Alcohol and Drug Use Among Drivers Following the Introduction of Immediate Roadside Prohibitions in British Columbia: Findings from the 2012 Roadside Survey

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EXECUTIVE SUMMARY

In the spring of 2010, the Government of British Columbia announced new measures to deal with drinking drivers that would be implemented in September 2012. The Immediate Roadside Prohibition (IRP) program involved a series of increased sanctions applied at roadside for drivers with blood alcohol concentrations (BACs) starting at 50 mg/dL. As part of an evaluation of the impact of the IRP legislation on the drinking-driving behaviour of drivers, a survey of drivers was conducted in five communities in British Columbia in June 2010 and again in June 2012.

Drivers were randomly selected from the traffic stream between 21:00 and 03:00 on Wednesday through Saturday nights and 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 2,513 vehicles selected for the survey in 2012, 89% of drivers provided a breath sample and 70% provided a sample of oral fluid. Driving after drinking was found to have decreased significantly following the introduction of IRP. Overall, driving after consuming any amount of alcohol decreased by 34% -- from 9.9% of drivers in 2010 to 6.5% of drivers in 2012. The prevalence of driving with a BAC of 50 mg/dL or over fell by 42%. Compared to similar roadside surveys dating back to 1995, these levels of drinking and driving were the lowest ever recorded.

The decreases in drinking and driving were not restricted to specific sub-groups of drivers but were universal across age groups, sex, and communities. The results also revealed a changing pattern of drinking of driving. For example, the typical pattern of increased drinking and driving on weekend nights was not observed and the prevalence of drinking drivers on the road during late night hours was less than half that found in 2010. No driver with a BAC over 80 mg/dL reported that they were coming from a bar, pub or nightclub. Together, these findings are evidence of a profound and universal change in drinking and driving in British Columbia following the introduction of the IRP legislation in September 2010.

The prevalence of drug use by drivers in 2012 did not change from the levels reported in 2010. Overall, 7.4% of drivers tested positive for drugs; in 2010 7.2% of drivers were drug-positive. Once again, cannabis and cocaine were the most commonly detected substances. As was the case in previous surveys, the pattern of drug use by drivers was more consistent than alcohol use across age groups, days of the week, and time of night.

It was evident from the interviews and questionnaires that drivers in British Columbia were aware of the new IRP legislation and remain concerned about impaired driving. They appear willing to accept tough measures in support of efforts to improve the safety of the roads.

Several challenges remain to sustain the observed changes and further reduce the impact of impaired driving. Male drivers between 25 and 34 years of age remain the most likely to drive after consuming impairing amounts of alcohol. Although females are less likely than males to drink and drive, when they do, they tend to do so with elevated BACs. Of the drinking drivers that remain, they tend to be frequent and/or heavy drinkers. Also, the overall prevalence of drug use among drivers has not changed but there were increases in drug use among certain subgroups. These issues continue to be in need of further study and extra attention is required to develop appropriate and effective policies and programs for education, prevention, enforcement, and rehabilitation.

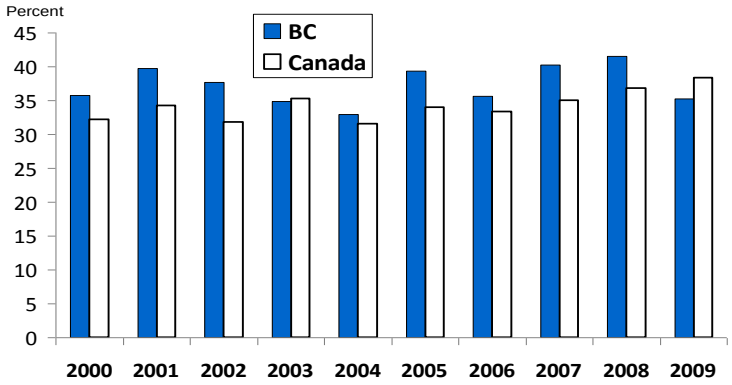
INTRODUCTION

Background

Following unprecedented decreases in the magnitude of the alcohol-crash problem during the 1980s and into the 1990s, recent years have shown little change in the number of alcohol-related serious crashes. For example, as illustrated in Figure 1, between 2000 and 2009, the percentage of all fatally injured drivers in Canada with a blood alcohol concentration (BAC) in excess of 80 mg/dL[1] varied between 31% and 38% with no distinctive upward or downward trend. A similar lack of trend is evident in the comparable data from British Columbia.

Roadside surveys of drivers, conducted periodically in British Columbia since 1995, have shown that while driving after consuming alcohol has become less prevalent in recent years, driving with an elevated BAC (i.e., 50 mg/dL or higher) has not changed substantially (e.g., Beirness and Beasley 2011). For example, in 1995, 18.7% of drivers surveyed were found to have been drinking; in 2010, only 9.9% had consumed alcohol. In contrast, the proportion of drivers with elevated BACs was actually higher in 2010 than it was twelve years earlier. These data illustrate that while many drivers have changed their behaviour in a positive way, far too many continue to drive after consuming sufficient alcohol to increase their risk of crash involvement, posing a danger to all road users.

Figure 1: Percentage of Fatally Injured Drivers with BACs > 50 mg/dL (British Columbia and Canada: 2000 – 2009)



A New Approach

In an effort to change behaviour and reduce the number of serious crashes attributable to alcohol, in the spring of 2010, the Government of British Columbia announced new measures to deal with drinking drivers that would come into force in September 2010. These measures included: an increase in the length of the immediate roadside prohibition for drivers with BACs between 50 and 80 mg/dL from 24 hours to 72 hours;

[1] In this report, BAC is reported in mg alcohol per 100 ml (or 1 dL) of blood. A BAC of 50 mg/dL is sometimes reported as 50 mg% or .05%. Most provinces in Canada impose sanctions on drivers starting at a BAC of 50 mg/dL. The *Criminal Code of Canada* specifies 80 mg/dL as the limit above which it is a criminal offence to operate a vehicle.

possible vehicle impoundment for 72 hours; an administrative penalty of $200; and a licence reinstatement fee of $250. The sanctions became increasingly more severe for repeat violations. Drivers found to have a BAC in excess of 80 mg/dL were subject to an immediate roadside prohibition of 90 days, 30-day vehicle impoundment, a $500 fine, a $250 licence reinstatement fee, plus enrolment in the Responsible Driver Program and the Ignition Interlock Program.[2] These new measures had all the characteristics of effective deterrence – i.e., they were applied immediately, they were applied with a high degree of certainty, and they were considerably more severe than the previous 24-hour prohibitions that had been in place for many years.

Prior to the implementation of these new measures, a random survey of drivers was conducted in five communities in British Columbia from Wednesday through Saturday nights in June 2010. The purpose of this survey was to gather information that would serve as a baseline measure of the prevalence of alcohol use among nighttime drivers. If the new sanctions were effective, there should be a decrease in the prevalence of drivers with elevated BACs. A roadside survey was deemed the best means of assessing behaviour change among the general population of drivers. In addition, six previous roadside surveys have been conducted in the lower mainland and capital regions of British Columbia (i.e., Vancouver and Saanich) since 1995. The current survey would extend this series of surveys and provide longer term trend data.

The roadside survey procedure also provided the opportunity to ask drivers about their awareness of, and opinions about, impaired driving legislation and countermeasure programs. Questions addressing these issues were included in both the 2010 and 2012 surveys.

In addition, recent years have seen increased concern about the use of drugs by drivers. A recent study reported that 33% of fatally injured drivers in Canada tested positive for a psychoactive drug. The prevalence of drugs among drivers who die in crashes rivals that of alcohol and indicates a problem of comparable magnitude. Hence, as a means to learn more about the use of drugs by drivers, since 2008 roadside surveys in British Columbia have collected oral fluid samples from drivers to assess the prevalence of drug use. Although the new measures introduced in 2010 were specific to alcohol, it was also deemed important to assess potential changes in the extent of drug use.

Purpose

The roadside survey described in this report was designed to measure the extent of alcohol and drug use among nighttime drivers in five communities in British Columbia as a means to determine the extent to which driving after drinking has changed in the 21 months following the introduction of the Immediate Roadside Prohibition legislation (IRP). The data from the survey conducted in 2010, using the same methods in the same communities prior to the implementation of the new legislation was used as a baseline from which changes in drinking-driving behaviour could be assessed. Changes in awareness of the legislation and opinions about various countermeasures were also examined. In addition, the current survey is the seventh such survey to measure the prevalence of alcohol use by drivers in selected cities in British Columbia, so the data were used to examine longer term trends in drinking and driving.

[2] Details of the sanctions can be found at www.pssg.gov.bc.ca/osmv

The present survey was also only the third time the extent of drug use among drivers has been assessed in British Columbia. The results provide further evidence of drug use and extend the previous findings. Because the new legislation was specific to drinking and driving, it was not expected to have an impact on the use of drugs by drivers.

METHODS

The survey was conducted using the same data collection procedures employed in previous surveys conducted in British Columbia, which were based on those originally outlined by Transport Canada and updated with a few minor modifications to improve the efficiency of the operation (e.g., improved breath test technology) and to provide for the collection of oral fluid samples (Boase 2012).

Sample Size
The target was to interview approximately 500 drivers in each of the five communities. Assuming a simple random sample, 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 ± 1.1%.

An overall estimate of the incidence of drinking and driving as well as drug use and driving for the sampled areas can be obtained by weighting the data to adjust for the disparity in the number of vehicles available at each site (i.e., traffic flow) and the populations of the various communities. This weighting procedure places greater emphasis on data from sites with higher traffic volumes and communities with larger populations.

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 selected sections were searched for suitable locations to serve as survey sites. A suitable site was a parking lot or open area off the travelled portion of the roadway with a separate entrance and exit. There had to be sufficient space 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, other potential safety hazards, and was free of other traffic or parked vehicles during survey hours.

Permission to use each site was obtained from property owners and/or managers. In most cases, this required a phone call to explain the nature of our request. In some cases a letter and/or personal visit from the project director was required.

Where possible, the same sites chosen for previous surveys in all 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.

A total of 16 sites in each city were selected and confirmed for use in the survey.

Survey Procedures

Drivers were randomly selected from the traffic flow at pre-selected locations in four time periods (21:00-22:30; 22:30-00:00; 00:00-01:30; and 01:30-03:00) on Wednesday, Thursday, Friday, and Saturday nights in June. Four six-person crews carried out the survey. Each crew consisted of a crew chief, four interviewers, and one traffic controller. A police officer was assigned to each crew to direct traffic safely off the roadway 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. This allows for six hours of continuous data collection.

The primary role of the police officer was to direct vehicles into the survey site as requested by the survey crew. The officer did not speak with drivers unless requested by a driver or member of 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. Commercial vehicles were not included in the survey.

The interview process consisted of four parts: an introduction, an interview with the driver, a breath test and the collection of an oral fluid sample. Once a vehicle was safety 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 was reading the card, the interviewer recorded observable information about the driver (e.g., sex), the vehicle (e.g., type), seat belt use, and occupant configuration.

The interviewer ensured that drivers understood 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.

Breath alcohol tests

The third part of the survey involved the driver providing a breath sample to measure alcohol content. 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. Readings below 5 mg/dL were considered to be zero. The instruments were calibrated using a standard of 30 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 then 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.[3]

Oral fluid samples

The final step involved collecting a sample of oral fluid (saliva) using the Quantisal oral fluid oral collection kit, that would be sent to the lab for analysis of drug content. 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 plastic 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.

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

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, including awareness of the new legislation and various countermeasure programs (Appendix C).

Impaired Drivers

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[4] 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

[3] When used by the police, the instruments are programmed to provide a digital display up to 49 mg/dL, and then display an "A" to indicate BACs between 50 and 99 mg/dL, and "F" for BACs of 100 mg/dL and over. For this survey, the devices were programmed to provide a digital readout of BAC.

[4] 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.

alcohol to drive safely and that they would be provided with safe transportation home. 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 or designated driver service[5] was provided. If necessary, the driver's car was parked in an area adjacent to the survey site.

RESULTS

Response Rate

A total of 2,513 vehicles were randomly selected from the traffic flow for participation in the survey -- 581 in Vancouver, 499 in Saanich, 473 in Abbotsford, 454 in Prince George and 506 in Kelowna. Interviewers completed an average of 32 interviews in a 90-minute period. The number of interviews ranged from 9 to 47 and depended at each site 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 time required to collect oral fluid samples. Overall the number of vehicles passing the survey sites was down approximately 7% overall from 2010. Vehicle counts were higher in Vancouver, Prince George and Kelowna than in 2010 but lower in Saanich and Abbotsford. The number of interviews was down 11.5%.

Table 2 shows participation rates separately for each of the five cities. Among the 2,513 drivers selected, 89.6% provided a breath sample and 70.4% provided an oral fluid sample. Response rates were comparable to the 2010 survey. Participation rates for providing breath and oral fluid samples differed by community (χ^2=13.8, df=4, p<.01; χ^2=16.4, df=4, p<.01). Drivers in Vancouver were least likely to provide breath and oral fluid samples; drivers in Prince George were most likely to provide breath samples and those from Abbotsford most likely to provide oral fluid samples.

Table 2: Participation Rates by Community

	Vehicles Selected (n)	Provided Breath Sample (%)	Provided Oral Fluid (%)
Total	**2513**	**89.6**	**70.4**
Vancouver	581	87.3	64.7
Saanich	499	89.8	71.7
Abbotsford	473	89.2	75.1
Prince George	454	94.1	72.9
Kelowna	506	88.5	68.8

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. The potential bias introduced would make the estimates of alcohol and drug use

[5] Designated driver services provide a vehicle and a second driver to transport the impaired person and his or her vehicle home.

as assessed in this survey conservative. An analysis of observable characteristics (e.g., sex, vehicle type, occupant configuration) and environmental factors (e.g., day of week, time of night) suggests that those who refuse to participate share factors that more closely resemble non-drinking drivers than drinking drivers. This provides a degree of confidence that drivers who refuse are not necessarily doing so because they have been drinking.

Drivers who refused to participate in the survey were asked to indicate a reason for not participating. The most common reasons cited were "in a hurry" (48.9%), "not interested" (18.6%), "language barrier" (7.8%), "civil rights" (6.8%) and "other" (15.9%). Fear of prosecution was mentioned by only 2% of drivers who refused to participate. Among those drivers refusing to provide an oral fluid sample, many of the "other" comments included statements about not wanting to provide DNA.[6] Some simply felt it was too invasive and made them uncomfortable. Several drivers did not wish to put anything in their mouths. Others stated objections on religious grounds. The reasons for refusal varied according to city (χ^2=45.2, df=20, p<.01). Language barriers were sited more frequently as a reason for not participating in Vancouver (16.2%) compared to other cities (Saanich - 7.4%, Abbotsford - 6.1%, Prince George - 3.0%, Kelowna - 3.4%). Other reasons for not participating were similar across cities.

Males (89.5%) and females (90%) had similar rates for providing breath samples (χ^2=0.13, df=1, p.71) yet there were significant (χ^2=8.2, df=1, p<.01) differences for providing an oral fluid sample with females (74.2%) more likely to provide a sample than males (68.6%). Reasons for refusal did not vary by sex (χ^2=5.3, df=5, p>.38).

Site Night

Compliance with the request for a breath test and oral fluid sample did not differ according to the night on which the survey was conducted (χ^2=6.7, df=3 p>.08; χ^2=4.8, df=3 p>.19, respectively).

Site Time

Table 3 displays response rates by site time. There were significant differences in breath tests according to site time (χ^2=10.0, df=3 p<.02). Participation rates were highest during sites between 21:00-22:30 with 92.7% of participants providing a breath sample. Participation decreased to 88-89% during the other three later site times. Reasons for refusal did not vary across the various site times.

There were also significant differences in compliance with the request to provide an oral fluid sample according to site time (χ^2==42.9, df=3 p<.001). Participation rates decreased throughout the night from 78.1% during the 21:00-22:30 sites to 61.1% during the 01:30 to 03:30 sites.

[6] Oral fluid samples were only used to test for the presence of drugs. DNA was not part of the testing protocol.

Table 3: Participation Rate by Site Time

Site Time	Provided Breath Sample (%)	Provided Oral Fluid (%)
21:00-22:30	92.7	78.1
22:30-00:00	88.8	71.1
00:00-01:30	87.8	69.2
01:30-03:00	88.7	61.1

Vehicle Types

Participation rates for providing breath samples did not vary according to the type of vehicle driven (χ^2= 6.8, df=5, p>.23). Compliance did, however, vary for oral fluid samples (χ^2=13.9, df=5, p<.016). There were 14 motorcyclists in the survey and only 4 (28.6%) provided an oral fluid sample. Drivers of all other types of vehicles had participation rates of over 67%.

Characteristics of the Sample

This section describes the characteristics of the sample. Unweighted data were used for these analyses so as to provide a picture of the drivers who actually participated in the survey.

Driver sex

Men comprised 66.9% of all drivers interviewed, outnumbering women by almost 2 to 1. The distribution of driver sex varied by community (χ^2=29.3, df=4, p< .001). Male drivers were more common in Vancouver (76.2%) than other communities (range 62.7% to 65.6%). A similar pattern was found in 2010.

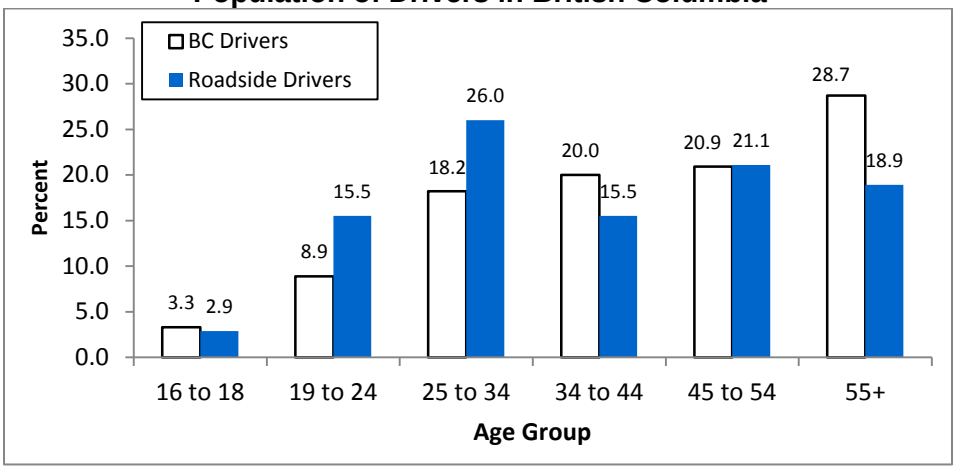
The distribution of male and female drivers did not vary according to the day of the week (χ^2=.95, df=3, p>.80). There was, however, a significant difference in the proportion of male and female drivers according to the time of night (χ^2=9.7, df=3, p<.03). Men were more often behind the wheel later at night. The proportion of male drivers increased from 64.5% between 21:00 and 22:30 to 71.8% after 01:30. Similar patterns were seen in 2010.

Driver age

Figure 2 provides the distribution of driver age for the roadside sample compared to the age distribution of the general population of drivers in British Columbia. In the Roadside sample there was a greater proportion of younger drivers, indicating that younger drivers are more likely to be out driving at night. Among the drivers at roadside, ages ranged from 16 to 89 years of age with a mean of 38.8 years old (SD = 15). Those age 25 to 34 made up the largest age group with 26.0% of the sample.

Compared to the 2010, the percentage of those 16 to 18 years of age was lower (from 7.2% to 2.9%) and there were more drivers 55 years and older (3.1% to 18.9%).
The distribution of driver age varied by community (χ^2=56.0, df=20, p<.001). Younger drivers (age 16 to 18) were less common in Vancouver (1.9%) than in other communities (4.3% to 5.7%). Kelowna and Saanich had the highest percentage of drivers over 55 years of age with 17.2% and 18.7% respectively.

Figure 2: Age Distribution of Drivers in the Roadside Sample and the Population of Drivers in British Columbia



The age distribution of drivers was similar among men and women (χ^2=8.7, df=5, p>.11) and did not vary significantly according to day of the week (χ^2=9.0, df=15, p>.87). Driver age did, however, differ according to time of night (χ^2=104.9, df=15, p<.001). The percentage of drivers over 55 decreased steadily from 22.4% between 21:00 to 22:30 to 5.9% between 01:30 and 03:00. In contrast, the percentage of drivers between 19 to 24 increased at later times (15.7% between 21:00 to 22:30 to 27.5% between 01:30 and 03:00) as did the percentage of those 25 to 34 years of age (23.7% between 21:00 to 22:30 to 31.4% between 01:30 and 03:00.

Survey night

For the purposes of this report, a survey night is defined as the series of four sequential sites at which interviews were conducted, 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 564 (22.4% of the total) on Wednesday nights to 683 (27.2%) on Saturday nights. More interviews were generally completed on Fridays and Saturdays - 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=17.5, df=12, p=.13).

Time of night

In general, more interviews were completed at the early sites (i.e., 21:00 to 22:30) than the later sites (i.e., 01:30 to 03:00). Overall, 27.3% of interviews were completed between 21:00 and 22:30 whereas 21.9% were completed between 01:30 and 03:00. 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=18.5, df=12, p>.09).

Vehicle types

The majority of vehicles selected for the survey were passenger cars (61.8%). Sport utility vehicles (SUVs) accounted for 17.1% of vehicles selected followed by pickup

trucks (12.4%), vans (4.8%) and minivans (3.6%). Less than 1% of vehicles were motorcycles.

The distribution of vehicle types differed according to community (χ^2=125.0, df=20, p<.001). In Vancouver, 68.1% of vehicles were cars. This compares with 61.9% in Saanich, 66.7% in Abbotsford, 59.5% in Kelowna and 51.6% in Prince George. Pickups accounted for a higher percentage of all vehicles in Prince George (24.8%) than in Kelowna (13.8%), Saanich (12.5%), Abbotsford (10.1%), and Vancouver (3.1%).

Occupant configuration
Over half of all drivers interviewed (58.2%) were the sole occupant of the vehicle. Vehicles with a drivers and one passenger of either the same sex (12.2%) or different sex (17.9%) were the next most common. Vehicles containing a family, same-sex group or mixed-sex group represented 3.2%, 2.2%, and 6.4%, respectively.

The distribution of occupant configurations did not vary according to community (χ^2=19.6, df=20, p>.47) nor did it vary according to the sex of the driver (χ^2=11, df=5, p>.05).

The distribution of occupant configurations varied by day of the week (χ^2=73.2, df=15, p<.001). The percentage of vehicles with just a driver decreased steadily from 65.6% on Wednesday night to 48.7% on Saturday night. Vehicles with one opposite-sex passenger increased from 14.1% on Wednesday to 24.0% on Saturday night. Groups were more common on Friday and Saturday nights.

Occupant configuration also varied according to time of night (χ^2=77.1, df=15, p<.001). Vehicles with families were most commonly encountered at the earlier site times (7.0% at the 21:00 – 22:30 site) and rarely at later times (1.3% between 01:30 and 03:00). Groups of same- or mixed-sex occupants were more common at later site times (11.5%) than earlier times (7%).

Driving after Drinking

The unweighted data show that 8.3% of all drivers who provided a breath sample had a positive BAC (i.e., ≥ 5 mg/dL). There were 109 drivers with a BAC below 50 mg/dL, comprising 4.8% of all drivers who provided a breath sample; 1.4% (36) of drivers had BACs between 50 and 80 mg/dL; and 1.6% (41) had a BAC over 80 mg/dL. Among this latter group, there were 8 drivers with BACs over 160 mg/dL. The highest BAC recorded was 400 mg/dL[7]. Over the course of this study, survey crews identified and removed from the road 77 drivers with elevated BACs, either by providing them with alternative transportation or having a passenger with a BAC below 50 mg/dL take over behind the wheel.

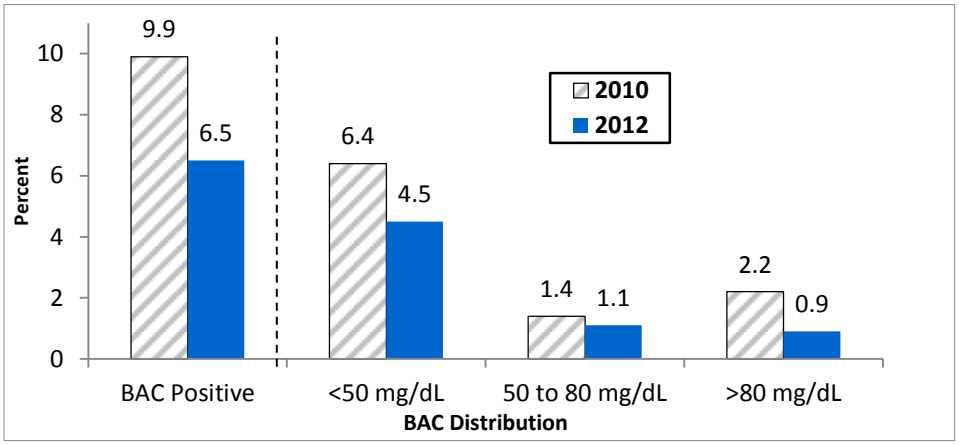
The raw data were weighted to adjust for differences in the traffic volume at the various sites. This weighting procedure places greater emphasis on interviews from sites with higher traffic volumes. The data were also adjusted for population in each community and combined into a weighted total. This weighted total provides an estimate of the

[7] The Intoxylizer has a maximum reading of 400 mg/dL.

results of the survey across all five communities but should not be interpreted as a provincial estimate.

Figure 3 presents the percentage of drivers who tested positive for alcohol as well as the distribution of BAC in 2010 and 2012. In 2012, 6.5% of drivers were found to have been drinking. This represents a 35% decrease from the 9.9% of drivers were positive for alcohol in the 2010 survey (z=4.19 p<.001). Not only was there an overall decrease in the percentage of drivers with positive BACs (χ^2=20.6, df=3, p<.001), there were decreases in every BAC group. Notable was the decrease in the percentage of drivers with a BAC over 80 mg/dL. In 2010, 2.2% of drivers had a BAC of this magnitude; in 2012 less than 1% of drivers had a BAC over 80 mg/dL -- a 59% decrease (z=3.08 p<.003).

Figure 3: BAC Distribution of Drivers in 2010 and 2012



Trends in Drinking and Driving

Beginning in 1995, six previous roadside surveys of alcohol use by drivers had been conducted in Vancouver and Saanich.[8] Abbotsford has been included in three previous surveys beginning in 2003; Kelowna and Prince George were added in 2010. 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.

Figure 4 shows the percentage of drivers with positive BACs in Vancouver and Saanich over the course of all seven 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 5.8% in 2012, the lowest level to date. Compared to 2010, the percentage of drinking drivers in 2012 was 46% lower (z=3.73 p<.001).

[8] In 1995 and 1998, surveys were conducted in June and again in the fall as part of an evaluation of an intensive summer enforcement campaign. To ensure comparability of the various surveys, only the results from the spring surveys in 1995 and 1998 have been included here.

Figure 4: Percentage of Drivers With Positive BACs in Roadside Surveys (Vancouver and Saanich 1995 - 2012)

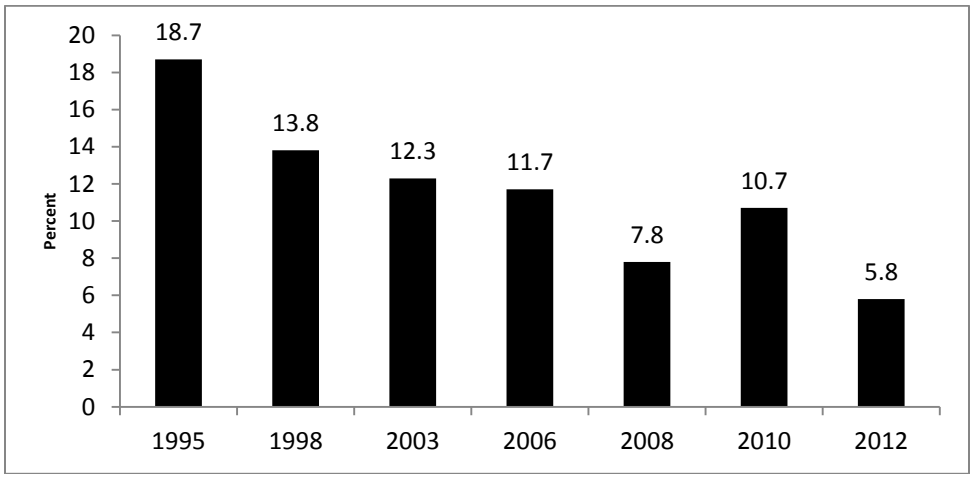


Figure 5 shows the percentage of drivers with BACs of 50 mg/dL and over in Vancouver and Saanich in each of the seven surveys. There was a 57% reduction in the drivers with BACs over 50 mg/dL from the 2010 survey (3.7%) to the 2012 survey (1.6%) (z=2.56 p<.02).

Figure 5: Percentage of Drivers with BACs ≥ 50 mg/dL in Roadside Surveys (Vancouver and Saanich 1995 - 2012)

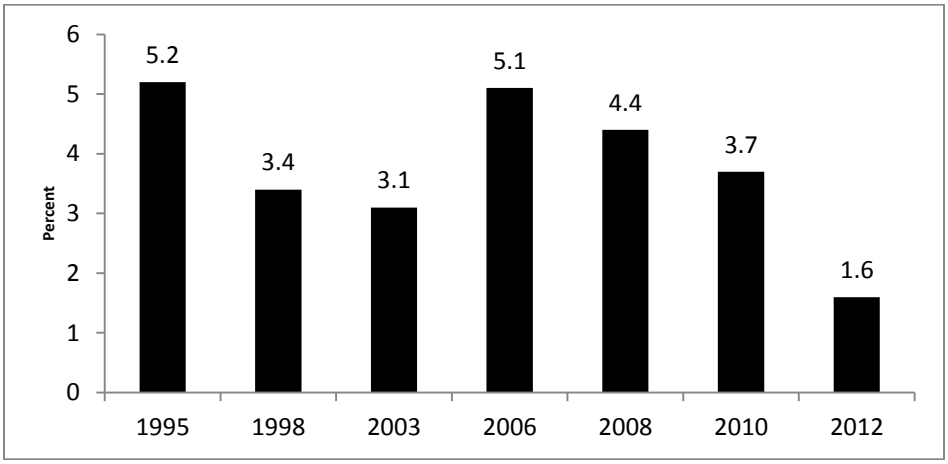
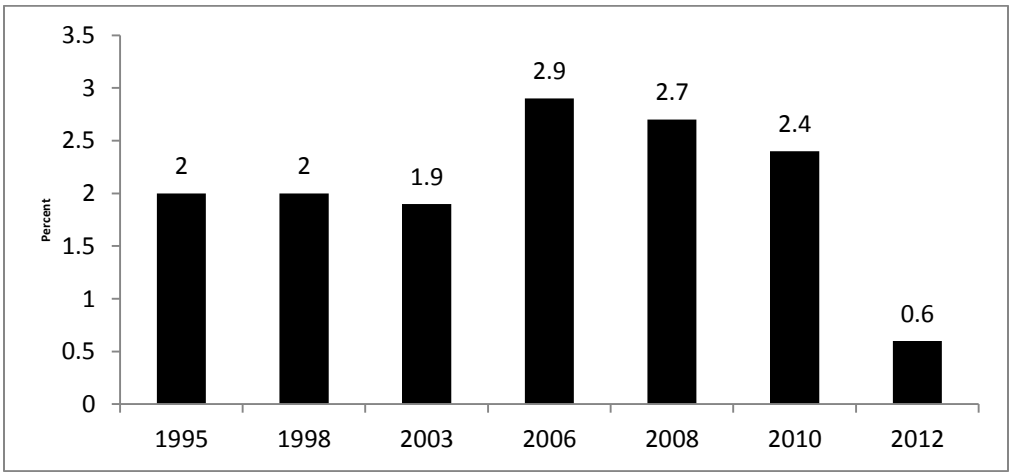


Figure 6 presents the percentage of drivers with BACs over 80 mg/dL in each of the seven surveys in Vancouver and Saanich. In 2012, only 0.6% of drivers were found to have a BAC over 80 mg/dL. This represents the lowest percentage of drivers with a BAC over 80 mg/dL in all surveys and a 75% reduction in drivers with BACs over 80 mg/dL from the 2.4% observed in 2010 (z=2.91 p<.005).

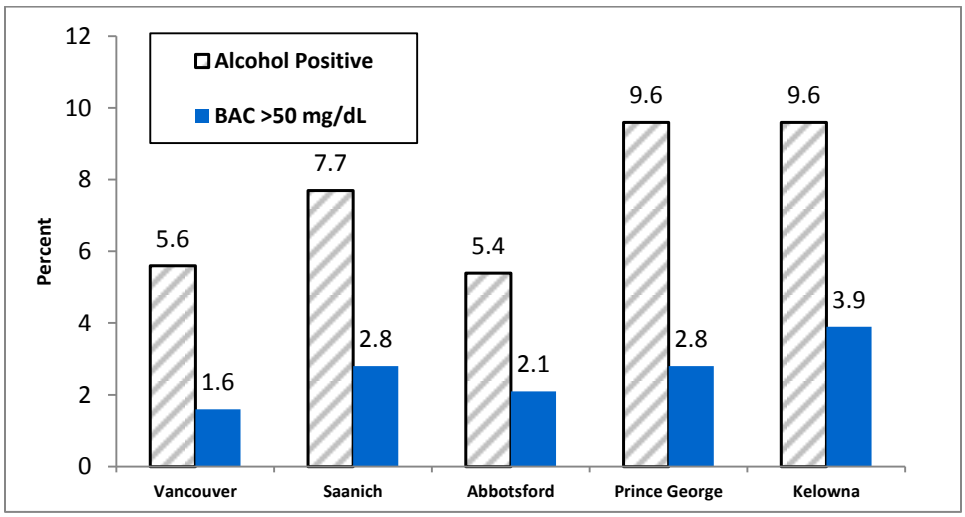
Figure 6: Percentage of Drivers with BACs > 80 mg/dL in Roadside Surveys (Vancouver and Saanich 1995 - 2012)



Communities

Figure 7 presents the percentage of drivers with positive BACs and those with a BAC over 50 mg/dL in each of the five communities. The percent of drivers with a positive BAC differed by community (χ^2=11.2, df=4, p<.024). Prince George and Kelowna were the communities with the highest percentage of alcohol-positive drivers with 9.6%. The lowest percentage was in Abbotsford with 5.4% of drivers positive for alcohol.

Figure 7: Percentage of Drivers with Positive BACs and BACs Over 50 mg/dL According to Community



The distribution of BACs did not differ among communities (χ^2=15.8, df=12, p>.20). Of note, however, in Kelowna, 27.3% of alcohol-positive drivers had a BAC over 80 mg/dL. This is in contrast to Vancouver where only 10.3% of alcohol-positive drivers had a BAC over 80 mg/dL.

Figure 8 displays the percentage of alcohol-positive drivers in the 2010 and 2012 surveys according to community. All communities saw a reduction in alcohol-positive drivers in 2012 compared to 2010. The highest reduction in alcohol-positive drivers (48.6%) was observed in Vancouver. This was followed by reductions of 32.5% in Saanich, 29.4% in Kelowna, and 23.9% in Abbotsford. The reduction in Prince George was considerably lower at only 5%.

Figure 8: Percentage of Drivers with Positive BACs According to Community in 2010 and 2012

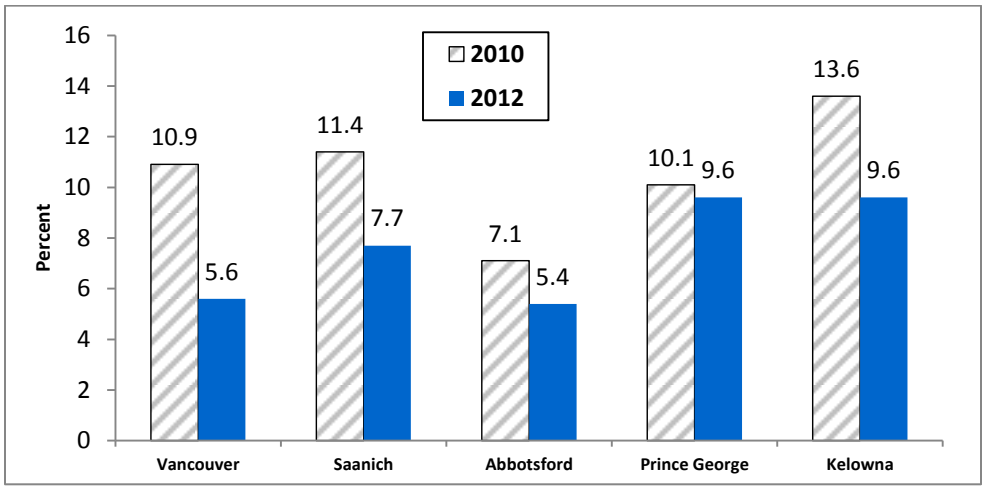
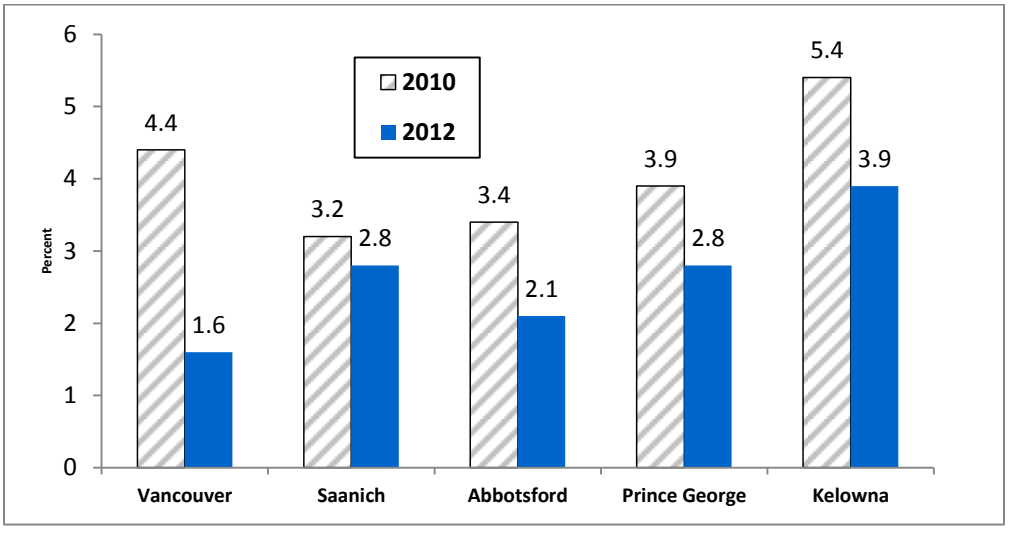


Figure 9 compares the percentage of drivers with a BAC over 50 mg/dL in the 2010 survey to the 2012 survey according to community. There was a lower percentage of drivers with BACs of at least 50 mg/dL in all communities in 2012. The largest reduction (63.6%) was observed in Vancouver. This was followed by Abbotsford (38.2%), Prince George (28.2%), Kelowna (12.5%) and Saanich (12.5%).

Figure 9: Percentage of Drivers with BACs ≥ 50 mg/dL According to Community in 2010 and 2012



Characteristics of Drinking Drivers

Driver sex

Figure 10 presents the distribution of BAC among male and female drivers. Overall, there was a significant difference in the BAC distribution and male and female drivers (χ^2=21.5 df=3, p<.001). Male drivers were more likely to have been drinking (8.0%) than female drivers (3.3%). However, most male drivers who had been drinking had BACs below 50 mg/dL. Although females were less likely to have been drinking, they were just as likely as likely as males to have a BAC over 80 mg/dL.

Male drivers were overrepresented among drinking drivers. Although males comprised about two-thirds of all drivers interviewed, they accounted for 84.9% of all drinking drivers. They made up 68.2% of drivers with a BAC over 80 mg/dL, 79.2% of drivers with a BAC between 50 and 80 mg/dL and 90% of drivers with a BAC below 50 mg/dL.

Figure 10: BAC Distribution of Male and Female Drivers in 2010 and 2012

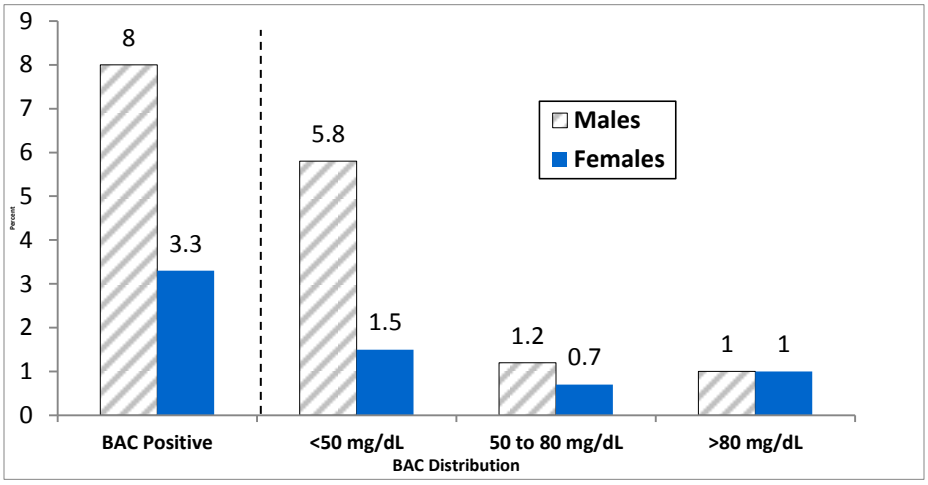


Figure 11 shows the percentage of male and female drivers who tested positive for alcohol in 2010 and 2012. Compared to 2010, the percentage of alcohol-positive drivers in 2012 was lower among both males (z=2.15 p<.03) and females (z=2.2 p<.03). There was a 60.2% reduction in alcohol-positive females compared to 22.3% reduction in alcohol-positive males.

Figure 11: Percentage of Male and Female Alcohol Positive Drivers in 2010 and 2012

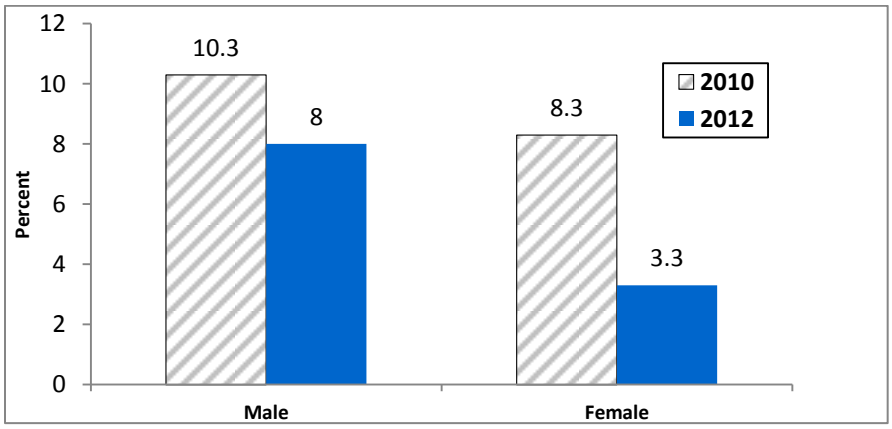
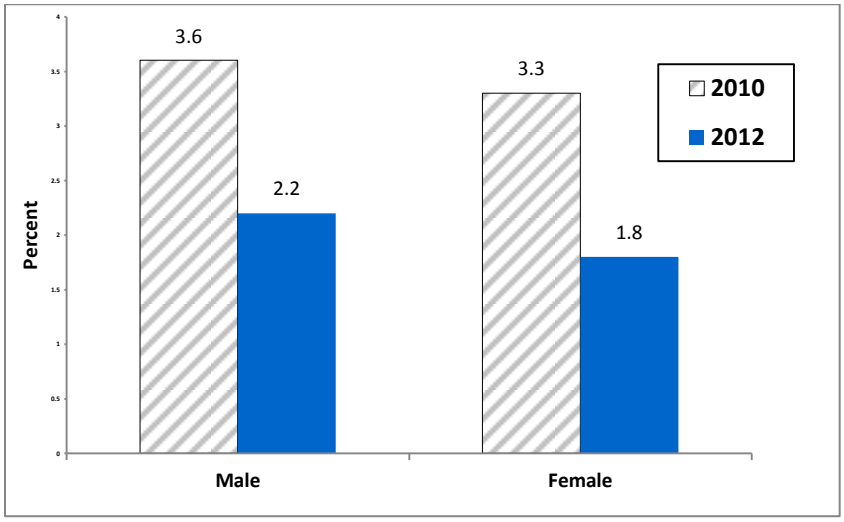


Figure 12 shows the percentage of male and female drivers with a BAC over 50 mg/dL in 2010 and 2012. There was a 39% reduction among males with a BAC over 50 mg/dL ($z=2.2$ $p<.03$) and a 45% reduction among females ($z=1.67$ $p>.1$).

Figure 12: Percentage of Male and Female Drivers with BACs > 50 mg/dL in 2010 and 2012.



Driver age

Figure 13 displays the percentage of drivers with positive BACs and BACs of 50 mg/dL and over according to age. The percentage of drivers with positive BACs varied according to age group ($\chi^2=15.2$, df=6, $p<.02$). Of note, however, there were no drivers in the 16 to 18 age group that had a positive BAC. Drivers age 35 to 44 (8.3%) and 25 to 34 (7.9%) were most likely to have been drinking. Drivers age 19 to 24 were most likely to have a BAC of at least 50 mg/dL (3.5%).

Figure 13: Drivers with Positive BACs and BACs ≥50 mg/dL According to Age

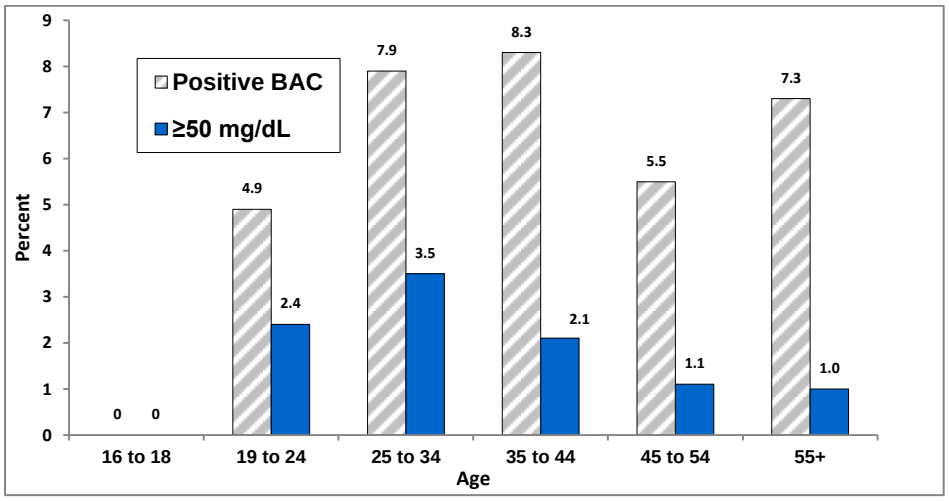


Figure 14 presents the percentage of alcohol-positive drivers by age group in 2010 and 2012. With the exception of those 55 years and older, there was a reduction in the percentage of alcohol positive drivers all age groups. The largest decreases were among those age 19 to 24 (46.7%) and those 25 to 34 (37.3%).

Figure 14: Alcohol Positive Drivers According to Age in 2010 and 2012

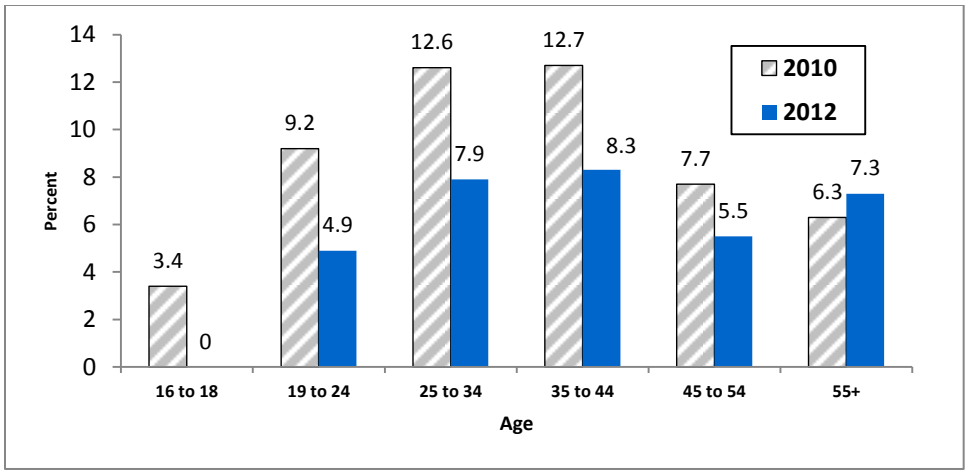
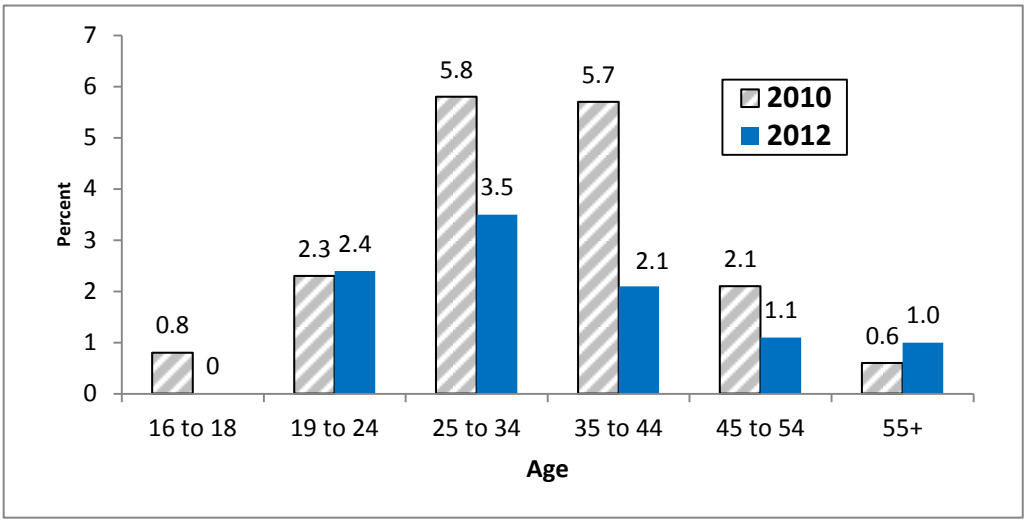


Figure 15 presents the percentage of drivers with a BAC of 50 mg/dL or over by age in 2010 and 2012. In 2012, there were no drivers age 16 to 18 with a BAC of 50 mg/dL or greater. The largest reductions were observed among those 35 to 44 years old (63.1%) and those 25 to 34 years of age (43.1%).

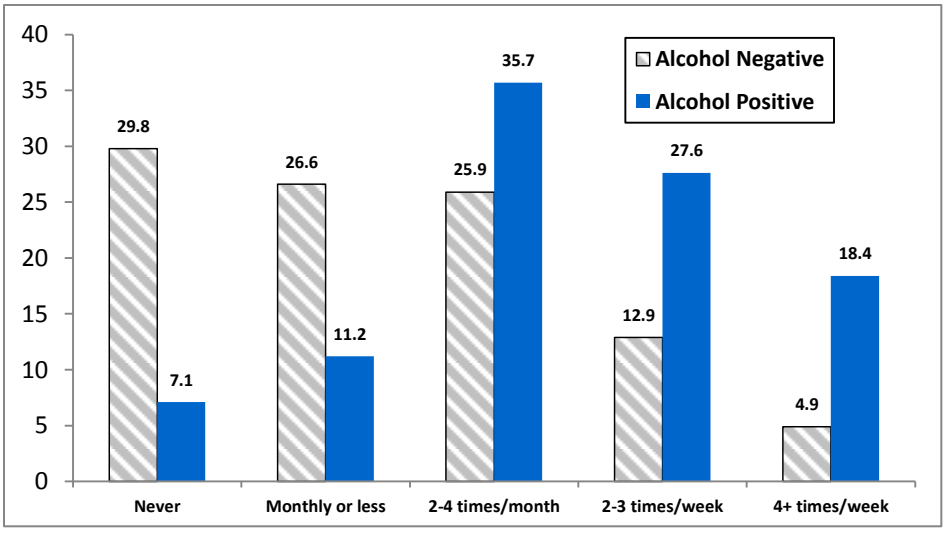
Figure 15: Percentage of Drivers with BACs > 50 mg/dL by Age 2010 and 2012



Self-reported Alcohol Use

Participants who provided an oral fluid sample were also asked to complete a self-report questionnaire on alcohol and drug use that included questions on the quantity and frequency of alcohol use. As Figure 16 presents, drivers with a positive BACs at roadside reported drinking more frequently than those who had a BAC of zero at roadside (χ^2=72.5, df=4, p<.001).

Figure 16: Self-Reported Frequency of Alcohol Consumption Among Drinking and Non-drinking Drivers



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). Drinking drivers also reporting consuming four or more drinks more frequently than drivers who had not been drinking (χ^2=45.1, df=7, p<.001).

Learner and Novice Drivers

Among drivers interviewed, 405 (18.3)% indicated that they had an "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; 39.4% were between the ages of 19-24, and the remaining 25.7% were over 25 years old.

Drivers with an 'L' or 'N' licence are restricted to driving with a zero alcohol level. Despite this restriction, 4.4% of these drivers tested positive for alcohol; 3.5% had a BAC under 50 mg/dL; and 1.2% had a BAC of at least 50 mg/dL.

Whereas alcohol use was relatively rare among young 'L" and 'N' licence holders, 13.0% of 'L' and 'N' drivers over the age of 55 and 7.5% between the ages of 25 to 34 tested positive. Most drivers with this type of license had a BAC under 50 mg/dL;, BACs of 50 mg/dL and over were only seen in drivers 19 to 24 years of age.

Characteristics of Drinking and Driving

This section examines the temporal and environmental circumstances surrounding drinking and driving behaviour—e.g., day of the week, time of day, type of vehicle and trip origin. These characteristics can help identify circumstances under which drinking and driving is most likely to occur and can assist in prevention and enforcement efforts.

Survey night

Figure 17 presents the percentage of alcohol-positive drivers according to survey night in 2010 and 2012. In past years, and as seen in 2010, the percentage of alcohol-positive drivers peaked on Friday and Saturday. A considerable change in this pattern was observed in 2012 with 49.5% less alcohol-positive drivers on Saturday night and 33.9% on Friday night. Whereas in 2010 the percentage of drinking drivers varied significantly according to survey night (χ^2=15.1, df=3, p<.002), in 2012 the percentage of drinking drivers was independent of survey night (χ^2= 3.0, df=3, p> 0.39).

Figure 17: Alcohol-Positive Drivers According to Survey Night in 2010 and 2012

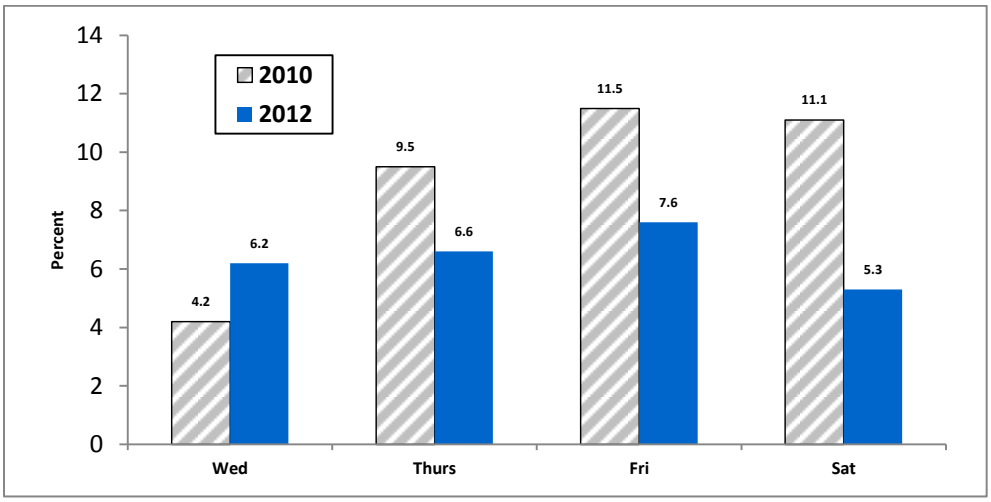
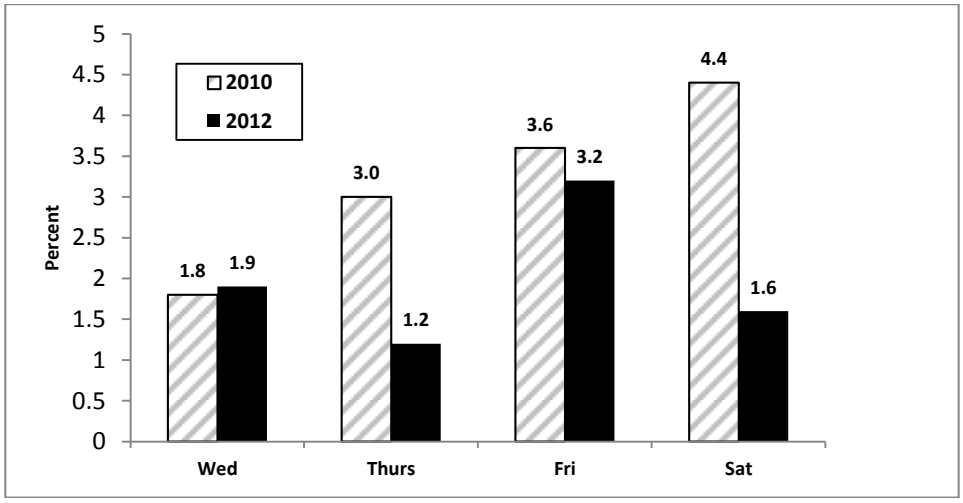


Figure 18 compares the percentage of drivers with a BAC of 50 mg/dL or greater by survey night in 2010 and 2012. Again, the pattern has changed, particularly on Saturday night, which saw a 76.8% reduction in drivers with an elevated BAC.

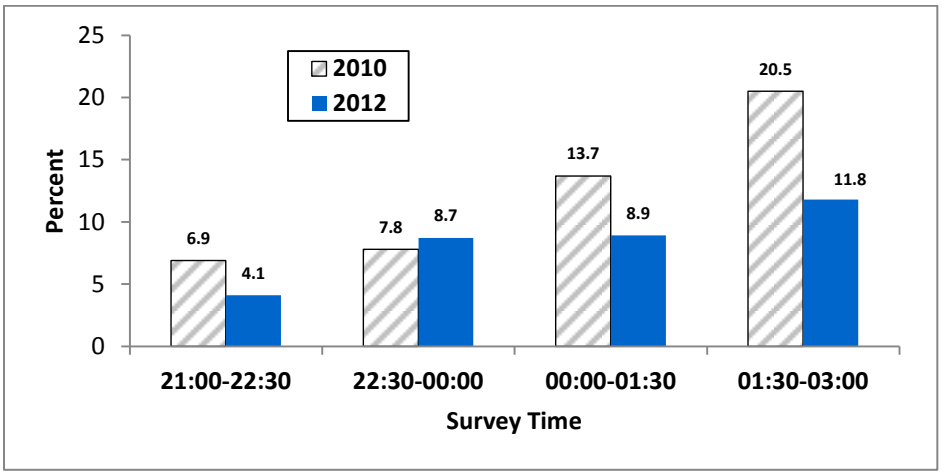
Figure 18: Percentage of Drivers with BACs > 50 mg/dL According to Survey Night



Time of night

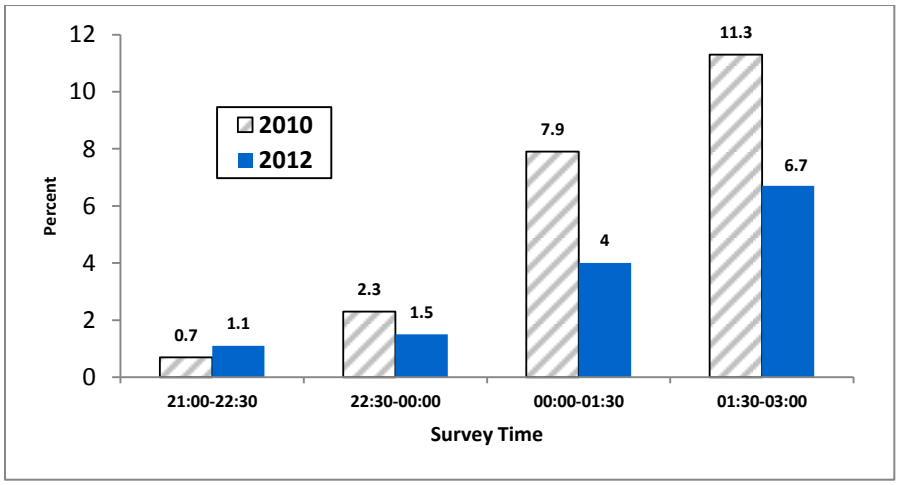
Figure 19 presents the percentage of drinking drivers according to survey time in 2010 and 2012. The typical pattern of an increasing percentage of drivers with a positive BAC during later survey times that was evident in 2010 was markedly reduced in 2012. In fact, in 2012 there was a 42.4% reduction in alcohol-positive drivers at the late site (01:30-03:00) and a 35.0% reduction at the 00:00-01:30 site.

Figure 19: Percentage of Drivers with Positive BACs According to Survey Time



Similarly, Figure 20 illustrates a reduction in the percentage of drivers with a BAC of at least 50 mg/dL across all site times. There was a 50.1% reduction in the percentage of drivers with a BAC over 50 mg/dL at the 00:00-01:30 site and a 40.7% reduction at the subsequent site (01:30-03:00). Although the pattern of more drinking drivers at later site times is still evident in 2012, it is considerably less pronounced than in 2010.

Figure 20: Percentage of Drivers with BACs ≥ 50 mg/dL According to Time of Night in 2010 and 2012



Vehicle type

Alcohol use among drivers varied significantly according to the type of vehicle driven (χ^2=17.4, df=5, p<.001). Drivers of pickup trucks were most likely to test positive for alcohol (13.0%); 4.2% had a BAC of at least 50 mg/dL.

Occupant configuration

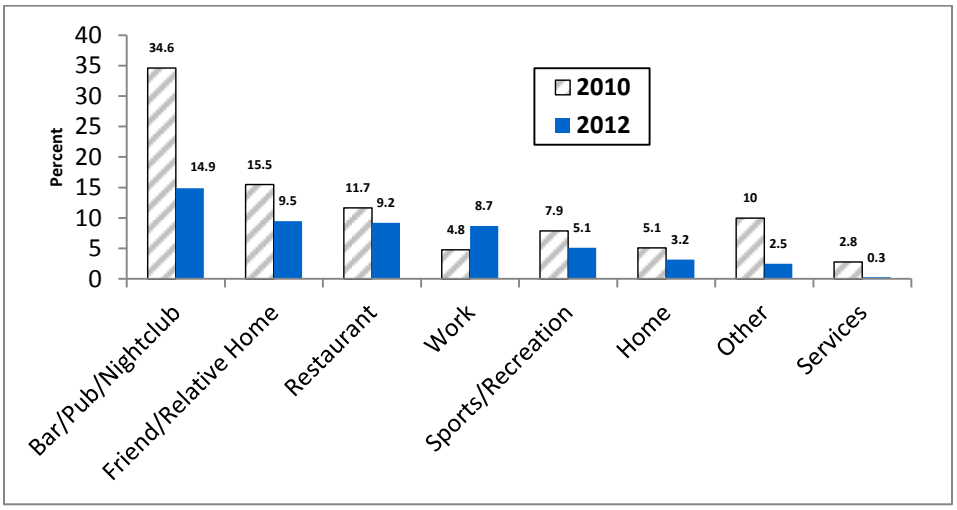
There were no significant differences in the percentage of drivers with positive BACs according to occupant configurations (χ^2=6.08, df=5, p>0.29). This is different than results obtained in 2010 where there was a significant difference in the percentage of alcohol positive drivers and drivers with a BAC greater than 80 mg/dL according to occupant configuration. 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.

Trip origin

Figure 21 shows the percentage of drivers with positive BACs coming from various places of origin in both 2010 and 2012. It is of interest that in 2010, just over one-third (34.6%) of drivers coming from bar/pub/nightclubs were positive for alcohol and in 2012 only 14.9% of drivers leaving a bar/pub/nightclub had been drinking – a 56.9% decrease (z=2.66 p<.01). Similarly, whereas in 2010 16.8% of drivers leaving bars/pubs/nightclubs had a BAC in excess of 50 mg/dL, in 2012 this had dropped to just 3% (z=2.65 p<.02).

An alternative was to examine these data is to identify the trip origin of drinking drivers. Among drivers with a BAC over 80 mg/dL, 35% indicated they were coming from work, 25% were coming from the home of a friend or relative, and 20% were coming from home. Of note, none of those with a BAC over 80 mg/dL were coming from a bar/pub/nightclub.

Figure 21: Percentage of Drivers with Positive BACs According to Trip Origin[9] in 2010 and 2012



Drugs and Driving

An examination of the raw (unweighted) data reveals that 178 (10.1%) of the 1,757[10] oral fluid samples tested positive for drugs. Of the drug-positive cases, 83.1% involved a

[9] "Services" includes grocery store, gas station, airport. "Other" includes picking up or dropping off family members and friends.

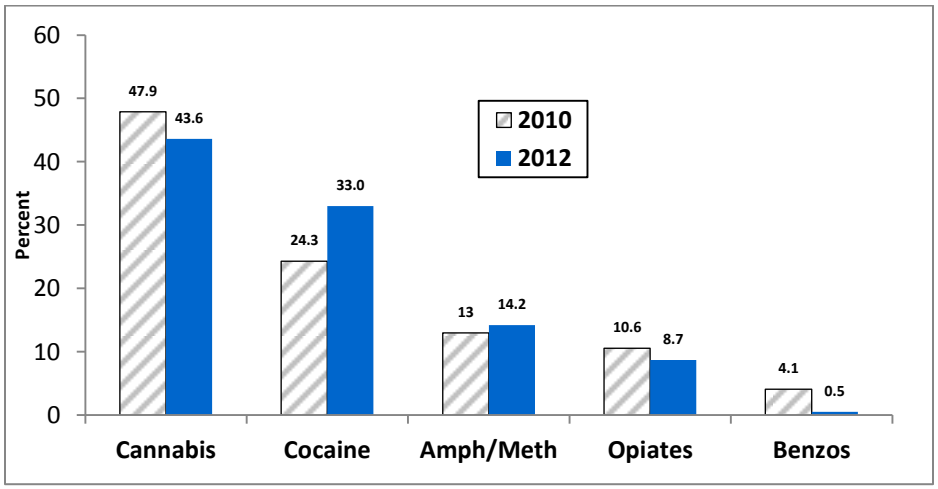
[10] There were an additional 16 samples sent to the lab but no results were reported.

single drug and 16.9% tested positive for more than one drug. There were 4 drivers that tested positive for 3 drugs and 3 drivers that tested positive for 4 drugs.

In 2010, 166 (9.1%) of the samples collected tested positive for drugs. Of these drug-positive cases 83.2% involved a single drug and 16.8% tested positive for more than one drug.

Figure 22 displays the frequency with which each of the drug categories were detected in 2012 and 2010. There were a total of 216 drugs detected in 2012, compared to 169 in 2010. Cannabis accounted for 43.6% of all drugs detected in 2012 and 47.9% of all drugs detected in 2010.

Figure 22: Distribution of Drug Types Detected Among Drivers in 2010 and 2012



Beginning in 2010 and continued in 2012, the concentration of the active ingredient in cannabis (i.e., tetrahydrocannabinol or THC) detected in oral fluid samples was quantified. The minimum level detected was 2 ng/ml and the highest level was recorded as ”greater than 40 ng/ml”. The mean THC concentration in 2012 was 29.7 ng/ml (SD = 14.7). This is significantly higher than the mean of 23.2 ng/ml found in 2010 (SD = 16.1) ($t=2.56$, $df=141$, $p<.02$). In 2012, 61.5% of the samples had a level over 40 ng/ml compared to 37.7% in 2010.

As was done with the alcohol data, the raw data were weighted to adjust for differences in the traffic volume at the various sites and the population of the community. This weighting procedure places greater emphasis on interviews from sites with higher traffic volumes and communities with greater population. The weighted data show that 7.4% of drivers who provided an oral fluid sample tested positive for at least one potentially impairing substance other than alcohol. This was only marginally higher than the 7.2% of drivers who tested positive for drugs in 2010 ($\chi^2=.07$, $df=1$, $p>.79$).

Communities

Figure 23 displays the percentage of drug-positive cases in the five participating communities in 2010 and 2012. The percentage of drivers who tested positive for drugs differed significantly among the communities in both 2010 ($\chi^2=29.2$, $df=4$, $p<.001$) and

2012 (χ^2=13.6, df=4, p<.009). In 2012, Abbotsford (10.6%), Prince George (10.7%) and Kelowna (12.3%) had double the rate of drug-positive drivers in comparison to Vancouver (5.3%). In comparison to 2010, three communities (Kelowna, Prince George and Vancouver) saw a decrease in the percentage of drug-positive drivers whereas the other two communities saw an increase (Saanich and Abbotsford). There were no community differences in the percentage of drug positive drivers that tested positive for more than one drug (χ^2=3.64, df=4, p>.46).

Figure 23: Percentage of Drivers Who Tested Positive in Each Community in 2010 and 2012

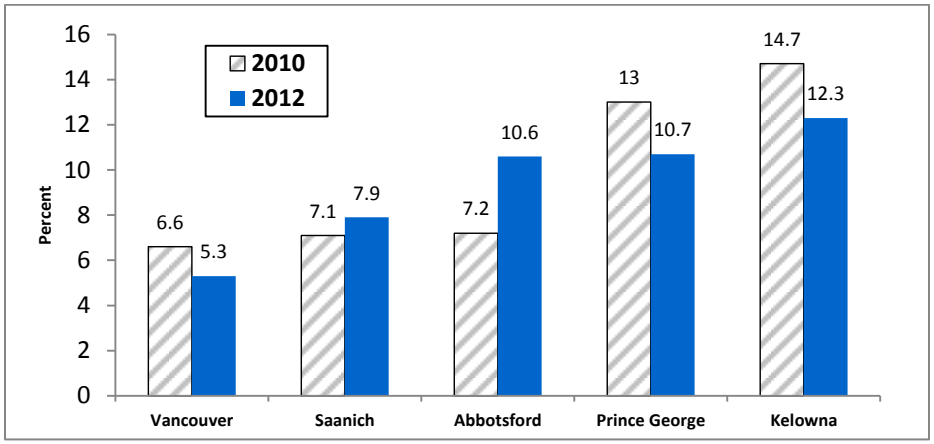
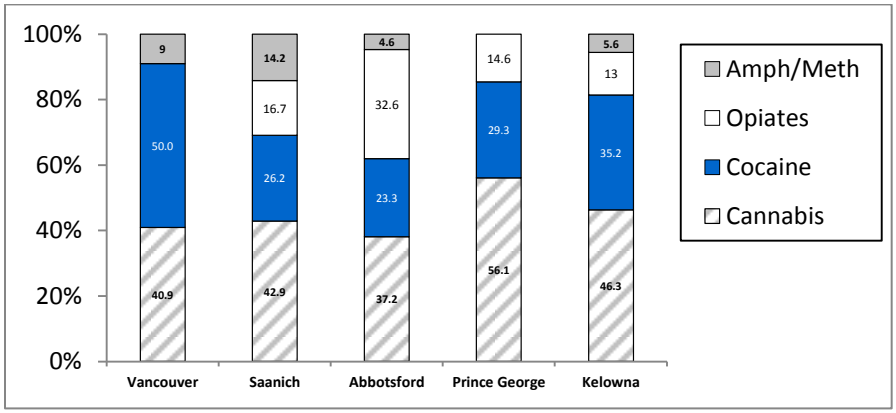


Figure 24 presents the distribution of the various drugs detected in each community. Although the numbers are small, there was a suggestion of differences in the drugs categories found among drivers in different communities. Cannabis was the most common drug detected in all communities except Vancouver where cocaine was the most common. Opiates were not found in Vancouver drivers but make up a significant portion (32.6%) of the drugs detected in Abbotsford drivers

Figure 24: Distribution of Drug Types Detected Among Drivers in Each Community

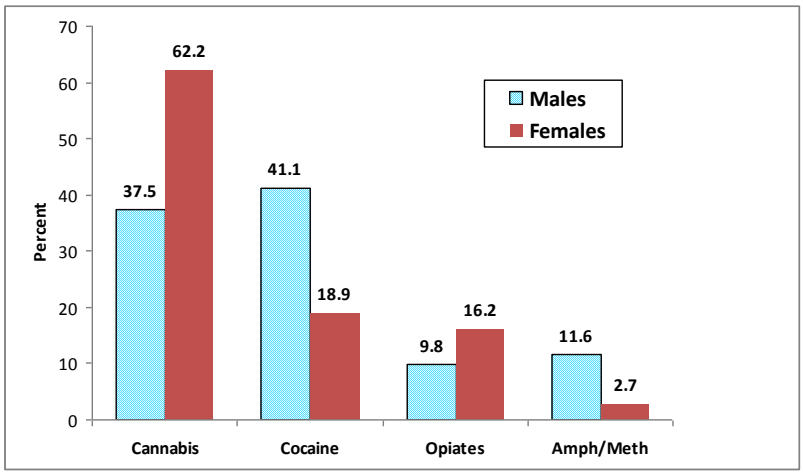


Characteristics of Drug-drivers

Driver sex

Females drivers were just as likely to test positive for drugs (6.5%) as males (8%)(χ^2=1.25, df=1, p>.26). There were also no significant sex differences in the percentage of drivers that tested positive for more than one drug (χ^2=1.4 df=1, p>.22). There were some differences in the types of drugs used by male and female drivers. Figures 25 illustrates that among female drivers, the most common drug used was cannabis (62.2%), followed by cocaine (18.2%). For male drivers, cocaine (41.1%) was the most common drug. Females also were considerably more likely to test positive for opiates (16.2%) than males (9.8%). Amphetamine/methamphetamine use by female drivers was rare. The numbers within each drug category, however, are small and warrant caution.

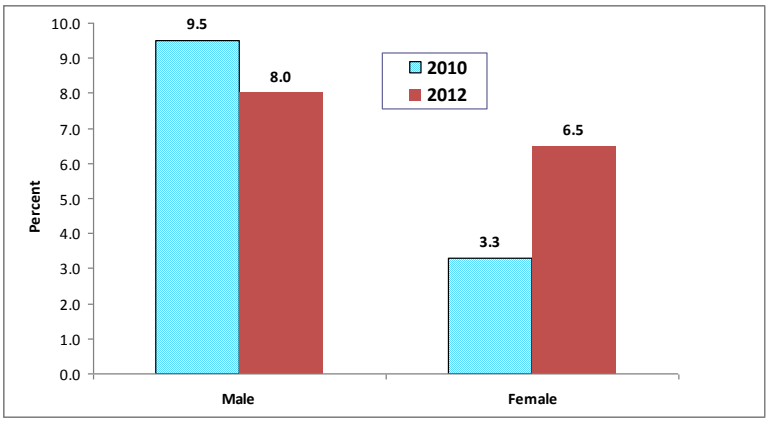
Figure 25: Distribution of Drug Types Detected Among Drivers According to Sex



The mean THC concentration of female drivers was 36.4 ng/ml (SD = 10.2) whereas males had a mean concentration of 26.2 ng/ml (SD = 15.3) (F= 8.1, df=1, p<.007). Female drivers were more likely (83.3%) than males to have a THC level over 40 ng/ml.

Figure 26 shows the percentage of drug-positive male and female drivers in 2012 compared to 2010. While there was a small decrease in the percentage of drug-positive male drivers between the two years (χ^2=1.7, df=1, p>.1), the percentage of female drivers who tested positive for drugs actually increased significantly, from 3.3% in 2010 to 6.5% in 2012 (χ^2=6.4, df=1, p<.01).

Figure 26: Percentage of Drivers Positive for Drugs According to Sex



Driver age

Within age groups the percentage of drivers who tested positive for drugs varied between 4.8% among drivers age 16 to 18 to 11.5% among those age 35 to 44. The differences in drug use among the various age groups, however, were not statistically significant (χ^2=10.9, df=5, p>.052).

Figure 27 presents the types of drugs found among those who test positive in each age group. The numbers, however, are small and warrant caution. Cannabis was the most common drug type across all age groups with the exception of those 55 years of age and older where cocaine predominated. Also interesting is that amphetamine and methamphetamine use was limited to those 25 years of age and older. The mean cannabis concentration did not vary significantly by age group (F= 1.6, df=5, p>.18).

Figure 27: Distribution of Drug Types According to Driver Age

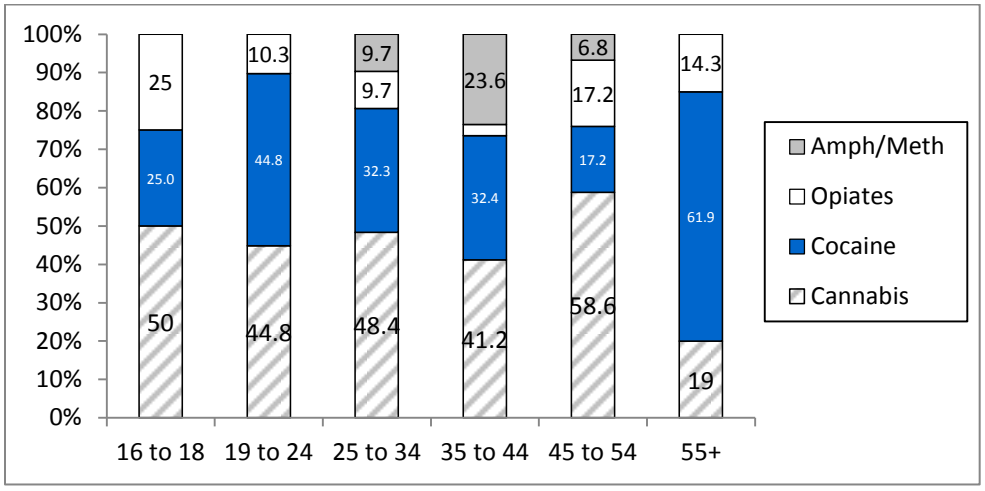
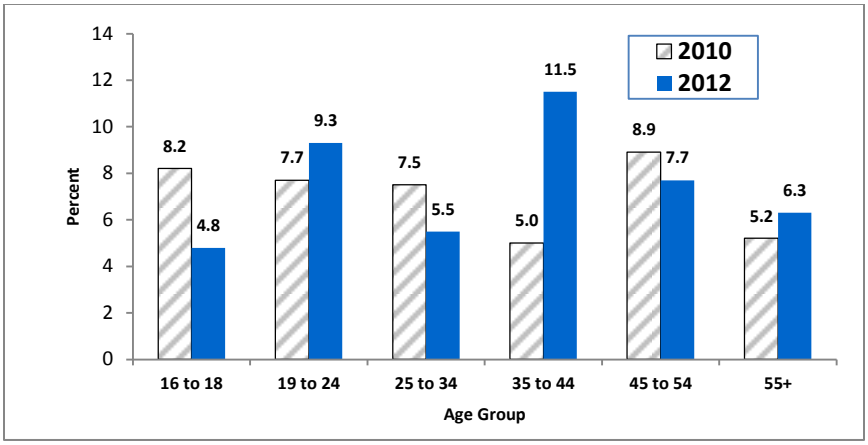


Figure 28 shows the percentage of drug-positive drivers in the various age groups in 2012 compared to 2010. Some age groups evidenced a decrease in the percentage of

drug-positive cases, such as those 16 to 18 years of age. Other age groups saw an increase – e.g., drivers age 35 to 44.

Figure 28: Percentage of Drug Positive Drivers According to Age in 2010 and 2012



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 and trip origin. These characteristics can help identify circumstances under which driving after drug use is most likely occur. For these and subsequent analyses, the data were weighted and pooled across cities.

Survey night

Figure 29 presents the percentage of drivers who tested positive for drugs according to survey night in both the 2010 and 2012 surveys. In 2012, there were significant differences across the survey nights (χ^2=22.5, df=3, p<.001). To a large extent, this is the result of a relatively high percentage of drivers using drugs on Thursday night (12.1%). This appears to be somewhat of an anomaly. The data from 2010 do not show this spike in drug use among drivers on Thursday night but rather show that drug use was fairly consistent across all survey nights.

Figure 29: Percentage of Drug Positive Drivers According to Survey Night in 2010 and 2012

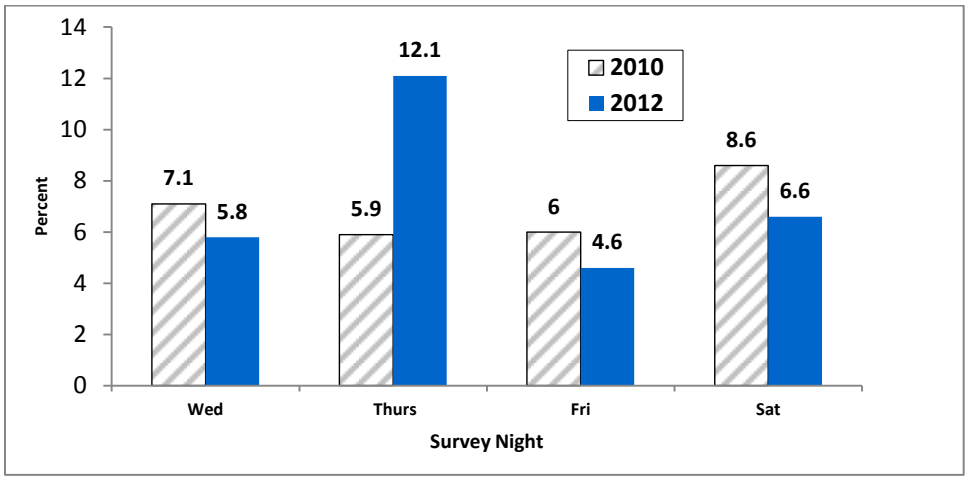
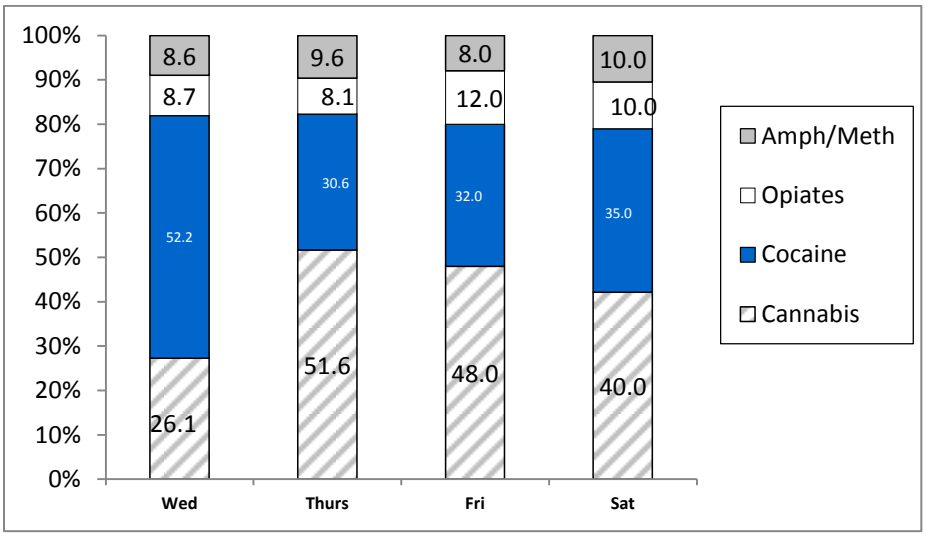


Figure 30 displays the types of drugs present according to survey night. Cocaine is the most common drug found on Wednesday nights but cannabis predominates the remaining survey nights. Opiates, amphetamine and methamphetamine use remain consistent across all survey nights. Once again, the numbers are small are should be viewed with caution.

Figure 30: Distribution of Drug Types According to Survey Night



Time of night

There were no significant differences in the drug use according to time of night (χ^2=3.6, df=3, p>.31) nor any differences in polydrug use (χ^2=7.7, df=3, p>.052). Figure 31 presents the percentage of drug-positive drivers according to survey time for 2012 and 2010. In 2010, drug use among drivers peaked between 01:30 and 03:00. This was not

the case in 2012, when drug use among drivers was most common between 22:30 and midnight.

Figure 31: Percentage of Drug-Positive Drivers According to Survey Time

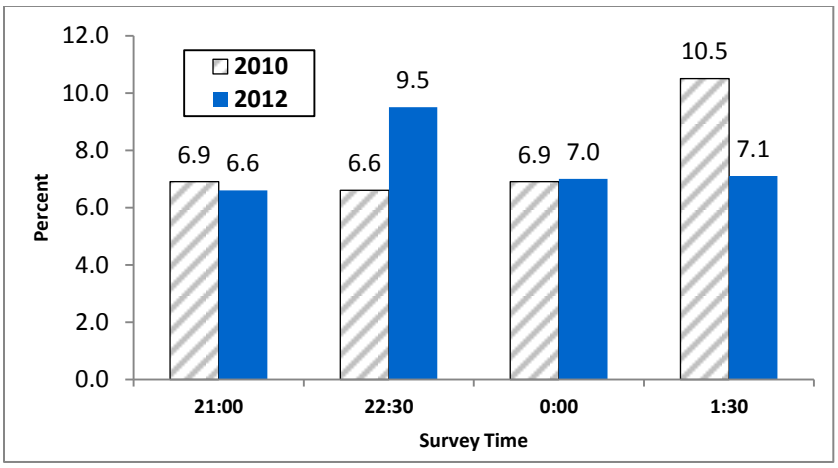
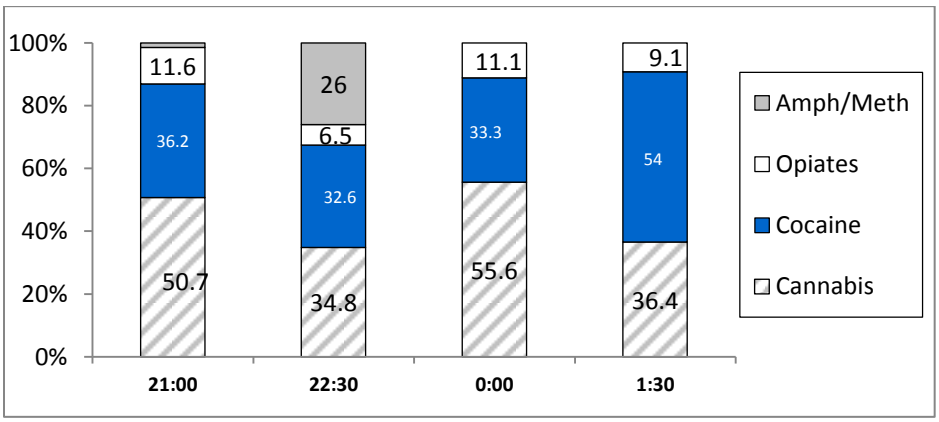


Figure 32 displays the types of drugs present according to survey time. Cannabis predominated at all survey times with the exception of the late survey time where cocaine was most common. Amphetamine/methamphetamine use peaked during the 22:30 survey time. The mean cannabis concentration did not vary significantly by time of night (F= 2.4, df=3, p>.08).

Figure 32: Distribution of Drug Type According to Survey Time



Vehicle type

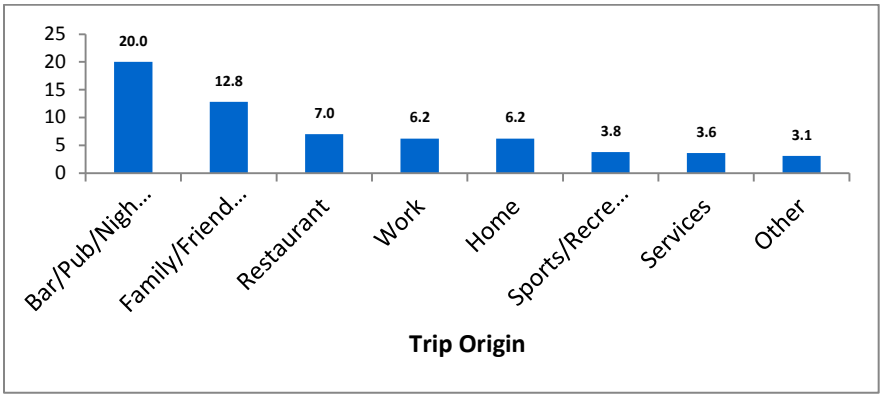
Driver drug use varied according to vehicle type (χ^2=41.1 df=5, p>.001). Drivers of pickup trucks were most likely to test positive for drugs (20.3%). Among these drivers, cannabis was the most common drug detected (75%), followed by cocaine (17.9%), and opiates (7.1%). About one in ten drivers of sport utility vehicles tested positive for drugs.

Occupant configuration
There were no significant differences in drug positive rates according to occupant configuration (χ^2=9.6 df=5, p>.086).

Trip origin
Drivers coming from a bar were among the most likely to test positive for drugs (20%), followed by those coming from friend or relative's home (12.8%), a restaurant (7.0%), or home (6.2%). Among those drivers coming from work, 6.2% tested positive for drugs.

An alternative way to examine these data is to isolate those drivers who tested positive for drugs and examine where they were coming from. Figure 33 displays these results. This approach finds about over one third (38.6%) of all drug-positive drivers reported coming from the home of relative or friend. Home (15.2%) was the next most common source of drug-positive drivers followed by work (13.6%).

Figure 33: Percentage of Drug Positive Drivers According to Trip Origin



Alcohol and Drug Use

The concurrent use of alcohol and drugs by drivers was relatively rare with only 0.6% of all drivers that were tested for drugs and alcohol being positive for both drugs and alcohol. Overall, 12% of drivers tested positive for either alcohol, drugs or both. Among the small number of drug-positive drivers who also tested positive for alcohol, over half (60%) had a BAC of less than 50 mg/dL; 10% had a BAC between 50 mg/dL and 80 mg/dL and 30% had a BAC in excess of 80 mg/dL. The types of drugs seen among both alcohol-positive and alcohol-negative groups were similar with cannabis accounting for about 42% of drugs detected in both groups.

Attitudes, Opinions and Awareness

Participants were asked whether they were aware that in the fall of 2010, the Government of British Columbia increased the severity of roadside sanctions, such as license suspension and vehicle impoundment for drivers with a BAC of .05 (i.e., 50 mg/dL). By far the majority of drivers (82.5%) indicated they were aware of the new sanctions. In the 2010 survey (conducted in the spring of 2010, prior to the introduction of the law), 57% were aware of the new measures.

Male and female drivers were equally likely to be aware of the legislation (χ^2=.83, df=1 p>.36) but there was a significant difference according to age (χ^2=9.4, df=3 p<.009). Those under the age of 25 were least likely to be aware (78.4%) and those over the age of 55 were most likely to be aware (86.6%). There were no significant differences in awareness according to positive BAC status (χ^2=2.2, df=1 p>.13) or BAC level (χ^2=5.5, df=1 p>.13). There were significant differences in awareness according to city (χ^2=24.6, df=4 p<.000) with awareness lowest in Vancouver (79.4%) and highest in Kelowna (88.8%).

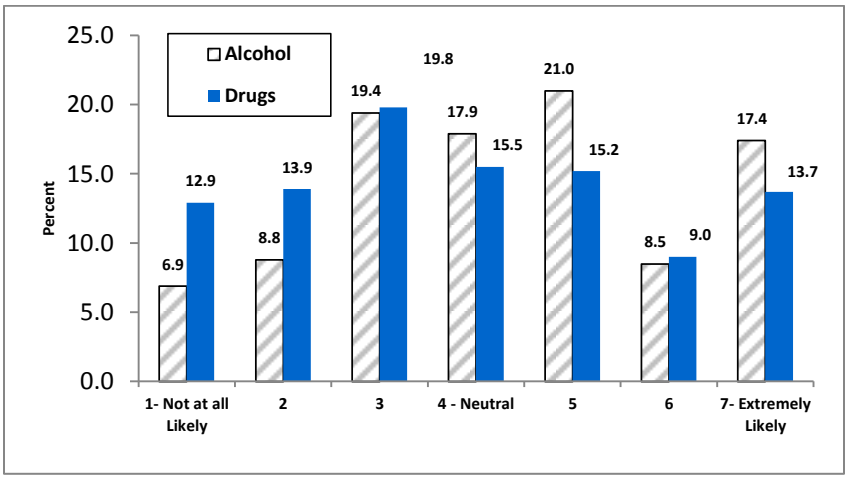
Drivers were also asked if they thought the new legislation would make roads safer. It was found that 89.6% were of the opinion that the legislation would make roads safer. There were no significant differences according to community (χ^2=4.6, df=2 p>.09). There were also no significant differences in responses among those with a positive BAC and a negative BAC (χ^2=.67, df=2 p>.41). In fact, 87.6% of drivers with a positive BAC answered affirmatively.

Drivers who indicated they were aware of the legislation were asked if the legislation had changed their drinking and driving behaviour. Most drivers (65.2%) indicated they did not drink and drive prior to the introduction of the law and continue not to drink and drive. About 30% said that the legislation prompted a change in their behaviour and 5% indicated that they continued to drink and drive despite the legislation.

Changes in behaviour differed significantly by age (χ^2=11.3, df=4 p<.023). Those under the age of 25 were most likely to indicate that they never used to drink and drive but the percentage of drivers who continue to drink and drive remains highest in this age group. Drivers age 25 to 54 were most likely to change their drinking and driving behaviour as a result of the legislation.
The drivers who indicated that their drinking driving behaviour had changed as a result of the legislation were asked to indicate which strategies they were using to avoid having an illegal BAC and driving. The most common strategies reported were drinking at home (57%), using a designated driver (54%), avoiding alcohol if driving (53%), and taking a taxi (52%).

Drivers were asked two questions about perception of risk and enforcement. The first was about the likelihood that a if a person drove after drinking too much, that they would be stopped by the police. The second question asked about the perceived likelihood of being stopped by the police for driving after using drugs. Responses for both questions were solicited on a scale where 1 represented ‘not at all likely’ and 7 represented ‘extremely likely’. Figure 34 presents the distribution of scores on both questions. Respondents were of the opinion that the likelihood of being stopped after drinking (Mean=4.33 SD =1.8) was greater than the likelihood of being stopped after drug use (Mean=3.88 SD=1.9)(t=17.0, df=2074, p<.001).

Figure 34: Perceived Likelihood of Drivers Being Stopped by the Police After Alcohol or Drug Use



There was a significant change in responses from the 2010 survey where drivers were asked the same question about being stopped after drinking (F=16.5, df=1, p<.001) and after drug use (F=8.13, df=1, p<.004). In 2012, participants thought it was more likely that a driver would be stopped by the police after drinking than in 2010. Similarly, in 2012 respondents thought it was more likely that a driver would be stopped by police after using drugs than in 2010.

Drivers were also asked if they had been stopped in a police alcohol check in the last two years. Just over half (53.3%) of drivers indicated that they had been stopped. Males were more likely (57%) than females to have been stopped (45.7%) (χ^2=19.3, df=1 p<.001). Those 25 to 54 years of age were also more likely to have been stopped (57.2%) compared to those under 25 (51.5%) and those over 55 years of age (44.0%) (χ^2=18.1, df=2 p<.001). Drivers in Saanich (68.7%) were most likely to report having been stopped to check for drinking followed by Prince George (56.5%), Vancouver (52.8%), Abbotsford (50.1%), and Kelowna (42.5%) (χ^2=53.9, df=4 p<.001). Drinking drivers and drivers who tested positive for drugs were no more likely than alcohol-free and drug-free drivers to have been stopped (χ^2=0.4, df=1 p>.51; χ^2=.14, df=1 p>.78, respectively).

One-quarter of drivers indicated that they did not have a good understanding of what a BAC of 50 mg/dL was. There were no significant sex differences (χ^2=5.14, df=1 p<.024) but there was a significant age difference (χ^2=13.2, df=5 p<.022). A lack of understanding of BAC peaked among those 35 to 44 where 32.5% indicated they did not have a good understanding. Drinking drivers did not differ from non-drinking drivers in terms of their understanding of BAC (χ^2=1.5, df=1 p>.22).

Drivers were also asked their opinion on various enforcement strategies for impaired driving. Respondents answered all of these questions on scale of 1 to 7 where 1 was 'completely disagree' and 7 was '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 (i.e., random breath testing). The mean response was 5.19 (SD =1.9) and 43.3% of drivers chose '7'

(completely agree) as a response. There were 14.2% of drivers that were not in favour of random breath testing (as indicated by a response of 1,2 or 3) and 6.5% completely disagreed with the strategy. Responses did not vary according to BAC status (F =1.4, df=1 p>.23). Those who were positive for drugs were less likely (M = 4.9, SD = 1.7) to support the strategy than those who tested negative for drugs (M = 5.4, SD = 1.9) (F = 10.1, df=1 p<.002). Compared to the 2010 survey (M = 5.19, SD = 2), drivers in the 2012 survey were more likely to be in favour of this enforcement strategy (F=5.9, d =1, p<.001).

A subsequent question asked about the extent to which participants 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 5.9 (SD =1.7) with 51% of drivers choosing '7' as a response. Only 2.2% of respondents indicated that they completely disagreed ('1' as a response'). Those who tested positive for drugs were less likely to agree (M=4.9, SD=1.9) with the statement than those who tested negative (M=6.0, SD=1.4) (F=73.3, df =1, p<.001). Support for this strategy has increased since the 2010 survey (M=5.7, SD=1.7) (F=13.5, df=1, p<.001).

Drivers were asked to rate the perceived inconvenience of some of the immediate sanctions imposed on drinking drivers as part of the new IRP legislation. Responses were based on the scale where 1 represented 'not an inconvenience' and 7 represented 'a complete inconvenience'. Responses clearly indicated that both an immediate 90-day driving prohibition and a 30-day vehicle impoundment sanctions would be very inconvenient. Two-thirds of respondents (69%) perceived the 90-day suspension as a "complete inconvenience" (M = 6.3, SD = 1.3). Similarly, 72.9% rated the 30-day impoundment as a "complete inconvenience" (M=6.4, sd=1.1). There were no significant differences in responses regarding the perceived inconvenience of license suspension between those who tested positive for alcohol and those who did not (F=0.4, df=1, p>.84). There was, however, a significant difference according to drug status (F= 6.1, df=1, p<.014). Those who tested positive for drugs (M = 6.4, SD = 1.2) indicated that it would be less of an inconvenience to have their license suspended compared to those who tested negative for drugs (M = 6.4, SD = 1.8). There were no significant differences for perceived inconvenience of vehicle impoundment according to alcohol (F = 2.78, df=1 p>.09) or drug use (F = 0.48, df=1 p>.48).

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 can be a powerful method to help evaluate the impact of countermeasure programs and policies. In this context, the present survey was conducted primarily as a follow-up to the 2010 survey as a means to assess the impact of new sanctions associated with immediate roadside prohibitions (IRP) introduced by the Government of British Columbia in September 2010 to deal with drinking and driving.

It was evident that the prevalence of driving after drinking, and in particular driving with a BAC over 50 mg/dL, had decreased substantially following the introduction of the new IRP legislation. Overall, driving after drinking was reduced by 34%, and driving with a

BAC of 50 mg/dL or over dropped by 42%. An examination of previous roadside survey data shows that the levels of driving after drinking in 2012 were the lowest ever recorded since the series of roadside surveys began in 1995.

Further analysis of the data revealed that the reductions in drinking and driving were not restricted to specific sub-groups of drivers. The broad impact of the legislation was observed in both male and female drivers, in all age groups, and across communities. In addition, the patterns of drinking and driving changed. The typical pattern of increased drinking and driving on weekend nights was not evident in 2012. In fact, drinking and driving was least prevalent on Saturday night. Although driving after drinking was still most common after midnight, the percentage of drivers interviewed between 01:30 and 03:00 with BACs over 50 mg/dL was less than half that found in 2010. The findings provide evidence of a profound and universal change in drinking and driving in British Columbia following the introduction of the IRP legislation in September 2010.

It should be noted that however compelling and persuasive the overall decrease in driving after drinking is, it can not be unambiguously attributed to the introduction of the new IRP legislation introduced in September 2010. The research followed a simple pre-post design. The absence of comparable surveys in another jurisdiction that did not introduce similar legislation (i.e., a control group) leaves opens a number of threats to the validity of a causal interpretation of the decrease. Further evidence examining data on crashes, injuries, and fatalities would help strengthen the inference that the IRP legislation was responsible for the observed changes in drinking and driving in British Columbia.

Other data from the survey, however, provide evidence that support the deterrence impact of the IRP legislation. Questions asked of participants indicate increased and widespread awareness of the new drinking and driving legislation. By far the majority of drivers (82.5%) knew of the new measures, an increase from the 57% who reported they were aware of the impending legislation in 2010. Drinking drivers, including those with elevated BACs were just as likely as non-drinking drivers to be aware of the new measures.

It should be noted that the announcement of the impending IRP legislation in the spring of 2010 received widespread media coverage. There was a degree of controversy surrounding the new measures and, on November 30, 2011, the British Columbia Supreme Court ruled that the part of the IRP legislation infringed on the constitutional rights of those who blew a “Fail” (i.e., over 80 mg/dL) on an approved screening device. This part of the law was suspended until June 15, 2012 when the government implemented amendments to the law. The ongoing controversy served to keep the issue in the news and on the public agenda for an extended period of time.

Awareness of the new law is a key determinant of deterrence. Perceived severity of the sanctions is another important factor. When asked how inconvenient it would be to have their licence suspended and vehicle impounded immediately, more than two-thirds of drivers reported that it would be a “complete inconvenience” if they were subjected to these sanctions. It was apparent that these sanctions were perceived as severe and would have a profound and immediate impact on drivers.

The success of any new legislation also depends on the extent to which the public believes there is a reasonable likelihood that they will be detected by the police if they

violate the law. To gain insight into this issue, drivers were asked to rate the perceived likelihood of someone being stopped by the police if they had consumed too much alcohol. Just under half of respondents thought there was a good likelihood of being stopped and the perceived likelihood was higher than in 2010. Drivers who had been drinking believed the probability of being stopped to be higher than those who had not been drinking. In response to a separate question, over half of all drivers indicated that they had been stopped in a police alcohol checkpoint in the last two years. Together, these two questions provide evidence that drivers believe the police are enforcing the drinking-driving laws and many have had the experience to support their opinion.

Police data provide evidence that the law is being enforced. From the implementation of the new law on September 20, 2010 through December 31 2011, a total of 28,352 IRPs were issued and 24,021 vehicles were impounded.[11] In addition, installations of alcohol ignition interlocks (a requirement for some offences under the new law) increased from 600 in the year prior to the law (2009) to 7,988 in 2011. These data leave little doubt that the law was being used to get drivers with elevated BACs off the roads and to comply with the law when are reinstated.

It was evident from the interviews and questionnaires that drivers remain extremely concerned about this issue of impaired driving. As severe as the new IRP measures are, drivers overwhelming believe this legislation will help make the roads safer. Drivers understand that tough measures are needed and they appear willing to accept and/or tolerate intrusions into their privacy/rights for the overall goal of improving the safety of the roads.

As encouraging as the present results are, it is also evident that there remain a number of drivers who continue to get behind the wheel after consuming too much alcohol. These drivers were more likely to be males between 25 and 34 years of age. Although females were less likely than males to drive after drinking, when they did so, they tended to have elevated BACs. Drinking drivers also tend to be more frequent and heavier alcohol consumers. Drivers with a BAC over 50 mg/dL were most prominent on Friday nights and were more commonly found after midnight. There was also a higher prevalence of driving after drinking in communities outside the lower mainland and capital areas. Targeting these groups of drivers and these times and places remains a priority for enforcement and prevention.

It was encouraging to find no drivers between the ages of 16 and 18 who had been drinking. This may be considered to be a benefit of the graduated licensing program in British Columbia that restricts drivers with a “Learner” or “Novice” (i.e., ‘L’ or ’N’) licence to a zero BAC. But most ‘L’ and ‘N’ driver are 19 years of age and over. Despite the zero alcohol restriction, this older group of ‘L’ and ‘N’ drivers was almost as likely as other drivers to have been drinking. Clearly there is a need for further efforts to encourage this older group of novice drivers to abide by the zero alcohol restriction.

Previous roadside surveys have reported that a large proportion of impaired drivers were coming from licensed drinking establishments. The present survey failed to find a single impaired driver who reported coming from a bar, pub or nightclub. This suggests either a major shift in drinking practices and/or a change in transportation choices. Anecdotal reports indicate that the management of licensed premises have taken proactive steps to

[11] Data provided by the Office of the Superintendent of Motor Vehicles.

discourage impaired driving such as providing increased support for server training and responsible serving practices, encouraging designated drivers, and offering shuttle services.

The most common point of origin for impaired drivers was reported to be “work”. In many cases it was unclear whether these drivers were consuming alcohol while at work or were drinking after work in their vehicle or parking lot before going home. Anecdotal reports from number of impaired drivers, in this survey as well as previous surveys, indicated that they were employed at a bar or pub and they had had a few drinks at work with co-workers after closing time. Further investigation of the nature and extent of this behaviour is warranted so that appropriate measures can be taken.

Among those drivers who tested positive for alcohol, two-thirds had a BAC below 50 mg/dL. These drivers had clearly been drinking but were able to keep their alcohol level below the threshold for legal action. When asked, 25% of drivers indicated that they did not understand what a BAC of .05 (50 mg/dL) meant. Although there are a number of factors involved, helping drivers understand the relationship between the amount of alcohol consumed and BAC could help increase compliance with the law.

The prevalence of drug use among drivers in the present survey did not differ from that found in the 2010 survey. This would indicate that the IRP legislation was perceived as being specific to alcohol and was not part of a more general effort to reduced all types of impaired driving. Increased drug use was noted among females and among drivers age 35 to 44, raising the suggestion that some drivers might have been substituting drugs for alcohol, believing that there was a lower likelihood of being detected by the police and that if they were, the sanctions were not as severe.

The next challenge is to sustain and strengthen the impact of the IRP legislation. The present survey was conducted 21 months after the legislation was implemented. Over this period of time, a great deal of media attention was devoted to the issue which served to increase public awareness of, and interest in, the issue. Police enforcement was intensive and many drivers experienced the sting of immediate sanctions. Further efforts to help understand the reasons why some drivers have failed to change their behaviour will be necessary to develop new and innovative countermeasure programs specifically targeted to high risk groups. In the meantime, maintaining public attention along with ongoing high profile enforcement will be key to changing behaviour and continued success.

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Appendix A
Information Card

FRONT

British Columbia 2012

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.

BRITISH COLUMBIA The Best Place on Earth

BCAA ROAD SAFETY FOUNDATION

ICBC

madd Saving Lives, Supporting Victims

Transport Canada

Transports Canada

Beirness & Associates, Inc.

BACK

This survey takes about 5 or 6 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 researchers. No identifying information will be kept in the data file.

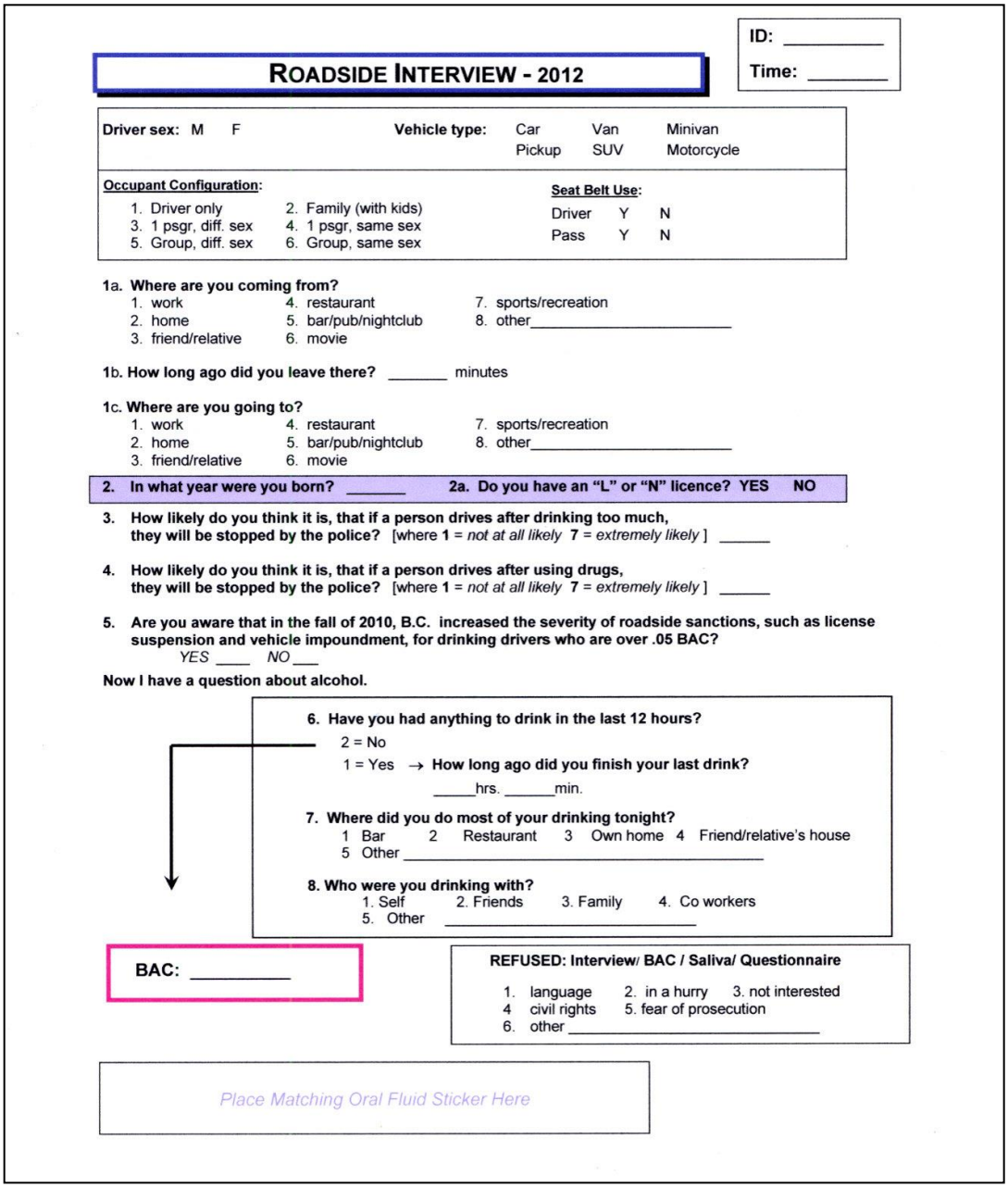
This research is supported by the Office of the Superintendent of Motor Vehicles, the British Columbia Automobile Association Road Safety Foundation, the Insurance Corporation of British Columbia, Transport Canada, BC Ministry of Justice Police Services Division, MADD Canada, and your local police.

Any questions you have about this survey can be directed to the Project Director, Dr. Doug Beirness (dbeirness@ magma.ca), or Neil Arason at the Office of the Superintendent of Motor Vehicles (250-356-6615 or neil.arason@ gov.bc.ca).

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

Alcohol and Drug Information and Referral Service
From the Lower Mainland: 604-660-9382
From the rest of BC: 1-800-663-1441
http://bc211.ca/adirs2.html

Appendix B
Roadside Interview Questionnaire



ID: _____
Time: _____

ROADSIDE INTERVIEW - 2012

Driver sex: M F **Vehicle type:** Car Van Minivan Pickup SUV Motorcycle

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

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

1c. Where are you going to?
1. work 4. restaurant 7. sports/recreation
2. home 5. bar/pub/nightclub 8. other_____
3. friend/relative 6. movie

2. In what year were you born? _____ **2a. Do you have an "L" or "N" licence? YES NO**

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*] _____

5. Are you aware that in the fall of 2010, B.C. increased the severity of roadside sanctions, such as license suspension and vehicle impoundment, for drinking drivers who are over .05 BAC?
YES ____ *NO* ___

Now I have a question about alcohol.

6. 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.

7. Where did you do most of your drinking tonight?
1 Bar 2 Restaurant 3 Own home 4 Friend/relative's house
5 Other _____

8. Who were you drinking with?
1. Self 2. Friends 3. Family 4. Co workers
5. Other _____

BAC: _____

REFUSED: Interview/ BAC / Saliva/ Questionnaire
1. language 2. in a hurry 3. not interested
4 civil rights 5. fear of prosecution
6. other _____

Place Matching Oral Fluid Sticker Here

Appendix C
Alcohol and Drug Use Questionnaire

Alcohol and Drug Questionnaire 2012

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 in B.C. a person can face roadside sanctions (including driving prohibitions and vehicle impoundment) for driving with a blood alcohol concentration (BAC) over .05?
   YES ____ (Go to Question #2)
   NO ____ (Go to Question #4)
2. Has this legislation changed your drinking behaviour?
   YES ____ NO, I never used to drive after drinking ___ NO, I haven't changed my behaviour _____
   How has your behaviour changed? (Check all that apply.)
   I use a designated driver ____
   I stayed overnight ____
   I call a taxi if I am drinking ____
   I use public transportation ____
   I drink at home ____
   I don't drink if I am driving ___
   I drink less if I am driving ___
3. Do you think this legislation will make the roads safer? YES ____ NO ____
4. I have a good understanding of what a BAC of .05 is.
   YES ____ NO ___
5. Have you been stopped by a police check point in the last 2 years?
   YES ____ NO ___
6. Have you heard of B.C.'s Responsible Driver Program for drinking drivers?
   YES ____ NO ___
7. Have you heard of B.C.'s Ignition Interlock Program for drinking drivers?
   YES ____ NO ___
8. Are you a driver in the Graduated Licensing Program (a driver with an L or N sticker)?
   NO ____ (Continue with Question 9)
   YES ____ Are you aware that you must have 0 BAC whenever you drive? YES ____ NO ____

9. To what extent do you agree that the police should be able to require drivers to provide to a breath test 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)*

10. 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)*

11. 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)*

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

1 2 3 4 5 6 7
(Not an inconvenience) (Neutral) (Complete inconvenience)

13. 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 an inconvenience) (Neutral) (Complete inconvenience)

14. 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 #17 please.

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

16. 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*

17. 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					
Sedatives (e.g., Valium,.)					
Methamphetamine					
Heroin, methadone					
Pain medications (Morphine, codeine, Tylenol 2 or T 3's, Oxycodone, Percocet, Demerol)					
Ketamine					