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Alcohol and Drug Use by Drivers in British Columbia: Findings from the 2018 Roadside Survey

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EXECUTIVE SUMMARY

A roadside survey of drivers was conducted in the province of British Columbia to obtain an objective, valid estimate of the prevalence of driving after drinking and driving after drug use. This survey was a follow-up to the roadside surveys conducted in 2008, 2010, and 2012 and served to provide a baseline of cannabis use by drivers prior to the pending legalization of the drug in Canada. The use of the same methods facilitates comparisons between the surveys.

Drivers were randomly sampled from the traffic stream at pre-selected locations between the hours of 21:00 and 03:00 on Wednesday through Saturday nights and invited to participate in a voluntary study of alcohol and drug use. Participants were asked to provide a breath sample to measure their alcohol use and an oral fluid sample to be tested subsequently in a toxicology laboratory for the presence of drugs. Of drivers selected for the survey, 74.8% (n=1,878) agreed to participate. Of these drivers, 94.1% (n=1,767) provided a breath sample and 89.0% (n=1,671) provided an oral fluid sample.

Key findings include:

- Overall, 13.7% of drivers were positive for alcohol, drugs or both;
- 4.9% of drivers were positive for alcohol;
    - 4.1% had a blood alcohol concentration (BAC) under 50 mg/dL;
    - Less than1% had a BAC of 50 mg/dL or over;
- 8.5% of drivers tested positive for drugs;
- Among drug-positive drivers, 70.5% tested positive for cannabis;
- Alcohol use was most common on Saturday nights (5.6%); drug use was most common on Thursday nights (13.9%);
- Only 1.5% of drivers aged 16-21 tested positive for alcohol; however, 10.2% of this age group tested positive for drugs;
- Drivers aged 26-35 and those over 65 years of age were the most likely to have been drinking (6.7% and 7.8%, respectively); and,
- Drug use was most prevalent among drivers over 55 years of age (12.5%) and those between the ages of 19–25 (12.7%).

Data from comparable surveys conducted in British Columbia since 1995 reveal changes in alcohol and cannabis use among drivers over time. As shown in following table, the percentage of drinking drivers in the present survey was lower than in any of the previous surveys conducted in British Columbia and represents a 78% reduction since 1995. The current survey also shows an increase in the percentage of drivers who tested positive for cannabis since drug use was first measured in the 2008 survey. As Canada enters a new era with greater access to recreational cannabis, road safety experts will need to be vigilant and implement policies and programs as necessary to help curb potential increases in the use of drugs by drivers.

Percentage of Drivers Positive for Alcohol and Cannabis in Roadside Surveys in British Columbia

Year of Survey	Alcohol (% Positive)*	Cannabis (% Positive)+
1995	18.7	--
1998	13.8	--
2003	12.3	--
2006	11.7	--
2008	7.8	4.6#
2010	10.7	4.5
2012	5.8	3.7
2018	4.0	5.3

* Includes data from Vancouver and Saanich only

+ Drug use was first included in the 2008 survey

Kelowna and Prince George were not included as part of the 2008 survey

INTRODUCTION

Among the concerns surrounding the pending legalization of the possession and sale of cannabis for recreational purposes is a possible increase in the number of drivers who choose to drive after using cannabis. Recognizing the negative impact of an increase in cannabis use by drivers, legislation was also introduced adding measures to deal with drivers adversely affected by drugs. Among other things, the legislation (Bill C-46) includes oral fluid drug screening, establishes a per se limit for cannabis, and facilitates the collection of blood samples from suspected impaired drivers.

Efforts to deal effectively with cannabis-impaired driving are hampered by the extent of knowledge on drugs and driving, which pales in comparison to that available on alcohol-impaired driving. For example, whereas research has clearly demonstrated impairing effects of alcohol on driving and has documented exponential increases in crash risk associated with increasing concentrations of alcohol in the blood (Blomberg et al., 2009; Borkenstein et al., 1974), there remain many questions about the effects of drugs and the risk of crash involvement (Asbridge, Hayden & Cartwright, 2013; Bédard, Dubois & Weaver, 2007; Beirness, Logan & Swann, 2010; Lacey et al., 2016; Dubois, Bédard & Weaver, 2010).

Roadside surveys have been used for many years to gather information about the use of alcohol by nighttime drivers and these data have played an important role in our understanding of the drinking driving problem. In recent years, the adaptation of the approach to gather data on drug use among drivers has begun to provide a wealth of information about the nature and extent of drugs and driving behaviour. In 2008, British Columbia was the first jurisdiction in Canada to include oral fluid sample collection as the primary means to gather information about drug use by drivers in a roadside survey (Beirness & Beasley, 2009; 2010). Subsequent roadside surveys conducted in British Columbia in 2010 and 2012 (Beirness & Beasley, 2011; Beasley & Beirness, 2012) and in Ontario in 2014 (Beirness et al., 2015) and 2017 (Beirness et al., 2018) also collected information on drug use by drivers. These studies provided objective evidence that drugs use was as commonplace as alcohol use among nighttime drivers and constituted an issue deserving immediate attention.

Repeated roadside surveys over time provide a means to monitor trends in prevalence, as well as changes in the temporal patterns of the behaviour, the types of substances used, and the characteristics of drivers who engage in the behaviour. In addition, repeated surveys provide the ability to assess the impact of specific countermeasure programs and policies on alcohol and drug use among drivers. The present survey is a continuation of efforts to understand drug use by drivers and provides a baseline against which to assess the effects of the legalization of cannabis on driving.

METHODS

The survey was conducted using the same data collection procedures employed in previous surveys conducted in British Columbia and Ontario, which were based on methods 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).

Selection of Communities

The survey was conducted in the same five communities as in several previous surveys conducted in British Columbia. The communities and the dates on which data were collected are listed in Table 1.

Table 1: Communities and Survey Dates

Communities	Survey Dates
Vancouver	May 30 - June 2
Abbotsford	May 30 - June 2
Prince George	June 6-9
Kelowna	June 6-9
Saanich	June 13-16

Sample Size

The target was to interview approximately 400 drivers in each of the five areas. A simple random sample of 2,000 drivers would provide an overall estimate of the prevalence of drug or alcohol use among drivers with a 95% confidence interval of ± 1.2%. The clustering of sites within communities introduces a complexity in the design that serves to inflate the estimates of sampling error. Tests of significance should be viewed with caution.

Site Selection

To the extent possible, the survey site locations used in the 2012 survey were used again in 2018. In cases where the initial site was unavailable, every effort was made to find a replacement site in the same area of the community. Initial site selection in each community 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” to accommodate up to four vehicles at a time. 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 staff was required.

A total of 80 sites were confirmed for use by the survey crews – 16 in each community.

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. Two crews were used to conduct the survey in each community. A survey 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 allowed for six hours of continuous data collection each night.

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 a member of the survey crew. When signalled by a member of the crew, the officer selected the next available vehicle approaching the survey site and directed it into the survey site. Commercial vehicles were not included in the survey. The officer was also provided with a counter and asked to record the number of eligible vehicles passing the survey site in the direction from which vehicles were selected during the survey period. These traffic counts were used in data weighting.

The interview process consisted of four parts: introduction and consent, 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, interviewers introduced themselves to the driver, briefly described the survey, and handed the driver a card explaining the survey and requesting their cooperation. (A copy of the information card is included in Appendix A). While drivers were reading the card, interviewers recorded observable information about the driver (e.g., sex), the vehicle (e.g., type), seat belt use, and the mix of occupants in the vehicle. No personal identifiers were recorded at any point during the survey.

Interviewer ensured that drivers understood that the survey was voluntary and confidential. 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 samples

The third part of the survey involved asking the driver to provide a breath sample to measure alcohol content. Breath samples were analyzed for blood alcohol concentration (BAC) using the ALERT J5. This breath alcohol screening device is accurate to within ±5 mg/dL. Readings below 5 mg/dL were considered to be zero. The instruments were calibrated at the factory prior to use in the field.

To collect a breath sample, the interviewer first placed a new mouthpiece on the instrument. 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.

Oral fluid samples

The final step involved collecting a sample of oral fluid using the Quantisal® oral fluid oral collection kit. 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 are sealed in separate vials containing a small amount of buffer fluid.

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 gift card 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 two to three minutes. During this time, drivers were asked to complete a pencil-and-paper questionnaire about alcohol and drug use (Appendix C).

The oral fluid samples were sent by courier to Immunalysis Corporation for analysis. Samples were initially screened for cannabis, cocaine, opioids, amphetamines, methamphetamine and benzodiazepines using enzyme immunoassay (ELISA) technology. Samples with a positive screen were confirmed by liquid chromatography/tandem mass spectrometry (LC-MS/MS). The list of drugs and detection thresholds for each substance are listed in Table 2.

Table 2: Included Drugs and Detection Thresholds[1]

Drug	Elisa (ng/mL)	LC-MS/MS (ng/mL)
THC	4	2
Cocaine: benzoylecgonine, cocaethylene	20	8
Amphetamine: MDA, MDEA, phentermine	20	10
Methamphetamine: MDMA (ecstasy)	20	10
Benzodiazepines: diazepam, nordiazepam, oxazepam, temazepam, clonazepam, alprazolam, lorazepam, tiazolam, chorldiazepoxide, nitrzepam, estaxolam, fluazepam, midazolam, phenazepam, bromazepam	5	1
Opioids: morphine, codeine, 6-AM, hydrocordone, hydromorphone	20	10
Oxycodone: oxymorphone,	20	10
Fentanyl: norfentanyl	1	0.5
Zolpidem	10	10

Alternative Transportation

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 to be adversely affected by alcohol or drugs, drivers who indicated they had a class "L" or "N" licence with any positive BAC were asked to speak with the crew chief. The crew chief explained to the driver that they had either consumed too much alcohol or appeared to be affected by a drug and that it was unsafe (and possibly illegal) for them to drive and that they would be provided with safe transportation home at no cost to them. If alcohol was involved, a second breath test was then administered to ensure the initial positive test was not the result of

[1] The detection threshold is the concentration below which a substance cannot be detected reliably.

mouth alcohol[2] and to assure the driver that the initial reading was not in error. Whenever possible, a passenger with a BAC under 50 mg/dL or not obviously affected by drugs was 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[3] was provided. If necessary, the driver's car was parked in an area adjacent to the survey site.

After each night of data collection, the questionnaire forms were reviewed and matched with the corresponding oral fluid samples. The number of interviews, breath tests, oral fluid samples, and drivers who required a safe ride home were counted for daily reports. The refusal rates for the breath test and oral fluid samples were tracked closely as a means to identify issues that could be addressed. Any issues or apparent errors in the data forms were noted and brought to the attention of all interviewers the next night. Crew chiefs and supervisors met daily to discuss operations and take issues and reminders back to their teams of interviewers.

RESULTS

Response Rates

A total of 2,510 vehicles were randomly sampled from the traffic flow for participation in the survey. The number of vehicles that entered each of the survey sites ranged from 13 to 56 and depended on the volume and pattern of traffic, the time of night, day of the week, the number of refusals, the numbers of drivers who required transportation home, and the capacity of the survey crew to process drivers.

Table 3 shows participation rates for each community. Among the 2,510 vehicles selected, 1,878 drivers (74.8%) agreed to participate; 25.2% refused to provide any information. Of the drivers who agreed to participate, 1,767 (94.1%) provided a breath sample and 1,672 (89.0%) provided an oral fluid sample. Participation rates varied by community. The highest rate of participation was in Prince George (88.1%); the lowest was in Kelowna (61.2%) ($\chi^2(4, N=2510)=113.1$, $p<.001$). Overall, 94.1% of all drivers who agreed to participate provided a breath test and 89.0% provided an oral fluid sample. The rate of compliance with the breath test and oral fluid sample varied by community ($\chi^2(4, N=1878)=30.0$, $p<.001$; $\chi^2(4, N=1878)=31.3$, $p<.001$, respectively).

[2] Alcohol in the mouth can result from very recent drinking, regurgitation, the consumption of foods containing alcohol, or the recent use of mouthwash. Mouth alcohol inflates breath alcohol readings and is not a true indicator of BAC.

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

Despite the relatively high participation rates, concern remains that drinking drivers and those using drugs might be more likely to refuse to participate, thereby introducing a conservative bias into the estimates of alcohol and drug use. To assess the impact of refusal bias, the 2007 U.S. National Roadside survey used two techniques. One involved the use of passive alcohol sensors[4] to provide an initial estimate of driver BAC (Lacey et al., 2009b). The passive sensor reading was combined with other variables (e.g., driver sex, time of night) to impute BACs for those who refused. The distribution of imputed BACs was virtually identical to that of drivers who provided a breath test. Second, drivers who refused were offered an incentive of up to $100 to participate. Of those who accepted the incentive, the percentage of alcohol positive cases (13%) was just marginally higher than among those who initially agreed (12.4%). There was a slightly higher percentage of drug positive cases among those who supplied an oral fluid sample in response to the additional incentive (17% vs 14.4%) but the difference was not statistically significant. These findings provide confidence that drivers who refuse are not necessarily doing so because they had been drinking or using drugs.

Table 3: Sample Size and Participation Rates by Community

Community	Vehicles Selected N (% of total)	Agreed to Participate N (% of selected)	Provided Breath Sample N (% of agreed)	Provided Oral Fluid N (% of agreed)
Vancouver	502 (20.0)	421 (83.9)	394 (93.6)	347 (82.4)
Saanich	681 (27.1)	473 (69.5)	457 (96.6)	441 (93.2)
Abbotsford	491 (19.6)	368 (74.9)	327 (88.9)	328 (89.1)
Prince George	388 (15.5)	342 (88.1)	335 (97.9)	301 (88.0)
Kelowna	448 (17.8)	274 (61.2)	254 (92.7)	255 (93.1)
Total	**2510 (100)**	**1878 (74.8)**	**1767 (94.1)**	**1672 (89.0)**

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” and “not interested”. “Civil rights” was mentioned by a small number of drivers as a reason not to participate. Some did not want to “provide their DNA”[5] while others simply felt the collection of oral fluid was too invasive and made them uncomfortable.

[4] A passive alcohol sensor measures the alcohol in the ambient air in the vicinity of the driver’s face and does not require the driver to provide a breath sample.

[5] Oral fluid samples were not used for DNA analysis.

Male and female drivers were equally likely to provide a breath sample (χ^2(1, N=1854)=0.30, p>.2) but female drivers were more likely than males (92.4%; 87.2%, respectively) to provide an oral fluid sample (χ^2(1, N=1854)=11.6, p<.001).

The rate of compliance with the request for a breath sample did not differ among age groups (χ^2(6, N=1804)=8.39, p>.2). Over 90% of all age groups agreed to provide a breath sample. There was also no difference in the rate of compliance with the request for an oral fluid sample according to driver age (χ^2(6, N=1804)=9.68, p>.13).

Compliance with the request for a breath test did not differ according to the night on which the survey was conducted (χ^2(3, N=1878)=5.44, p>.1) or the time of night[6]; χ^2(3,N=1878)= 1.56, p>.6).

Rates of compliance with the request for a an oral fluid sample differed by survey night (χ^2(3, N=1878)=10.1, p<.02) but did not vary according to the time of night (χ^2(3,N=2022)=1.9, p>.5). Participation was highest on Thursday night (93.0%) and lowest on Wednesday night (86.9%).

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 sample of drivers who were randomly selected from the traffic stream to participate in the survey.

Driver sex

Males comprised 65.5% of drivers who completed the interview, outnumbering women by almost 2 to 1. The distribution of driver sex did not differ by region (χ^2(4, N=2006)=5.22, p> 0.25).

The distribution of male and female drivers did not vary according to night of the week (χ^2(3, N=2231)=0.5.15, p>.15). There was, however, a significant difference in the proportion of male and female drivers according to the time of night (χ^2(3, N=2231)=34.8, p<.001). Females were less likely to be behind the wheel at the late night site (01:30 to 03:00) (23.3%) compared to the earliest site (21:00 to 22:30) (39.4%).

Driver age

Driver age was determined from reported year of birth[7]. Participants ranged from 17 to 94 years of age with a mean of 37.8 years (SD =16.1). Figure 1 displays the distribution of driver age in the roadside sample compared to the age distribution of the general population of drivers in British Columbia (ICBC Quick Statistics, 2017). The roadside sample was comprised of a greater proportion of drivers under 35 years of age than in the general driver population, indicating that younger drivers are more likely than older drivers to be out driving at night.

[6] Time of night was divided into four time periods corresponding to the four 90-minute periods during with the survey was conducted – i.e., 21:00-22:30, 22:30-00:00, 00:00-01:30, and 01:30-03:00.
[7] Age was calculated as of the end of 2018. Although this does not necessarily provide an exact age, it was deemed adequate for purposes of the survey.

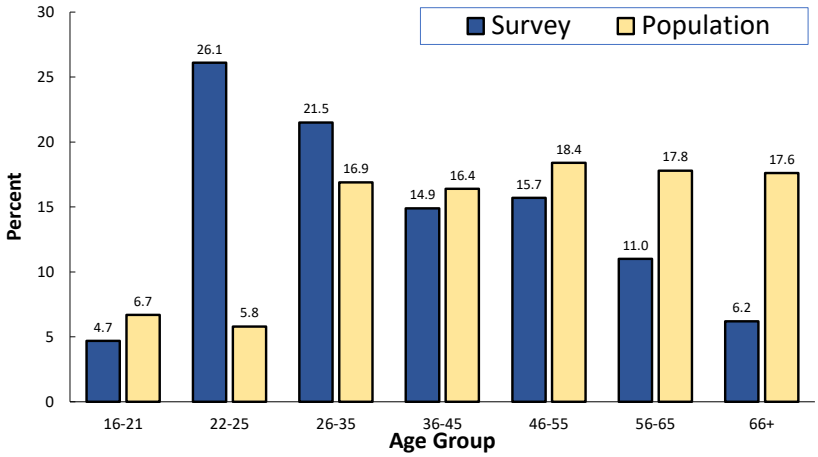
The mean age of drivers was similar among men (37.9) and women (37.4) ($t(1793)=0.63$, $p>.8$). The distribution of driver age did not differ according to day of the week ($\chi^2(18, N=1815)=23.27$, $p>.1$). Driver age did, however, differ according to time of night ($\chi^2(18, N=1815)=90.8$, $p<.001$). The percentage of younger (age 16-18) and older (age 46+) drivers decreased during late night hours whereas the percentage of those aged 19-25 and 26-35 increased throughout the night.

Vehicle types

The majority of vehicles selected for the survey were passenger cars (53.2%). Sport utility vehicles (SUVs) accounted for 22.6% of vehicles selected followed by pickup trucks (12.9%), vans (3.8%) and minivans (2.3%).

The distribution of vehicle types differed according to community ($\chi^2(24,N=2491)=158.0$, $p<.001$). Pickup trucks were most common in Prince George (24.5%) and Kelowna (18.8%). Sport utility vehicles (SUVs) were most prevalent in Vancouver (27.9%) and Prince George (25.3%).

Figure 1: Age Distribution of Drivers in the Roadside Survey and the Population of Licenced Drivers in BC*



*ICBC (2017) Quick Statistics. Retrieved from: www.icbc.com/about-icbc/newroom/documents/quick-statistics.pdf.

Occupant configuration

Over half of all drivers interviewed (57.1%) were the sole occupant of the vehicle. Drivers with one passenger of either the opposite sex (19.2%) or same sex (10.8%) were the next most common occupant configurations. Vehicles containing a family, same-sex group or mixed-sex group represented 3.1%, 2.0%, and 5.7%, respectively.

The distribution of occupant configurations varied by day of the week ($\chi^2(15, N=2422)=65.3$, $p<.001$). The percentage of vehicles with only the driver accounted for two-thirds of vehicles on Wednesday and Thursday nights but decreased to 55.1% on Fridays and 51% on Saturdays. Vehicles with a driver and an opposite sex passenger increased from 13.8% on Wednesday night to 23.1% on Saturday night. Vehicles with either same sex or opposite sex groups also increased on weekend nights.

Graduated Licensing

Graduated Licensing was introduced to help reduce the risk of collisions for new (i.e. "novice") drivers regardless of age, by requiring them to progress through a two-step ("L" and "N") licensing system before obtaining a full driver's licence. The system requires novice drivers to adhere to a comprehensive set of driving restrictions designed to reduce their exposure to high-risk driving situations. One notable restriction is that all novice drivers must be free of alcohol and drugs when operating a vehicle.

A total of 409 (22.1%) of the drivers interviewed indicated that they had an "L" or "N" license. Although there is a tendency to consider all new drivers as young, in fact, 31.2% of drivers who indicated they had an "L" or "N" license were over 25 years of age.

Licence Class

Drivers were asked to indicate their class of licence as part of the self-report questionnaire that was completed while the oral fluid sample was being collected. Hence, these data are only available for participants who consented to provide an oral fluid sample. The majority of drivers (66.1%) indicated they had a class 5 licence. Most other licence classes were reported as well as a small number from another province or state.

Seat Belt Use

Rates of seat belt use were high among both drivers and front seat passengers. Among drivers, 99.0% were wearing their seat belt; among front seat passengers, 98.6% were belted.

Origin and Destination

Drivers were asked during the interview where they were coming from, how long ago they left that location, and the nature of their destination. The mean travel time from the point of origin was 19.7 minutes (SD =40.1; *Mdn*=10) and ranged from 1 to 300 minutes. The majority of participants (74%) had been driving for 15 minutes or less.

Table 4 displays the distribution of reported trip origin and destination. The "services/errands" category refers to locations such as a gas station, grocery store, convenience store. "Sports/recreation" encompasses a wide range of leisure activities including the movies, concerts and sporting events – either watching or participating. The most common point of origin reported by participants was work (24.2%), followed by the home of a friend or relative (22.2%). The majority of participants (67.5%) were on their way home.

Table 5 presents trip origin according to the day of the survey ($\chi^2(21, N=1877)=55.3, p<.001$). The percentage of drivers on Friday and Saturday nights who reported coming from work was lower than on Wednesdays and Thursdays. Coming from the house of a friend or relative and a bar/pub/nightclub increased from Wednesday to Saturday.

Table 4: Participants' Trip Origin and Destination

Location	Trip Origin (%)	Trip Destination (%)
Work/School	21.5	5.0
Home	18.2	68.9
Home of friend/relative	22.5	11.6
Restaurant	8.1	3.1
Bar/Pub/Nightclub	2.8	0.6
Sports/Recreation	7.8	1.6
Services/errands	5.0	0.4
Other	13.7	8.4

Table 5: Percentage of Reported Trip Origin According to Survey Night

Origin	Wed	Thurs	Fri	Sat
Work	26.7	25.5	21.1	15.0
Home	15.8	21.2	16.8	19.1
Friend/Relative	19.4	21.0	22.4	26.5
Restaurant	7.0	5.9	8.8	10.1
Bar/Pub/Club	1.7	2.3	2.7	4.3
Sport/Recreation	8.3	6.8	9.7	6.7
Services/errands	4.9	3.2	6.8	5.0
Other	16.3	14.2	11.7	13.3

Trip origin varied by survey time ($\chi^2(21, N=1877)=125.0$ $p<.001$). The percentage of driver coming from work increased from 13.8% at the early site (21:00 – 22:30) to 29.0% at the late site (01:30 – 03:00). There was also an increase in the percentage of drivers who reported coming from a bar, pub or tavern at later sites (1.0% to 6.7%).

The reported destination of drivers also differed according to survey time ($\chi^2(21, N=1874)=44.2$ $p<.002$). Over two-thirds of all drivers were on their way home regardless of survey time but the percentage of drivers going to work increased from 2.4% to 9.2% from the early to the late site.

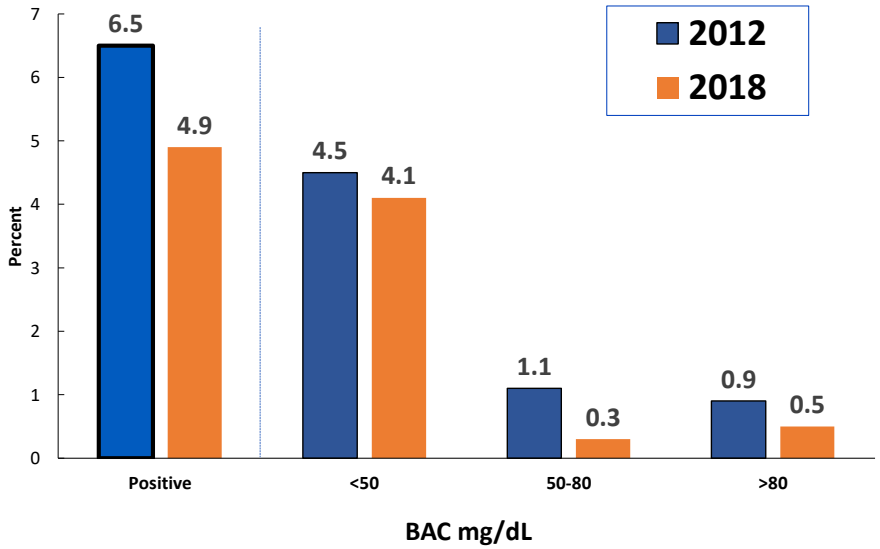
Driving after Drinking

The unweighted data show that 4.0% of drivers (71/1,767) who provided a breath sample had a positive BAC (i.e., ≥ 5 mg/dL). Of these 71 drivers with a positive BAC, 56 (3.2% of 1,767) had a BAC below 50 mg/dL; 6 (0.3%) had BACs between 50 and 80 mg/dL; and 9 (0.5%) had a BAC over 80 mg/dL. Among this latter group, 2 drivers had a BAC of 150 mg/dL or greater.

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 weighting procedure provides an estimate of the results of the survey across all five regions.

Figure 2 presents the weighted percentage of drivers who tested positive for alcohol and the distribution of positive BACs. For comparison, the distribution of BAC is also presented for the 2012 survey. Overall, 4.9% of drivers tested in 2018 were positive for alcohol, a decrease of 24.6% from the 6.5% who had been drinking in the 2012 survey. Most drivers who had been drinking had a BAC below 50 mg/dL (i.e., 4.1%), 0.3% had a BAC between 50 and 80 mg/dL and 0.5% had a BAC over 80 mg/dL. The BAC distribution of drivers in 2018 differed significantly from that in 2012 ($\chi^2(3, N=4220)=9.05, p<.05$).

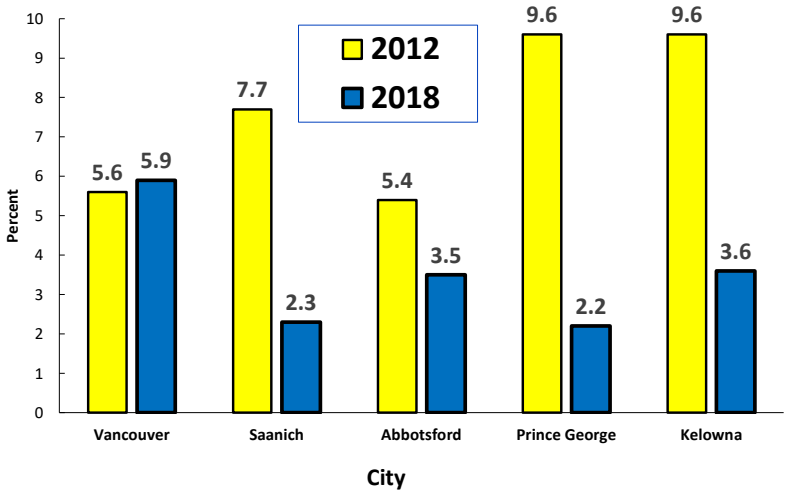
Figure 2: BAC Distribution of Drivers in 2012 and 2018



Cities

Figure 3 presents the percentage of drivers with positive BACs in each of the five cities in 2018 and 2012. The percentage of drinking drivers was smaller in 2018 relative to that in 2012 in every city except Vancouver. The actual numbers, however, are small and changes from 2012 to 2018 should be viewed with caution. It is of interest that in both Saanich and Prince George no drivers were found with BACs greater than 50 mg/dL.

Figure 3: Percentage of Drivers with Positive BACs According to City (2012 and 2018)



Characteristics of Drinking Drivers

Driver sex

Males were overrepresented among drinking drivers. They comprised two-thirds of all drivers who provided a breath sample but 78% of drivers who had been drinking. The percentage of male drivers who had been drinking (5.8%) was significantly higher than females (3.2%) ($\chi^2(1, N=1859)=6.21$, $p<.05$). Men and women were equally likely to have a BAC of at least 50 mg/dL. The numbers, however, are small and should be interpreted with caution.

Driver age

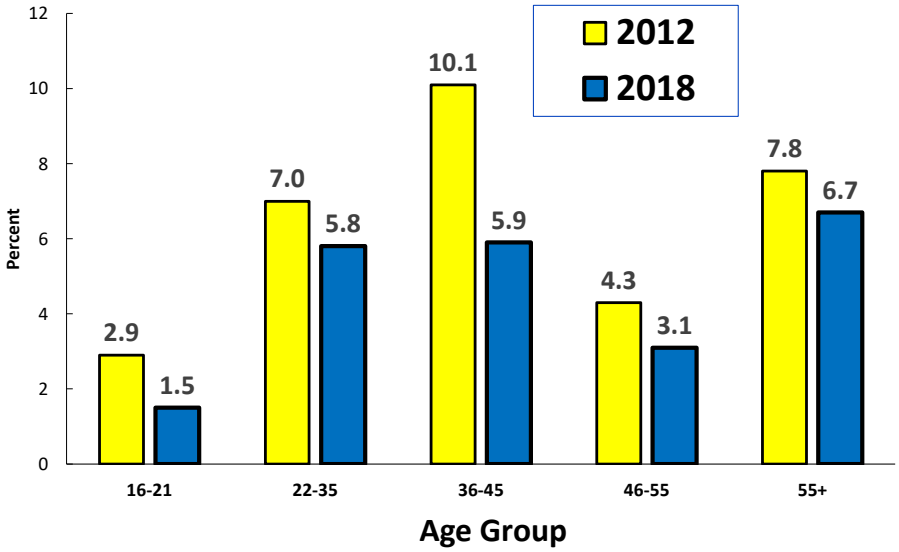
The percentage of drivers with positive BACs in 2018 varied according to age group ($\chi^2(6, N=1811)=13.4$, $p<.05$). There was one driver in the 16 to 18 age group that had a positive BAC. Drivers age 66 and over were most likely to have been drinking (7.8%). Among the small group of drivers with BACs of at least 50 mg/dL, the largest number was found in the 56 to 65 year-old age group.

Figure 4 displays the percentage of drivers with positive BACs according to age group in 2012 and 2018. There was a reduction in drinking and driving in every age group but these differences were not statistically significant ($\chi^2(4, N=232)=1.74$, $p>.05$)

Graduated Licensing

As part of the Graduated Driver Licensing program, drivers who hold an “L” or “N” licence are restricted to a zero BAC when driving. Among the group of 313 drivers who reported they had an “L” or “N” licence, 2.2% had a positive BAC. All but one of these alcohol positive drivers was at least 24 years of age. Of those with a positive BAC, half had a BAC over 50 mg/dL.

Figure 4: Percentage of Drivers with Positive BACs According to Age (2012 and 2018)



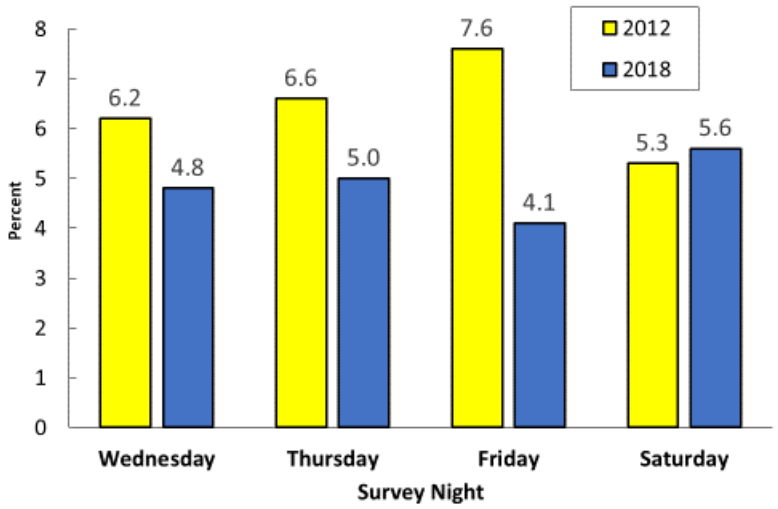
Characteristics of Drinking and Driving

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 situations under which drinking and driving is most likely to occur and can assist in prevention and enforcement efforts.

Survey night

Figure 5 presents the distribution of drivers with a positive BAC according to survey night as well as the comparable distribution from 2012. Although the highest proportion of drinking drivers was found on Saturday night, the differences between nights were small and not statistically significant ($\chi^2(3, N=1876)=1.33, p>.7$).

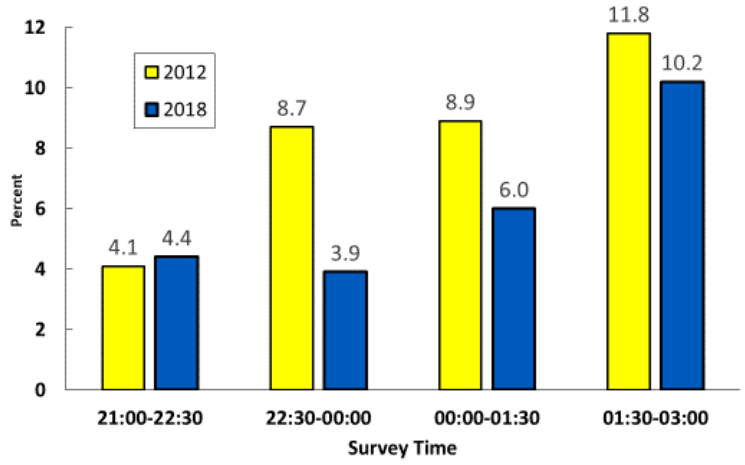
Figure 5: Drivers with Positive BACs According to Survey Night (2012 and 2018)



Survey time

The percentage of alcohol-positive drivers in each of the four time periods of the survey is presented in Figure 6. Comparable data from the 2012 survey are also presented. The percentage of drinking drivers differed significantly across the time periods ($\chi^2(3, N=1875)=12.1$, $p<.01$) with the highest proportion of drinking drivers being between 01:30 and 03:00.

Figure 6: Drivers with Positive BACs According to Survey Time (2012 & 2018)



Vehicle type

The percentage of drivers who had been drinking did not differ according to the type of vehicle driven ($\chi^2(4, N=1790)=8.039$, $p>.05$). No drivers of vans or minivans were found to have been drinking.

Occupant configuration

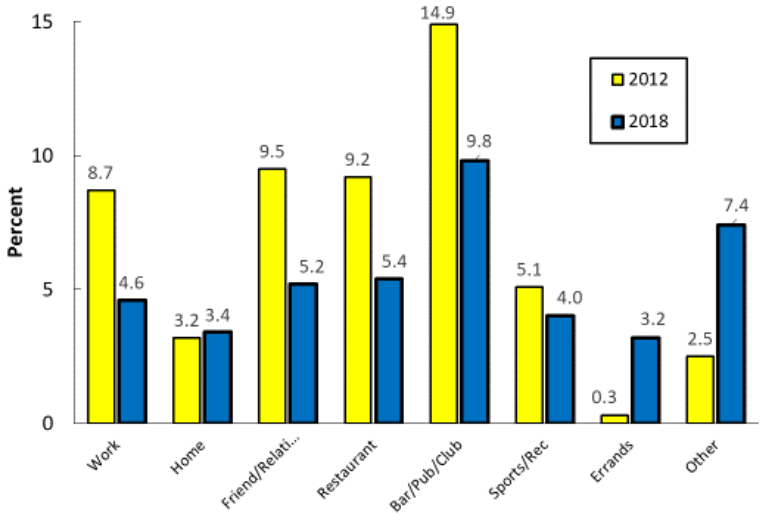
The configuration of vehicle occupants was related to driver alcohol use ($\chi^2(5, N=1825)=14.8$, $p<.02$). Drivers with one different-sex passenger were most likely to have been drinking (7.9%) whereas no drivers with a same-sex group of passengers were found to have been drinking.

Trip Origin

Figure 7 displays the percentage of drivers with positive BACs according to the reported origin of the trip with positive BACs.[8] Although the actual number was small, drivers who reported coming from a bar, pub, club, or tavern were most likely to have been drinking (9.8%).

Among all drinking drivers, the largest number reported coming from the home of a friend or relative; work was the second most common point of origin of drinking drivers.

Figure 7: Drivers with Positive BACs According to Trip Origin (2012 & 2018)



Drugs and Driving

An examination of the raw (unweighted) data reveals that 166 (9.9%) of drivers who provided an oral fluid sample tested positive for drugs. Of the drug-positive cases, 86.1% involved a single drug and 13.9% tested positive for more than one drug. Of those who tested positive for drugs, 12 drivers (7.4%) also tested positive for alcohol.

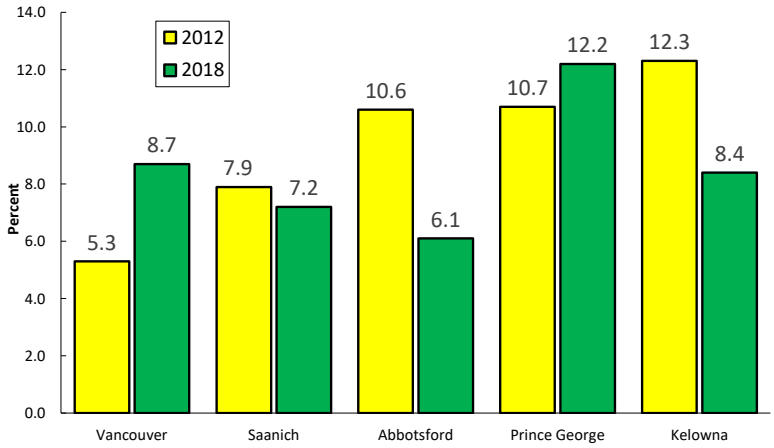
[8] Small numbers in some categories precluded an analysis of these data.

Cannabis was the most frequently found substance – 70.5% of drug-positive drivers tested positive for tetrahydrocannabinol (THC), the substance primarily responsible for the psychoactive effects of cannabis. Stimulants (e.g., cocaine, amphetamine) were detected in 36.1% drug-positive drivers and opioids (e.g., fentanyl, oxycodone) were detected in 6.0%. Benzodiazepines were detected in only two drivers.[9]

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. The weighted data show that 8.5% of drivers who provided an oral fluid sample tested positive for at least one potentially impairing substance other than alcohol.

Figure 8 shows the weighted drug test results in each community. The results from the 2012 survey are also presented for comparison. The percentage of drug-positive cases did not differ significantly among the communities ($\chi^2(4, N=1739)=4.21$, $p>.3$).

Figure 8: Drivers Positive for Drugs According to City (2012 & 2018)



Characteristics of Drug-drivers

Driver sex

Male drivers were more than twice as likely as females drivers (10.7% and 4.5%, respectively) to test positive for drugs ($\chi^2(1, N=1727)=19.2$, $p<.001$). Males represented 65.4% of all drivers but accounted for 81.8% of drivers who tested positive for drugs.

Male drivers were also significantly more likely than female drivers to test positive for cannabis (7.0% and 2.0%, respectively) ($\chi^2(1, N=1726)=19.5$, $p<.001$).

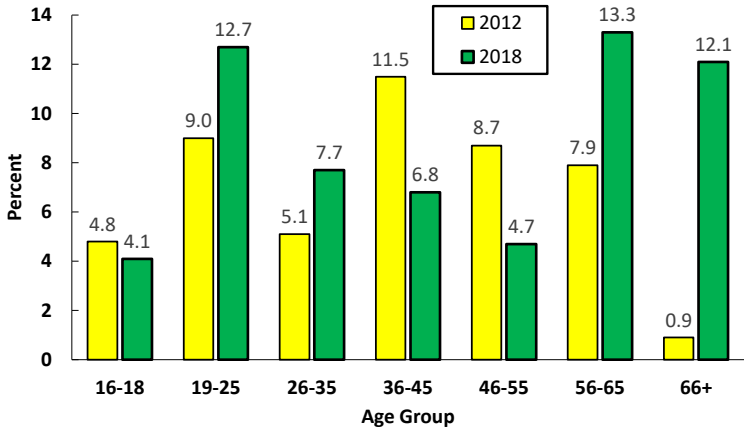
[9] Percentages add to more than 100% due to more than one drug being detected in some drivers.

Driver Age

Figure 9 presents the percentage of each age group of drivers that tested positive for drugs. Data from the 2012 survey are presented for comparison. Drug use varied significantly according to driver age ($\chi^2(6, N=1690)=22.3$, $p<.001$). Drivers 16 to 18 years of age were least likely to test positive for drugs (4.1%) and drivers between 56 and 65 years of age were most likely to test positive for drugs (13.3%).

The distribution of drug use among age groups of drivers varied significantly between 2012 and 2018 ($\chi^2(6, N=254)=23.0$, $p<.01$). Most notable is the increase in drug use among those over 55 years of age, especially those over 65 years of age. Among this oldest age group of drivers, 12.1% were drug positive. Although people in this age group might be expected to be more likely to test positive for prescription pharmaceuticals (e.g., opioids, benzodiazepines), all cases were positive for cannabis alone.

Figure 9: Drivers Positive for Drugs According to Age Group (2012 & 2018)



It was previously noted that 2.2% of drivers with an ”L” or “N” licence had been drinking. However, among drivers with an ”L” or “N” licence who provided an oral fluid sample, 12.2% tested positive for drugs. Among this latter group of drivers, 93.6% were over 18 years of age.

Characteristics of Drug-driving

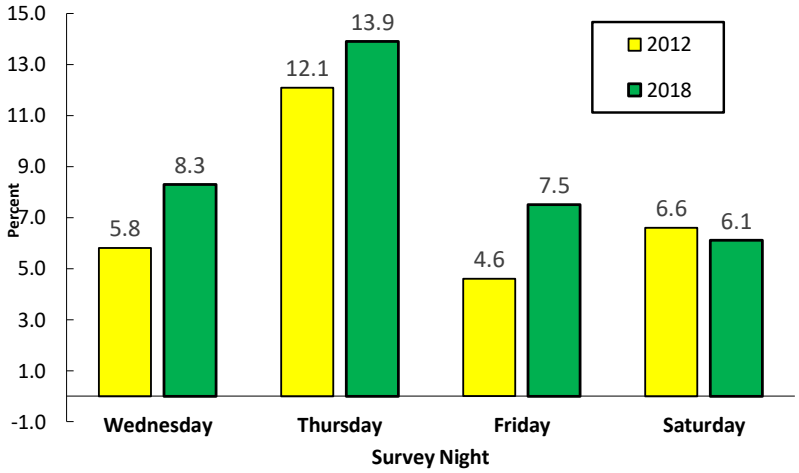
This section examines the temporal and environmental circumstances surrounding drug use and driving behaviour—e.g., day of the week, time of day, type of vehicle and trip origin. These characteristics can help identify situations under which drug use and driving is most likely to occur and can assist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

Survey night

Figure 10 presents the percentage of drivers who tested positive for drugs according to survey night. The data from the 2012 survey are presented for comparison. Drug use by drivers differed significantly according to day of the week ($\chi^2(3, N=1740)=18.7$, $p<.001$). Drivers on Thursday

night were the most likely to test positive for drugs in 2012 (12.9%) and 2018 (13.9%). In both years, drug use by drivers was lower on weekend nights than weekday nights.

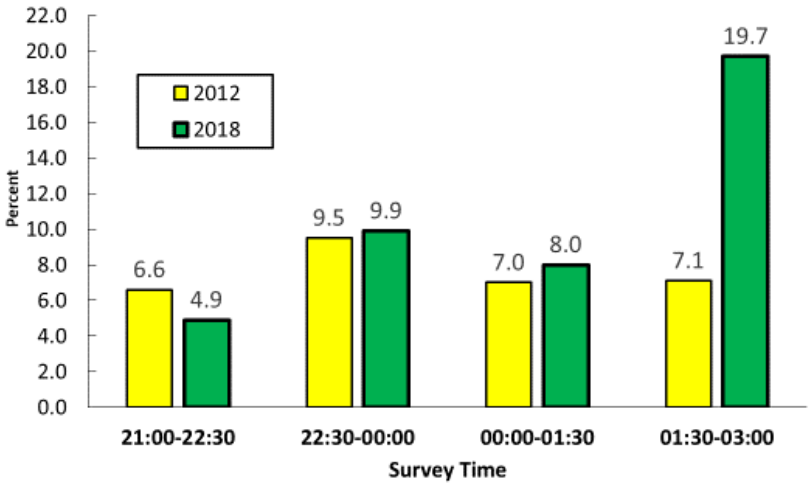
Figure 10: Drivers Positive for Drugs According to Survey Night (2012 & 2018)



Survey time

Figure 11 displays the percentage of drivers who tested positive for drugs according to the time of the survey. The percentage of drug-positive drivers varied according to site time, reaching the highest level between 01:30 and 03:00 (19.7%) ($\chi^2(3,N=1740)=35.8$, $p<.001$).

Figure 11: Drivers Positive for Drugs According to Survey Time (2012 & 2018)



Vehicle Type

The percentage of drivers testing positive for drugs varied according to vehicle type ($\chi^2(5, N=1667)=35.8$, $p<.001$). Drivers of pickup trucks were most likely to test positive for drugs (11.7%) followed by drivers of cars (10.6%). No drivers of minivans tested positive for drugs.

Occupant Configuration

The percentage of drug positive drivers did not vary significantly according to occupant configuration ($\chi^2(5, N=1698)=8.2$, $p>.1$). Drivers who had one same-sex passenger were most likely to test positive for drugs (13.8%). Among drivers with a family in the vehicle, 9.2% tested positive for drug use. Drivers who were the only vehicle occupant comprised 54.7% of all drivers who were positive for drugs,

Trip Origin and Destination

The most common places of origin of drivers who tested positive for drugs was home (24.5%) or the home of a friend or relative (24.5%). A sport or recreation event was the origin of 10.2% of all drug-positive drivers.

Home was the reported destination of 60.1% of all drivers who tested positive for drugs followed by the home of a friend or relative (17.6%). Among drivers who indicated they were on their way to work, 9.6% were positive for drugs.

Experiences and Awareness

As part of the interview, drivers were asked about the likelihood of a person being stopped by the police if the person drove after drinking too much or after using drugs. Drivers were asked to respond using a scale from 1 to 7, where 1 represented ‘not at all likely’ and 7 represented ‘extremely likely’. Drivers thought it somewhat more likely that a driver would be stopped by the police after drinking too much ($M=4.28$, $SD=1.91$) than driving after using drugs ($M=3.86$, $SD=2.06$). Drivers who had been drinking thought a person was more likely to be stopped after drinking too much than drivers who had not been drinking ($t(1869)=3.34$, $p<.01$). The perceived likelihood of being stopped after using drugs did not differ according to whether or not the driver was positive for drugs ($t(1732)=1.59$, $p>.11$).

Drivers who agreed to provide an oral fluid sample were asked to complete a self-report questionnaire (Appendix C) during the 2-3 minutes while the sample was being collected. The questions asked about awareness of impaired driving laws and alcohol and drug use.

Overall, 88.5% of respondents indicated that they knew of the immediate suspension for driving with a BAC of 50 mg/dL or greater and 82.5% were aware of the suspension for poor sobriety test performance. There were no differences in responses between those who had been drinking or tested positive for drugs.

The majority of participants were aware that drivers face an immediate short-term licence suspension for driving with a BAC over 50 mg/dL (80.8%). Most drivers (73.8%) were aware of similar suspensions for poor performance on a Standardized Field Sobriety Test (SFST).

As part of this questionnaire, drivers were asked about the maximum allowable level of alcohol for drivers who had an “L” or “N” licence. Overall, 72.0% of drivers were aware that novice drivers were restricted to a zero BAC. However, 13.7% of participants who indicated they had

an “L” or “N” licence novice drivers were unaware of the zero alcohol policy; 28.4% of novice drivers who were 19 years of age or older did not know that they were not allowed to drive with any alcohol in their system.

When asked how many drinks it takes them to reach an alcohol level of 50 mg/dL, 32.9% of respondents selected the answer “I’m not sure”. Just over half of all respondents (57.0%) indicated one or two drinks; 7.6% indicated 3 drinks; and 1.9% indicated 4 or more drinks.

Drivers were asked what being a Designated Driver meant to them, with three options from which they were to select one. Overall, most respondents (94.8%) indicated that it meant “drinking no alcohol or using not drugs at all”, while 4.5% selected “drinking some alcohol or a few hits on a joint but not enough to be impaired”, and less than 1% indicated that it meant “drinking less alcohol or drugs than my passengers”.

Drivers were asked to indicate the reasons why it was hard for people to avoid drinking and driving and driving after using cannabis. Respondents were provided with nine possible answers and were allowed to check as many as they thought were applicable. Table 6 represents the number and percentage of participants who checked each item. The three most common reasons selected for it being hard to avoid driving after drinking and driving after using cannabis were: “people don’t think they are impaired”, “people don’t think they will get caught by the police”, and “people don’t want to leave their car somewhere”.

Table 6: Reasons it is hard for people to avoid drinking and driving and driving after using cannabis

Reason	Driving after drinking n (%)	Driving after using cannabis n (%)
People don’t think they are impaired	961 (61.1)	893 (56.9)
People don’t think they will get caught by the police	759 (48.3)	790 (50.3)
People don't want to leave their car somewhere	750 (47.7)	515 (32.8)
Taxis/ride share services cost too much	571 (36.3)	374 (23.8)
Staying overnight is inconvenient	559 (35.6)	363 (23.1)
Public transit service is poor or inconvenient	559 (35.6)	364 (23.2)
Taxis/ride share services are not available	548 (34.8)	347 (22.1)
There is no public transit	519 (33.0)	339 (21.6)
The wait for a taxi/ride share service is too long	516 (32.8)	341 (21.7)

Alcohol and Cannabis Use

By far the majority of drivers indicated that they had not used cannabis in the past twelve months (78.0%). Of those who had used cannabis, 1.7% reported daily use and a further 4.1% used at least weekly. Smoked cannabis was the most common form of cannabis used on the last occasion of use (71.5%) followed by concentrates (13.3%).

Among drivers who tested positive for cannabis, 21.4% reported daily use of cannabis; an additional 21.5% reported using cannabis at least weekly. Interestingly, 7.1% of drivers who tested positive for cannabis indicated that they had never used cannabis.

The reported use of alcohol was common; 73.0% of drivers who completed the questionnaire reported consuming alcohol in past 12 months. Among drinkers, 27.2% reported consuming five or more drinks on an occasion at least monthly.

The use of both alcohol and cannabis on the same occasion was reported by 17.4% of drivers. Among this group, 7.7% indicated that they combined alcohol and cannabis use on the same occasion every day; a further 14.8% did so at least once per week.

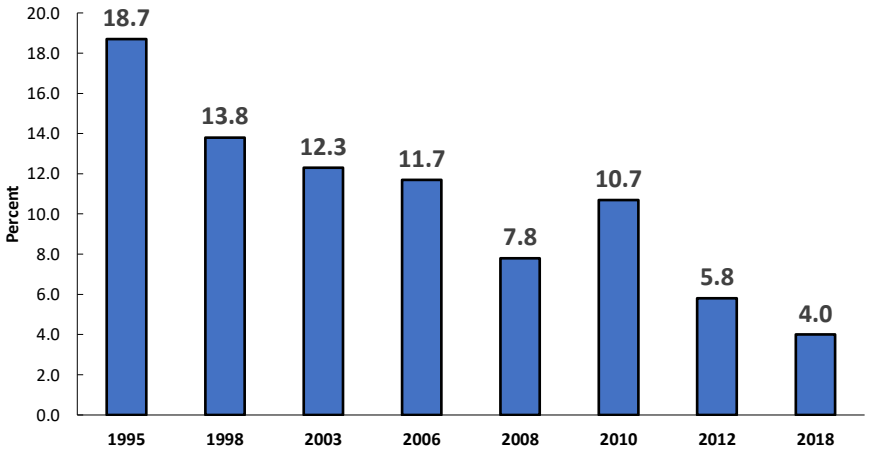
DISCUSSION

Roadside surveys provide a means to obtain an objective, scientifically valid estimate of the prevalence of alcohol and drug use by drivers 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 prevalence of drinking and driving as well as driving after drug use. In addition, roadside surveys provide a means to monitor changes in these behaviours and can be a powerful tool to help evaluate the impact of countermeasure programs and policies.

The roadside survey described in this report was undertaken as a means to gather objective information about the extent and circumstances of the use of alcohol and drugs by drivers as well as to describe the characteristics of British Columbia drivers who drive after using drugs and/or alcohol. The present survey also provides the opportunity for comparison with the previous survey conducted in 2012 and contribute to the establishment of a baseline of cannabis use by drivers prior to the legalization of cannabis in Canada in October 2018.

The proportion of drivers in the present survey who tested positive for alcohol (4.9%) was 50.5% lower than that in the 2010 roadside survey conducted in the same communities (9.9%). Compared to older surveys dating back to 1995, in which only Vancouver and Saanich were included, the present results in these two communities show a 78% reduction in the proportion of drivers who had been drinking (Figure 13). Among other factors, this result speaks to the success of the comprehensive range of programs, policies, legislation, and public education campaigns directed at drinking and driving behaviour in British Columbia. Drivers appear to have adopted a general intolerance of drinking and driving and have, to a large extent, changed their behaviour.

Figure 13: Percentage of Drivers with Positive BACs in BC Roadside Surveys (1995 – 2018)*



* Vancouver and Saanich only

In addition to the overall reduction in the percentage of drivers who had been drinking, the alcohol concentrations of drivers who had consumed alcohol were relatively low, most being below the level at which administrative suspensions could be imposed (i.e., 50 mg/dL). Nevertheless, there remains a small minority of drivers who consume sufficient quantities of alcohol to place themselves and other road users at risk. The search for innovative strategies and messages that impact this select group of drivers needs to continue.

It is noteworthy that in both the 2012 and 2018 surveys, there were very few drivers between 16 and 21 years of age who were found to have a positive BAC. This finding may well be a reflection of the success of the "zero alcohol" restriction for drivers with an "L" or "N" licence. This finding also supports anecdotal reports that young people have embraced the anti-drinking-driving message and are taking positive steps to avoid this risky behaviour. However, the fact that 14% of novice drivers were unaware of the zero alcohol restriction indicates the need to repeatedly reinforce the message, particularly among the 28% of novice drivers who are of legal age to drink.

Overall, 8.5% of drivers were found to have recently ingested one or more impairing substances other than alcohol, 15% more than in the 2012 survey (7.4%). As was the case in 2012, cannabis was the most frequently found substance in drivers, with 70.5% of drug-positive drivers testing positive for cannabis. Stimulants were detected in 36% of all drug-positive drivers; opioids were found in 6%. The use of more than one drug was detected in 13.9% of all drug positive cases; 7.4% of all drug-positive cases had also been drinking.

Drinking and driving continues to be most prevalent between 01:30 and 03:00, a period that coincides with the cessation of service at licensed drinking establishments. Bars, taverns, clubs, and restaurants are the source of a large number of drinking drivers. The home of a friend or relative was also a common point of origin for drinking drivers, which suggests an ongoing need for programs offering social hosts strategies and tactics for preventing their guests from driving.

Drug use among drivers was also most commonly found between 01:30 and 03:00. However, licensed drinking premises were not the most common point of origin for drivers who tested positive for drug use. Drug-drivers were most prevalent among those coming from home or the home of a friend or relative, or a sport or recreation event. This would suggest that prevention and enforcement efforts directed towards drug-drivers should target locations than those directed at drinking drivers.

Drivers aged 16-21 were considerably more likely to drive after drug use (4.1%) than after alcohol use (1.5%). There would appear to be a discrepancy between young drivers' thoughts and perceptions about the safety of operating a vehicle after alcohol versus after using cannabis. In addition, other recent research has reported that there is a common notion among youth that cannabis doesn't impair driving and the police can't do anything about it anyway (Porath-Waller et al., 2013). The challenge for any future educational and awareness efforts will be to overcome a growing normative environment that is tolerant of cannabis use that has been created by the ongoing discussion, and pending legalization, of cannabis along with the widespread perception of cannabis as a safe, natural, medicinal product.

Drug use was prevalent among drivers aged 19 to 24. Cannabis was the substance detected most frequently. Once again, there would appear to be a discrepancy between drivers' thoughts and perceptions about operating a vehicle after drinking versus after using drugs. It is also possible that drugs are being substituted for alcohol in some situations, possibly as a (misguided) means to avoid impairment and detection by the police. Efforts to improve the level of knowledge, awareness and perceptions about drugs and driving among young drivers would be of value in efforts to change this behaviour.

The increase in drug use by drivers over 55 years of age is an observation worthy of further investigation. Traditionally, this age group has been the highest users of prescription medications and these drugs are occasionally detected among drivers. It is likely that many of these drivers were using the drugs for legitimate medical reasons. The substantial increase in the prevalence of cannabis among this age group might reflect a substitution for prescription medications combined with a perception of cannabis as being less impairing. Further research is necessary to better understand the use of cannabis by older drivers.

Limitations

As valuable as the data from the present study are, it is important to understand the limitations of the study. First, it must be recognized that drug presence does not necessarily indicate impairment. Whereas research has established the concentration of alcohol at which performance is impaired in the majority of drivers, such levels have yet to be agreed upon for the wide variety of drugs of interest.

Drivers were interviewed in five distinct regions selected to represent the vast geography of the province. The specific communities were not selected randomly. Practical and logistical considerations limited the ability to select communities at random and, hence, the estimates of alcohol and drug use by drivers should not be interpreted as provincial estimates.

The survey included the same five regions of the province as were used in both the 2010 and 2012 surveys. Although a standard, documented procedure was used to identify potential sites, practical considerations often restricted the ability to select sites completely at random. The

criteria for a survey site were very strict so as to ensure the safety of the public, the police officers and the survey crew. It was also necessary to obtain the permission of property owners (or their designate) to use the property. In a few cases where permission was not granted, an alternative site had to be selected.

Despite the high rate of participation in the survey, response rates were lower than in previous surveys. Initially, it was thought that the high level of media attention afforded the issue of driving under the influence of cannabis might facilitate participation rates. This was not the case. Drivers were actually more likely to refuse all participation in the present survey. However, if drivers agreed to the interview, there was a high degree of cooperation with the request for both a breath and oral fluid sample.

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APPENDIX A

Information Card

British Columbia 2018

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 | RoadSafetyBC

madd
Saving Lives, Supporting Victims

Transport Canada | Transports Canada

This survey takes about 5 or 6 minutes to complete. Participation is completely VOLUNTARY and you may discontinue at any time. 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 2-3 minutes. Should you agree to provide a sample, we will give you a coupon for $10 worth of gasoline.

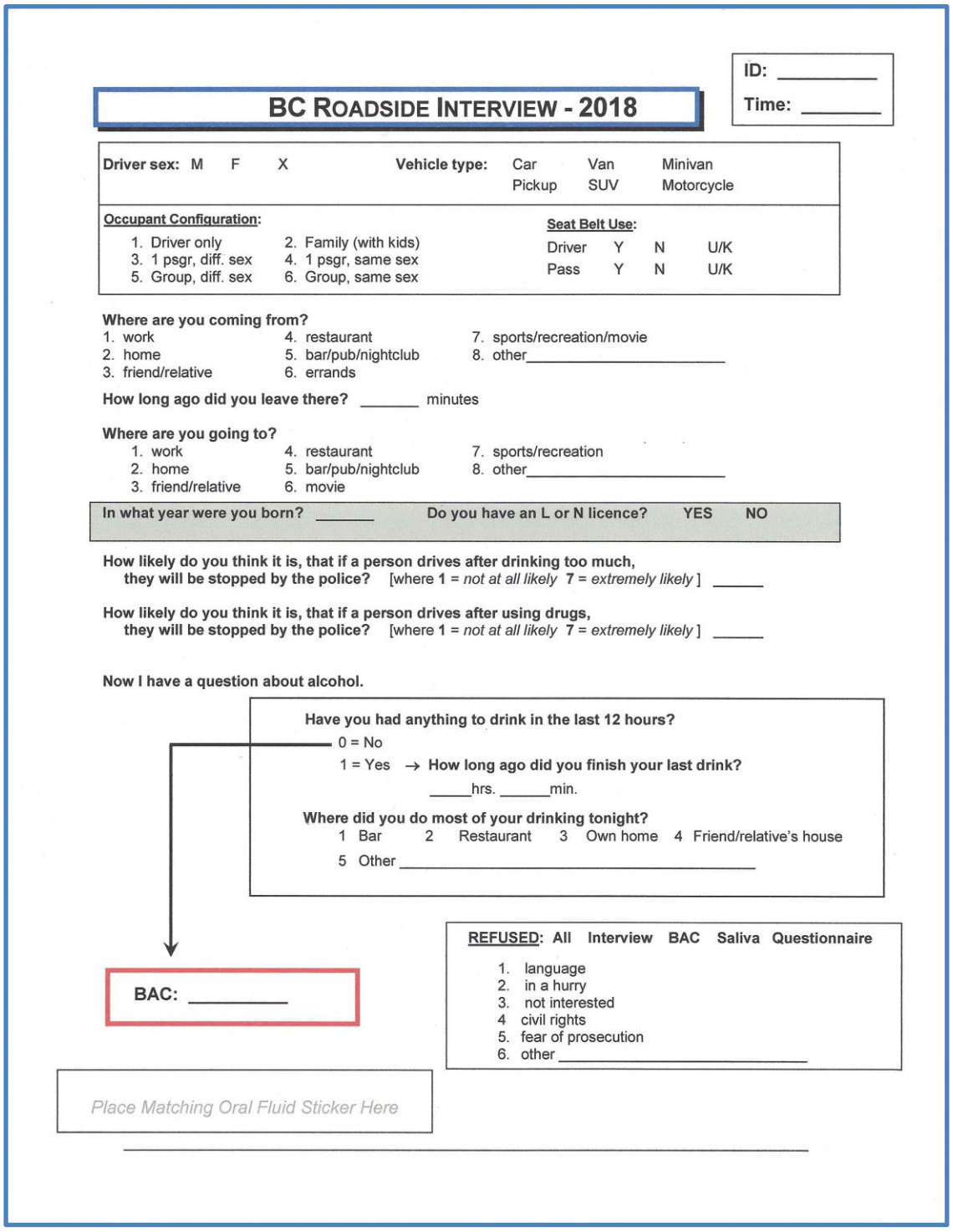
Your answers to the questions and the results of your breath test and the oral fluid test will be anonymous and will be kept by the researchers. No identifying information will be kept in the data file.

This research is supported by the Ministry of Public Safety and Solicitor General, Transport Canada, 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 Bradley Gerhart at RoadSafetyBC (778-698-5194 or bradley.gerhart@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



ID: _____

Time: _____

BC ROADSIDE INTERVIEW - 2018

Driver sex: M F X **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 U/K

Pass Y N U/K

Where are you coming from?

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

How long ago did you leave there? _____ minutes

Where are you going to?

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

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

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*] _____

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

Now I have a question about alcohol.

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

0 = No

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

_____hrs. _____min.

Where did you do most of your drinking tonight?

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

5 Other _____

BAC: _____

REFUSED: All 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 Questionnaire

Alcohol and Drug Questionnaire 2018

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

Please mark the response that best reflects your answer.

1. What class of driver's licence do you have?
   ☐ 1 ☐ 3 ☐ 5 ☐ 7 ☐ Learner ☐ Don't know
   ☐ 2 ☐ 4 ☐ 6 ☐ 8 ☐ Novice ☐ Other _____
2. Are you aware that in British Columbia a person can face an immediate 3, 7, or 30-day licence suspension for driving with a blood alcohol concentration (BAC) over .05?
   ☐ Yes ☐ No
3. Are you aware that in British Columbia a person can face an immediate 3, 7, or 30-day licence suspension for poor performance on roadside sobriety tests?
   ☐ Yes ☐ No
4. What is the maximum allowable level of alcohol for drivers who are have a **Learner** or **Novice** driver's licence?
   ☐ .00 ☐ .02 ☐ .05 ☐ .08
5. How many drinks do you think it might take you to reach an alcohol level of .05?
   _____ (number of drinks) ☐ I'm not sure
6. Are you the designated driver tonight?
   ☐ Yes ☐ No
7. What does being a Designated Driver mean to you?
   ☐ Drinking no alcohol and using no drugs at all.
   ☐ Drinking some alcohol or a few hits on a joint but not enough to be impaired.
   ☐ Drinking less alcohol and using less drugs than my passengers
8. In your experience, what makes it hard for people to avoid driving after alcohol use? (***Check all that apply***)
   ☐ Taxis/ride share services are not available
   ☐ Taxis/ride share services cost too much
   ☐ People don't think they are impaired
   ☐ There is no public transit
   ☐ Staying overnight is inconvenient
   ☐ The wait for a taxi/ride share service is too long
   ☐ Public transit service is poor or inconvenient
   ☐ People don't want to leave their car somewhere
   ☐ People don't think they will get caught by the police
   ☐ Other: (Please specify) _____
9. In your experience, what makes it hard for people to avoid driving after using cannabis? (***Check all that apply***)
   ☐ Taxis/ride share services are not available
   ☐ Taxis/ride share services cost too much
   ☐ People don't think they are impaired
   ☐ There is no public transit
   ☐ Staying overnight is inconvenient
   ☐ The wait for a taxi/ride share service is too long
   ☐ Public transit service is poor or inconvenient
   ☐ People don't want to leave their car somewhere
   ☐ People don't think they will get caught by the police
   ☐ Other: (Please specify) _____
10. How often in the past 12 months have you used cannabis/marijuana?
    ☐ *Every day* ☐ 5 or 6 times a week ☐ *2 to 4 times a week*
    ☐ *Once a week* ☐ *2 to 3 times a month* ☐ *Once a month*
    ☐ *Less than once a month* ☐ *Never* ☐ *Don't know*

11. The last time you used cannabis, how did you use it?

☐ *Smoked* ☐ *Inhaled concentrates (e.g., dabs)*
☐ *Edibles* ☐ *Infused beverage* ☐ *Oil*
☐ Vaping ☐ *Other* _____ ☐ *I don't use cannabis*

12. 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 # 15.*

13. How often in the past 12 months have you had 5 or more drinks on one occasion?

☐ *Every day* ☐ 5 or 6 times a week ☐ *2 to 4 times a week*
☐ *Once a week* ☐ *2 to 3 times a month* ☐ *Once a month*
☐ *Less than once a month* ☐ *Never* ☐ *Don't know*

14. How often in the past 12 months have you had alcohol and used cannabis on the same occasion?

☐ *Every day* ☐ 5 or 6 times a week ☐ *2 to 4 times a week*
☐ *Once a week* ☐ *2 to 3 times a month* ☐ *Once a month*
☐ *Less than once a month* ☐ *Never* ☐ *Don't know*

15. Please indicate with an **X** in the box that best reflects when you last used each of the following medications/drugs.

	Never	**Over 12 months ago**	**Within past 12 months**	**Within past 30 days**	**Today**
Cough/cold medicines					
Amphetamines (Ritalin, Aderall, etc.)					
Anti-depressants (Prozac, Celexa, etc.)					
Cannabis/Marijuana					
Synthetic Cannabis/Stimulants (e.g., K2, Spice, Bath Salts, Izms),					
Cocaine (crack or coke)					
Ecstasy (MDMA)					
Sleeping pills, Anti-anxiety medications (e.g., Valium, Lorazepam, Zolpidem)					
Methamphetamine					
Heroin, Methadone					
Prescription pain medications (e.g., morphine, codeine, oxycodone, percocet)					

APPENDIX D

Frequency of Specific Drugs Detected

Drug Category	Drug	N (unweighted)
Cannabis	THC	117
Stimulants	Cocaine	41
	Benzoylecognine	39
	Cocaethylene	5
	AMP	18
	METH	21
	MDA	0
	MDMA	1
	MDEA	0
	Phentermine	0
Benzodiazepines	Diazepam	1
	Nordiazepam	1
	Oxazepam	1
	Temazepam	0
	Clonazepam	0
	Alprazolam	1
	Lorazepam	0
	Triazolam	0
	Chlordiazepoxide	0
	Nitrazepam	0
	Estazolam	0
	Flurazepam	0
	Midazolam	0
	Phenazepam	0
	Bromazepam	0
Opioids	Morphine	1
	Codeine	14
	6-AM	1
	Hydrocodone	0
	Hydromorphone	0
	Oxycodone	2
	Oxymorphone	0
	Fentanyl	8
	Norfentanyl	1
Zolpidem	Zolpidem	0