of the week, time of day, type of vehicle, trip origin). These characteristics can help identify circumstances under which driving after drug use is most likely to occur. For these and subsequent analyses, the data were weighted and pooled across cities.

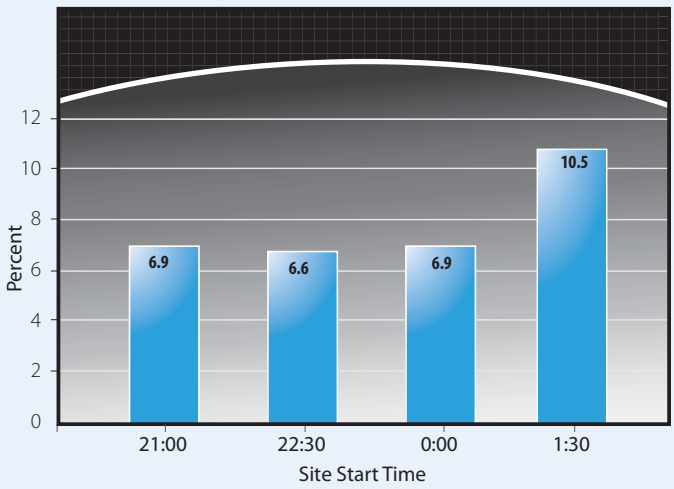
Figure 17: Percentage of Drug-Positive Drivers According to Survey Night



Survey night: Figure 17 shows the percentage of drivers who tested positive for drugs according to survey night. The differences between nights were not statistically significant ($\chi^2=3.9$, $df=3$, $p>.26$). There was no apparent difference in the types of drugs used by drivers according to survey night.

Time of night: In contrast to the findings on drinking drivers where alcohol was more likely to be found among drivers later in the evening, Figure 18 indicates that this was not the case for drug-positive drivers. Although there appears to be an increase in drug-positive cases at the latest survey time, the difference is not significant ($\chi^2=3.1$, $df=3$, $p>.37$). Once again, there was no apparent difference in the types of drugs used by drivers according to the time of night.

Figure 18: Percentage of Drug-Positive Drivers According to Survey Time

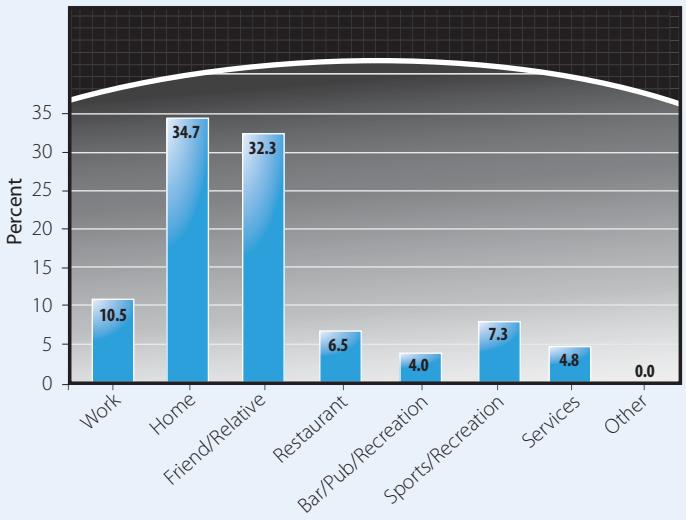


Occupant configuration: Drivers of vehicles with a same-sex passenger were most likely to test positive for drugs (11.2%), followed by drivers with a group of different sex passengers (9.5%); drivers only (7.8%); drivers with a single, different-sex passenger (5.2%); drivers with a family (3.4%); and drivers with a group of same sex passengers (2.4%) ($\chi^2=11.9$, $df=5$, $p<.04$).

Trip origin: Drivers coming from home were among the most likely to test positive for drugs (15.8%), followed by those coming from the home of a friend or relative (11%). Among drivers who had been at a bar, pub or nightclub, 5.5% tested positive for drugs, while 4.5% of drivers coming from a restaurant tested positive for drugs. Noteworthy, 4.3% of those drivers coming from work tested positive for drugs.

An alternative way to examine these data is to isolate those drivers who were found to have a positive oral fluid sample and examine where they were coming from. Figure 19 displays these results. About one third (34.7%) of all drug-positive drivers reported coming from their home. The home of a friend or relative (32.3%) and work (10.5%) were the next most common sources of drug-positive drivers.

Figure 19: Trip Origin of Drug-Positive Drivers

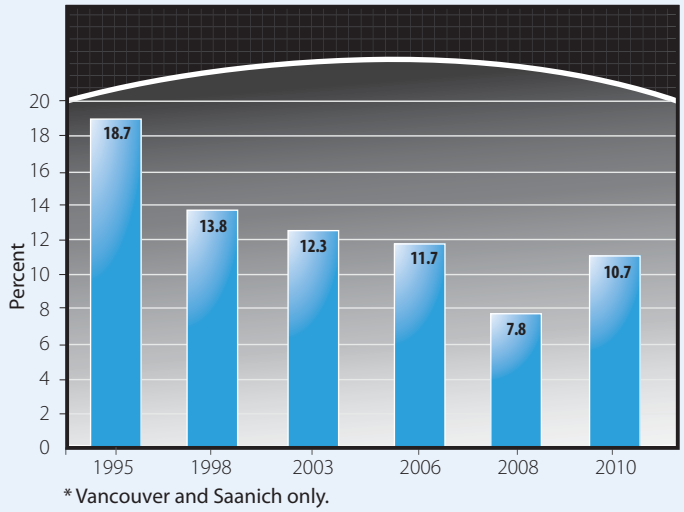


Trends in drinking and driving

Beginning in 1995, six roadside surveys of alcohol use by drivers have been conducted in Vancouver and Saanich. Abbotsford has been included in three previous surveys beginning in 2003. With the exception of the collection of oral fluid samples, which first occurred in the 2008 survey, the same methods were used in all surveys. This makes it possible to compare the alcohol test results from Vancouver and Saanich to examine trends in alcohol use among drivers since 1995.[5]

Figure 20 shows the percentage of drivers with positive BACs in Vancouver and Saanich over the course of the six surveys. Of note, the 1995 survey was conducted prior to the start of an enhanced enforcement campaign in both cities. This campaign involved an intensive program of enforcement checkpoints combined with media awareness activities over the summer months and into the fall (Beirness et al., 1997). It is apparent that driving after drinking has decreased substantially in these two cities—from 18.7% in 1995 to 7.8% in 2008, a reduction of 58% (z=8.17, p<.001). The recent findings suggest that this downward trend has ended and drinking and driving has returned to the level more comparable to that observed in 2006.

Figure 20: Percentage of Drivers Positive for Alcohol*

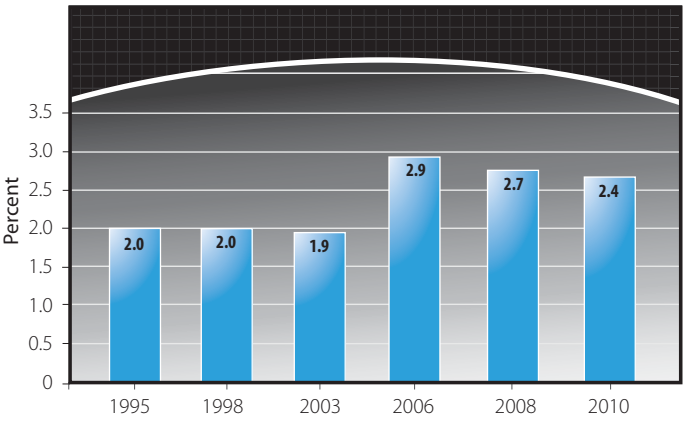


* Vancouver and Saanich only.

[5]In 1995 and 1998, surveys were conducted in June and again in the fall (Beirness et al., 1997; 2000). To ensure comparability of the data from different years, only the results from the spring surveys have been included in the trends.

While overall drinking-driving has decreased, Figure 21 shows that driving while legally impaired (i.e., with a BAC in excess of 80 mg/dL) has not changed appreciably since 1995. In fact, the incidence of BACs over 80 mg/dL has actually increased slightly in recent years, from 2.0% in 1995 to 2.9% in 2006. In the most recent survey, 2.4% of drivers had a BAC over 80 mg/dL. Although not shown in the figure, the number of drivers with high BACs (i.e., over 160 mg/dL) is of particular concern.

Figure 21: Percentage of Drivers with BACs > 80 mg%*



* Vancouver and Saanich only.

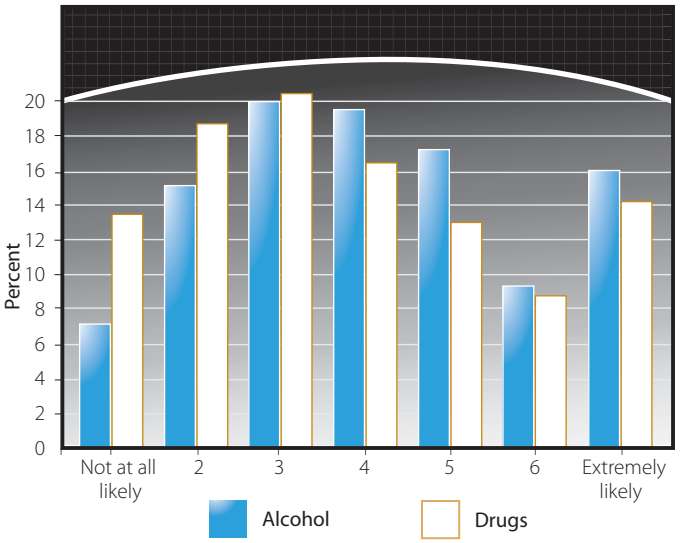
Attitudes, opinions and awareness

Drivers were asked two questions about perception of risk and enforcement. The first asked about the likelihood of a person being stopped by the police if he or she drove after drinking too much. The second question asked about the perceived likelihood of being stopped by the police after using drugs. Responses for both questions were solicited on a scale from 1 to 7, where 1 represented 'not at all likely' and 7 represented 'extremely likely'. Figure 22 represents the distribution of scores on both questions. The mean score for the alcohol question was 4.11 (sd=1.8) and the mean score for drug question was 3.72 (sd=1.9)(t=15.9, df=2227, p<.001), indicating that drivers thought is was more likely a person would be stopped for alcohol than drugs.

Responses differed according to the driver's BAC (F=10.6, df=3, p<.01), where those with BACs over 80 mg/dL (mean=4.98, sd=1.8) thought it was more likely an individual would be stopped than those who had not consumed alcohol (mean=4.12, sd=1.7). Drivers who tested positive for drugs did not differ from those who had not used drugs in terms

of their perceived likelihood of being stopped by the police after using drugs (F=.006, df=1, p>.09).

Figure 22: Perceived Likelihood of Being Stopped by Police After Alcohol or Drug Use Among Alcohol and Drug Positive Drivers



Participants were asked whether they were aware that B.C. would be increasing the severity of roadside sanctions for drivers with a BAC of .05 (i.e., 50 mg/dL) or over beginning in the fall of 2010. Although announced publically in the weeks prior to the survey, only 57% were aware of the new measures. Awareness of two existing impaired driving programs (i.e., B.C.'s Responsible Driver Program and the Ignition Interlock Program) was also assessed. Only 34.4% of respondents had heard of B.C.'s Responsible Driver Program for drinking drivers. Similarly, only 40.7% were aware of B.C.'s Ignition Interlock Program for drinking drivers.

Drivers were also asked their opinion on various enforcement strategies for impaired driving. Respondents answered all of these questions on scale from 1 to 7, where 1 represents 'completely disagree' and 7 represents 'completely agree'. The first question asked about the extent to which they agreed that the police should be able to require drivers to provide a breath test to measure alcohol at any time, even without suspicion. The mean response was 5.19 (sd=2) and 43.6% of drivers chose '7' as a response. Those who tested positive for alcohol (mean=4.31, sd=2.2) were less likely to agree with the statement than those who tested negative (mean=5.29, sd=1.9) (F=36.2, df=1, p<.001).

The second question asked about the extent to which they agreed that drivers should be required to submit to a drug test if the police suspect the driver is under the influence of drugs. The mean response was 5.7 (sd=1.7) with 52.2% of drivers choosing '7' as a response. Those who tested positive for drugs (mean=4.13, sd=2) were less likely to agree with the statement than those who tested negative (mean=5.83, sd=1.6) (F=119, df=1, p<.001).

Drivers were then asked about the extent to which they agreed with mandatory alcohol education programs for drinking drivers. The mean response was 6.2 (sd=1.3) with 62.2% of drivers indicating they completely agree (i.e., choosing '7' as a response). Those with a positive BAC (mean=5.24, sd=1.8) were less likely to agree with this statement than those who tested negative (mean=6.25, sd=1.2)(F=86.1, df=1, 0<.001). Additionally, those with a BAC over 80 mg/dL (mean=4.82, sd=1.7) were less supportive of this statement than those with a BAC under 80 mg/dL (mean=6.18, sd=1.3) (F=32.6, df=1, p<.001).

Drivers were also asked to rate the perceived inconvenience of some of the immediate sanctions imposed on drivers who have a BAC over 80 mg/dL. Responses were based on the scale from 1 to 7, where 1 represents 'not an inconvenience' and 7 represents 'a complete inconvenience'. Responses clearly indicate that both an immediate 90-day driving prohibition and a 30-day vehicle impoundment would be very inconvenient. Two-thirds of respondents (65.6%) perceived the 90-day suspension as a complete inconvenience (mean=6.14, sd=1.4). Similarly, 65.3% rated the 30-day impoundment as a complete inconvenience (mean=6.14, sd=1.5). There were no significant differences in responses regarding the perceived inconvenience of licence suspension between those who tested positive for alcohol and those who did not (F=1.8, df=1, p=.18). There was, however, a significant difference in the perceived inconvenience of vehicle impoundment between those who did and did not test positive for alcohol (F=4.7, df=1, p<.01). Impoundment was rated as less of an inconvenience for those who tested positive for alcohol (mean=5.89, sd=1.6) compared to those who tested negative (mean=6.15, sd=1.5).

DISCUSSION

Historically, roadside surveys have been conducted as a means to obtain an objective, scientifically valid estimate of the extent of driving after drinking within specified geographic and temporal parameters. Using a well-developed, standard technique, the roadside survey is a valuable tool for determining the magnitude and characteristics of the drinking and driving problem—and for monitoring changes over time. In addition, roadside surveys are an important approach in the evaluation of the impact of countermeasure programs and policies.

The present survey was conducted primarily to establish a baseline from which to assess the impact of new measures to deal with drinking and driving in British Columbia. To provide a more comprehensive picture of drinking and driving in the province, the survey was expanded to include an interior community (Kelowna) and a northern community (Prince George). A secondary purpose of the survey was to determine the extent of drug use among drivers.

Despite the high participation rates, concern remains that drinking drivers and those using drugs are more likely to refuse to participate, thereby introducing a bias into the results. For example, Wilson and Chen (2000) reported that those who refused to participate in a roadside survey more often showed characteristics of drinking drivers than non-drinking drivers. The potential bias introduced would make the estimates of alcohol and drug use as assessed in this survey conservative. Hence, there remains a need for appropriate caution in the interpretation of the findings.

Although the overall sample size was large, the proportion of drivers who tested positive for alcohol and/or drugs was relatively small. This results in small numbers of cases—too small to conduct detailed analyses of the characteristics of drivers who use specific types of substances and the circumstances of driving after using specific substances. Further research with much larger sample sizes is required to address issues concerning the characteristics and circumstances surrounding the use of specific drugs before driving.

The results of the survey reveal that driving after drinking remains a common behaviour on British Columbia roadways. Overall, 9.9% of drivers had a positive BAC. More importantly, 1.4% of drivers had a BAC between 50 and 80 mg/dL and 2.2% had a BAC in excess of 80 mg/dL. It is these latter two groups of drivers that are the target of the new legislative and enforcement measures in B.C.

Whereas the extent of drinking and driving has been assessed in Vancouver and Saanich on several occasions since 1995, the present survey was the first to be conducted in Kelowna and Prince George. These two communities are a considerable distance from the large metropolitan areas of the lower mainland and capital areas. Driving after drinking was somewhat more prevalent in Kelowna than in other communities but most drinking drivers had relatively low BACs (i.e., < 50 mg/dL). The overall prevalence of driving after drinking in Prince George was similar to that in other areas but driving with a BAC over 80 mg/dL was slightly more common. These findings may reflect different patterns of drinking within these two communities and may indicate that different countermeasure approaches may be appropriate. For example, simple reminders may be sufficient for responsible drinkers (i.e., those with BACs < 50 mg/dL) but more intensive enforcement measures may be required for those who drive with higher BACs.

In the 2008 survey, there were no drivers between the ages of 16 and 18 who had been drinking. This was considered to be a result of the graduated licensing program in British Columbia that restricted drivers with an 'L' or 'N' licence to a zero BAC. The present survey found that 13.3% of drivers reported having an 'L' or 'N' licence. Drivers with these types of licences were not necessarily young, nor were they necessarily free of alcohol. Of some interest, it was the older drivers with these types of licences that were most often in violation of the zero alcohol restriction. The reasons for this behaviour need to be explored.

As part of the survey, oral fluid samples were collected from drivers as a means to assess the extent of drug use. Overall, 7.2% of drivers who provided an oral fluid sample tested positive for one or more drugs. It would appear that the prevalence of drug use among drivers was lower than the 10.4% reported in 2008. However, caution needs to be exercised in making direct comparisons with the results of the 2008 survey because of the addition of two new cities in the 2010 survey. Although somewhat speculative at this point, this finding might possibly reflect the impact of the introduction of new legislative and enforcement measures

to deal with drug-impaired driving introduced in the month following the 2008 survey. Further studies are needed to establish trends in the use of drugs by drivers.

It should be noted that the drug results were primarily qualitative in nature (i.e., the analytic technique was limited to the detection of the presence of specific substances above the analytic threshold value). The presence of a substance in oral fluid indicates recent drug use but does not necessarily imply the driver's ability to operate a vehicle was impaired. The exception in the present study was samples that tested positive for cannabis. These samples were quantified to determine the concentration of THC present. Although a specific threshold for cannabis-induced impairment has yet to be established, levels of 5 ng/ml and higher are often associated with impairment and increased risk of crash involvement. In the present study, 90% of drivers who tested positive for cannabis had a THC level in excess of 5 ng/ml. This suggests that most of the drivers who tested positive for cannabis have consumed sufficient quantities of the drug to impair their ability to operate a vehicle safely and/or increase their risk of crash involvement.

The analytic procedure tested for a limited set of substances most likely to be used by drivers (i.e., cannabis, cocaine, opiates, amphetamines, methamphetamine and benzodiazepines). To the extent that other substances may have been used by drivers, the present findings should be viewed as a conservative estimate of the prevalence of drug use.

The present survey was the first time that drug use by drivers had been assessed in Kelowna and Prince George. As was the case with alcohol, it appeared that drug use patterns by drivers in these two communities differed from that in those communities included in the previous survey. Drug use among drivers was considerably higher in these outlying communities than in those in the lower mainland and capital areas.

The present findings are consistent with those from 2008 in that the patterns of drug use by drivers differed considerably from the well-known patterns of drinking and driving. For example, whereas the incidence of alcohol use by drivers increases during late-night hours and is more common on weekend nights, drug use among drivers appears to be more consistent across day and time. This suggests that the use of drugs by drivers represents a different behaviour than driving after alcohol use and therefore requires a distinct and separate societal response.

By conducting the survey in the same communities as previous surveys, the current survey contributes to existing trend data that monitor the extent of drinking and driving over time. Trend data are important not only as an ongoing surveillance activity but also to monitor and assess changes in the behaviour in response to environmental and legislative factors.

Since the first survey of this type was conducted in 1995, the overall proportion of drivers on the roads at night who have consumed some amount of alcohol has decreased considerably. This trend, however, is tempered by the continued high rates of drivers with BACs in excess of 50 mg/dL. This seems to indicate that fewer drivers are choosing to drive after drinking, but that those who do tend to do so after consuming sufficient quantities of alcohol to impair their ability to drive safely. This suggests that heavier drinkers have not been dissuaded from driving while impaired and continue to present a risk to all road users.

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APPENDIX A: Information Card

British Columbia 2010

ALCOHOL & DRUG DRIVING SURVEY

Please help in our effort to improve road safety.
A few minutes tonight will help save lives tomorrow!

We are asking for your help in a voluntary driver safety survey that deals with alcohol, drugs and driving. Your vehicle was selected completely at random for this survey—you are not suspected of any traffic violation.

CCSA - CCLAT | BCAA Traffic Safety Foundation | British Columbia The Best Place on Earth | Canada | MADD Mothers Against Drunk Driving Les mères contre l'alcool au volant | northern health

Front

This survey takes about 6 or 7 minutes to complete. If you choose to participate, a researcher will ask you a few questions and will also ask you to provide a breath sample to measure the amount of alcohol in your system. You are not suspected of drinking and driving—this information is requested from all drivers. If the breath test should happen to show that you have had too much to drink to drive safely, you will be asked to let a non-impaired passenger drive, or we will provide you with a safe ride home.

You will also be asked to provide a sample of oral fluid (saliva). These samples will be sent to a laboratory to test for the presence of drugs. The collection of oral fluid takes about 3 minutes. Should you agree to provide a sample, we will give you a coupon for $10 worth of gasoline.

Your answers to the questions and the results of your breath test and the oral fluid test will be anonymous and will be kept by the Canadian Centre on Substance Abuse. No identifying information will be kept in the data file.

This research is supported by the Office of the Superintendant of Motor Vehicles, the British Columbia Automobile Association Traffic Safety Foundation, the Government of Canada, Police Services Division, Northern Health Region, the Canadian Centre on Substance Abuse and your local police.

Any questions you have about this survey can be directed to the Project Director, Dr. Doug Beirness (dbeirness@ccsa.ca), or Neil Arason (604-294-2151, neil.arason@gov.bc.ca).

If you'd like further information on alcohol and drugs, or it you feel you need assistance or support with these issues, please contact:

Alcohol and Drug Information Referral Service
From the Lower Mainland: 604-660-9382
From the rest of BC: 1-800-663-1441
www.vcn.bc.ca/isv/adirs.htm

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APPENDIX B: Roadside Interview

ROADSIDE INTERVIEW - 2010

ID: _____

Driver sex: M F **Vehicle type:** Car Van Minivan Pickup SUV Motorcycle **Time:** _____ (when finished)

Occupant Configuration:

1. Driver only
2. Family (with kids)
3. 1 psgr, diff. sex
4. 1 psgr, same sex
5. Group, diff. sex
6. Group, same sex

Seat Belt Use:

Driver Y N
Pass Y N

1a. Where are you coming from?

1. work
2. home
3. friend/relative
4. restaurant
5. bar / pub / nightclub
6. movie
7. sports/recreation
8. other_____

1b. How long ago did you leave there? _____ minutes

1c. Where are you going to?

1. work
2. home
3. friend/relative
4. restaurant
5. bar / pub / nightclub
6. movie
7. sports/recreation
8. other_____

2. What year were you born? _____ **2.a. Do you have a *Novice* or *Learner* license?** Y N

3. How likely do you think it is, that if a person drives after drinking too much, they will be stopped by the police? [where **1** = *not at all likely* **7** = *extremely likely*] _____

4. How likely do you think it is, that if a person drives after using drugs, they will be stopped by the police? [where **1** = *not at all likely* **7** = *extremely likely*] _____

Now I have a question about alcohol.

5. Have you had anything to drink in the last 12 hours?

2 = No

1 = Yes → **How long ago did you finish your last drink?**

_____hrs. _____min.

6. Where did you do most of your drinking tonight?

1 Bar
2 Restaurant
3 Own home
4 Friend/relative's house
6 Other _____

BAC: _____ (3 digits)

Coupon: Y N

IF REFUSED: Interview / BAC / Saliva / Drug Ques.

1. language
2. in a hurry
3. not interested
4. civil rights
5. fear of prosecution
6. other _____

Oral Fluid Sticker Here

APPENDIX C: Alcohol & Drugs Use Questionnaire

Alcohol and Drug Questionnaire

These questions are for research purposes only. If you don't want to answer a particular question, just leave it blank. This will take approximately five minutes to complete.

Please mark the response that best reflects your answer.

1. Are you aware that beginning in fall 2010, B.C. will be increasing the severity of roadside sanctions for drinking drivers with a blood alcohol concentration (BAC) over .05?

   YES ____ *NO* ___

2. Have you heard of B.C.'s Responsible Driver Program for drinking drivers?

   YES ____ *NO* ___

3. Have you heard of B.C.'s Ignition Interlock Program for drinking drivers?

   YES ____ *NO* ___

4. Are you a driver in the Graduated Licensing Program (a driver with an L or N sticker)?

   NO ____ (Go to Question 5)

   YES ____ Are you aware that you must have 0 BAC whenever you drive? YES ____ NO ____

5. Are you aware that in B.C. a person can face roadside sanctions (including driving prohibitions and vehicle impoundment) for driving with a BAC over .05?

   YES ____ *NO* ___

6. To what extent do you agree that the police should be able to require drivers to provide a breath sample to measure alcohol at any time, even without suspicion? (Circle the number please)

   1 2 3 4 5 6 7
   (Completely Disagree) (Neutral) (Completely Agree)

7. To what extent do you agree that drivers should be required to submit to a drug test if the police suspect the driver is under the influence of drugs?

   1 2 3 4 5 6 7
   (Completely Disagree) (Neutral) (Completely Agree)

8. To what extent do you agree with mandatory alcohol education programs for drinking drivers?

   1 2 3 4 5 6 7
   (Completely Disagree) (Neutral) (Completely Agree)

9. To what extent would it be an inconvenience for you if your licence was suspended for 90 days?

   1 2 3 4 5 6 7
   (Not at all inconvenient) (Neutral) (Extremely inconvenient)

10. To what extent would it be an inconvenience for you if your vehicle was impounded for 30 days?

    1 2 3 4 5 6 7
    (Not at all inconvenient) (Neutral) (Extremely inconvenient)

Please turn over

11. In the past 12 months, how often did you have a drink containing alcohol?

□ *Never* □ *Monthly or less* □ *2-4 times/month* □ *2-3 times/week* □ *4 or more times/week*

If Never, skip ahead to question #14 please.

12. During the past 12 months, on those days that you drank, how many drinks did you usually have?

_____

13. How often in the past 12 months have you had 4 or more drinks on one occasion?

□ *Daily* □ *2 to 5 times a week* □ *Once a week* □ *2 to 3 times a month* □ *Once a month*
□ *Less than once a month* □ *Never* □ *Don't know*

14. Please indicate (with an **x**) when you last used any of the following medications/drugs:

	Never	Over 12 months ago	Within past 12 months	Within past 30 days	Tonight
Cough/cold Medicines					
Amphetamines (Ritalin, Aderall, etc.)					
Muscle Relaxants (Robaxasal, Robaxacet)					
Anti-depressants (Prozac, Celexa, etc.)					
Marijuana/hashish					
Cocaine (crack or coke)					
Ecstasy					
GHB					
Phencyclidine (PCP)					
Sedatives (Valium, etc.)					
Methamphetamine					
Heroin, methadone					
Pain medications (Morphine, codeine, Tylenol 2 or T 3's, Oxycodone, Percocet, Demerol)					
Ketamine					

Sticker or Number