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A ROADSIDE SURVEY OF THE BLOOD ALCOHOL CONCENTRATION LEVELS OF NIGHTTIME DRIVERS IN THE PERTH METROPOLITAN AREA

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A roadside survey of the blood alcohol concentration levels of nighttime drivers in the Perth metropolitan area

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Abstract:

The aim of this research was to investigate changes in driver blood alcohol concentration (BAC) levels within the Perth metropolitan area over time through a replication of, and comparison with, two previous road side surveys conducted during 1999 (Ryan, 2000) and in 2000 (Kirov, 2001). Data was collected at roadside police Random Breath Testing (RBT) sites during April to May 2012. A total of 8,435 tests were conducted over a six week period on Thursday, Friday and Saturday nights. Around 7% of drivers tested returned a positive BAC, and 1.4% of these had BACs over the legal limit. There was a relatively even proportion of drink drivers detected across the three week nights, Thursday, Friday and Saturday but a greater proportion of drink drivers were detected in the early morning sessions between 1am and 4:45 am. The back-calculation process applied to BAC evidentiary tests in Western Australia resulted in 26 drivers not receiving a drink driving charge and 65 drivers receiving a reduced BAC level charge. It is recommended that RBT schedules be amended to achieve greater coverage during early morning periods to accommodate the evolving changes in socialisation and alcohol consumption patterns and that this survey be conducted on annual basis to monitor drink driving patterns.

Key Words:

Alcohol, blood alcohol content, BAC, breath test, drink driving, random breath testing, RBT, roadside survey, back-calculation.

Disclaimer:

This report is disseminated in the interest of information exchange. The views expressed here are those of the authors and not necessarily those of Curtin University or Monash University.

Preface

Project Manager / Team Leader:

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Contributorship Statement

Belinda Clark: Wrote and submitted the proposal, managed the project, analysed the data, and wrote the report.

Peter Palamara: Assisted with the study design, liaised with the WA Police, supervised the survey teams, contributed to data collection and data entry, and provided editorial comment.

All other staff contributed to the collection of data and to data entry (Jessica Martin; Lachlan Palamara)

Ethics Statement

Ethics approval was granted by Curtin University Human Research Ethics Committee SPH-05-2012.

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EXECUTIVE SUMMARY

INTRODUCTION

Random breath testing (RBT) was introduced in Western Australia in 1988. Since its introduction there have been several key changes to RBT practices, these include reductions in the legal BAC limit as well as the use of RBT 'booze buses' for high volume RBT enforcement. While a substantial proportion of police resources are committed to enforcement strategies for the detection of drink drivers, the current drink driving patterns and corresponding driver BAC levels remains unclear. The collection of roadside survey data has become a well-recognized strategy to explore drink driving patterns and trends. This current research is based on two previous roadside drink driving surveys conducted in Perth during 1999 and again in 2000.

Aim

The aim of this research was to investigate drink driving patterns within the Perth metropolitan area over time. The survey was designed to support the ongoing monitoring of RBT data through the replication of two previous roadside surveys conducted in 1999 (Ryan, 2000) and in 2000 (Kirov, 2001).

Method

A survey team attended 36 RBT buses sites based operated by the Western Australia Police, situated at the same locations as the previous two surveys. The sites were surveyed over a six week period on Thursday, Friday and Saturday nights from the 19th April to 26th May 2012. The sites were originally chosen to sample the major traffic corridors from the CBDs of Perth and Fremantle and were representative of the three metropolitan regions, north, south and east. Two sites were surveyed each night for approximately 1.5 hours each. The first sessions commenced at either 22:00 or 23:00 hours, the RBT bus was then relocated and the second sessions commenced at around 01:00 or 02:00 hours (some delays in commencement or completion occurred at specific sites).

The survey team collected site details such as: date, time, location, road type (e.g. primary, secondary arterial), speed limit, weather conditions. They then observed drivers stopped by the police officers at the RBT site and recorded their gender, estimated age, vehicle type (e.g. car, motorcycle), displaying of P or L-plates. For drivers who recorded a positive BAC result, the police officer would ask the driver for their exact age, and location of last place of drink (e.g. home, hotel, and restaurant) and convey this information directly to the observer.

Findings

This current survey has identified a reduction in the proportion of drivers detected with both positive (but legal) as well as illegal BAC levels (≥0.05 g/100ml or 0.02g/100ml for learner, provision drivers), compared to data obtained in 1999 and 2000.

Of the 8,435 drivers tested, 1.4% were detected with an illegal BAC level. This represents a significant reduction in the number of drivers detected with an illegal BAC compared to both of the two previous survey findings of 2.1% of drivers in 2000 and 1.9% in 1999.

Amongst the drivers with illegal BACs there was a smaller proportion of drivers detected (0.7%) in the current survey within the ≥0.05-0.079 g/100ml range compared to the two previous surveys (1.0% & 1.1%).

In the 0.08-0.149 g/100ml BAC range a greater proportion of drivers were detected in the current survey (1.5%) than in the 1999 survey (0.8%) and in 2000 (0.9%).

The same proportion of drivers (0.1%) was detected in ≥0.15 g/100ml BAC range across all three surveys.

Western Australia is the only Australian jurisdiction to apply the back-calculation process to BAC evidentiary tests.

The application of the back-calculation process in this survey sample resulted in 26 drivers not receiving a drink driving charge and 65 drivers receiving a reduced charge ranging between one to four BAC charge levels.

Recommendations

To maximize both general and specific deterrence, regular RBT enforcement schedules should be extended into the early hours of the morning to reflect the evolving changes in socialisation and alcohol consumption patterns.

Future surveys should be conducted in a regular season (spring or autumn) to reduce the chance of seasonal variation in the results.

This survey should be replicated on a regular basis (annual or maximum every three years), to support ongoing monitoring of drink driving patterns across Perth, and to inform police RBT enforcement and drink driving countermeasures.

The implementation of the back-calculation process in Western Australian RBT practices does not achieve its desired aim, to the contrary it has been found to favour drink drivers and therefore should be ceased.

1 INTRODUCTION

1.1 BACKGROUND

Around 30 percent of the fatalities on our roads involve drink driving, with associated costs of over $200 million annually (WA FORS, 2011).

Random breath testing (RBT) was introduced in Western Australia in 1988. Since its introduction there have been several key changes to RBT practices, these include changes in legislation as well as enforcement practices. In July 1993 the legal blood alcohol content (BAC) limit was reduced from 0.08 g/100ml to 0.05 g/100ml. In July 1995 the RBT "booze bus" was introduced, these buses were specifically designed for conducting drink driving enforcement. The buses enabled sites to be set up on major roads resulting in the breath testing of large numbers of drivers in a single session. Drivers found to have BAC levels over 0.05 g/100ml were now able to be evidentiary tested and interviewed on-site in the bus. These buses were designed to be highly visible and thus increase the general deterrence effect with passing motorists. Although a BAC limit of 0.02 g/100ml for provisional license holders (two years) had been legislated in Western Australia since 1982, in 2007 a zero BAC limit was introduced for this group of drivers.

While a substantial proportion of police resources are committed to enforcement strategies for the detection of drink drivers, the current drink driving patterns and corresponding driver BAC levels remain unclear. Reviews exploring the prevalence of drink driving behaviour and the effectiveness of RBT in addressing this behaviour have highlighted the inherent biases associated with analysis based on police drink driving detection and/or conviction data. Police drink driving enforcement is frequently targeted and thus not truly random, and RBT enforcement scheduling is often governed by resource availability and policing priorities. For example RBT bus operations commonly conclude at 01:00-02:00 hours and therefore little is known about the drink driving patterns in the early morning hours.

The collection of roadside survey data has become a well-recognized strategy to address these methodological challenges in drink driving research (Ryan, 2000; Mathijssen & Noordzij, 1993). In South Australia roadside RBT surveys are conducted by research teams (McLean, Holubowycz, & Sandow, 1980), in New Zealand police officers are employed to assist with traffic regulation for annual roadside RBT surveys and research teams conduct the breath testing (Keall, Frith & Perkins, 1966). In Victoria, research teams collected observational data at Victoria Police operated RBT bus sites, OH&S issues pertaining to both the passing motorists and the research team were influential in this decision. Similarly, in his exploration into an effective methodology to monitor drink driving trends in Western Australia, Ryan (2000) used researcher based observation at booze bus sites operated by the Western Australia Police; this methodology was replicated by Kirov (2001) in her surveys during 2000.

Western Australian RBT policy is based on a premise that a driver's BAC will be on the 'rise' when stopped at an RBT site and therefore their evidentiary test reading (taken after the PBT) will be higher than their actual BAC level at the time when they were operating a vehicle. To account for this presumed BAC increase, evidentiary BAC readings are back-calculated to the driver's "time of last drink". These back-calculations are based on the formula that a BAC rises at 0.016 g/100ml per hour for two hours and then falls at the rate of 0.016 g/100ml per hour. If a driver can prove (convincingly) that they recall their time of last drink then that is the time used in the calculations however, more frequently, the time that the driver undertook the roadside PBT is substituted in the back-calculation process. To allow for the dispersal of mouth alcohol (estimated to disperse in approx. 8 minutes), the minimum allowable time span between a roadside PBT and the evidentiary test is 20 minutes. Typically, the evidentiary test is undertaken 30 minutes after the PBT and then 30 minutes is used in the back-calculation formula, resulting in a subtraction of 0.008 g/100ml from a driver's evidentiary BAC result.

Figure 1-1 provides a graphical example of the rise and fall of driver BAC over time, on which the justification for the back-calculation process is based.

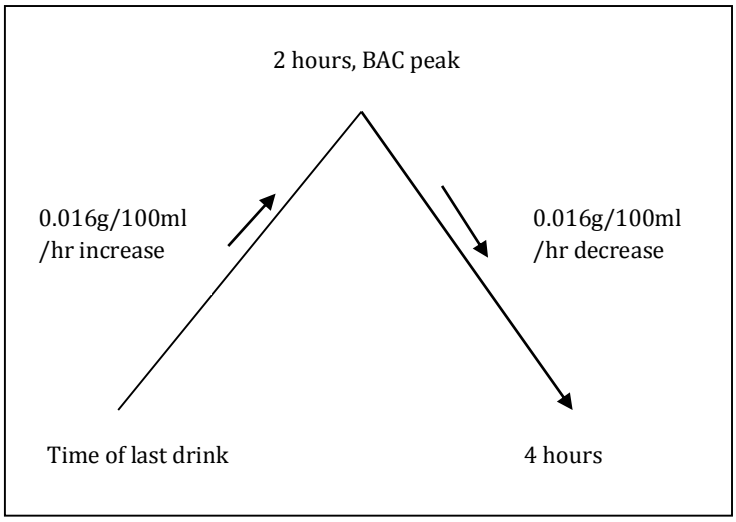

FIGURE 1-1 BAC PEAK AND DECLINE DIAGRAM TO OUTLINE BACK-CALCULATION PROCESS

The following provides an example of the application of the back-calculation process:

A driver records a roadside PBT reading of 0.089 g/100ml claims to accurately recall their time of last drink to be 1hr 45 minutes prior to the evidentiary test. The back-calculation to accommodate this period results in a reduction of 0.028 g/100ml (1.75 x 0.016) applied to the driver's evidentiary test reading. Their final drink driving charge will be reported as a BAC of 0.061 g/100ml, which attracts a lesser sanction. In this instance the driver would be charged with a BAC ≥ 0.06 g/100ml but < 0.07 g/100ml which attracts a $250- 500 fine and 4 demerit points compared to the charge of a BAC ≥0.08 g/100ml but < 0.09 g/100ml which attracts a $500-1500 fine and 6 months licence disqualification period. In contrast, if the driver could not recall

the time since their last drink, the period between the preliminary and evidentiary breath tests (typically 30 minutes) would have been used in the back-calculations. If a 30 minute interval is used, this results in a 0.008 g/100ml (0.5 x 0.016) reduction being applied to the driver's evidentiary test reading. The final drink driving charge would then be based on a reported BAC of 0.081 g/100ml, which would attract the higher sanction of a $500-1500 fine and 6 month licence disqualification period. These sanction examples are based on those that apply to first offence only, sanction reductions resulting from back-calculations may be greater for repeat offences.

1.2 AIMS AND OBJECTIVES

The aim of this research was to investigate changes in nighttime driver BAC levels over time, within the Perth metropolitan area. This was undertaken through the replication of and comparison with, two previous road side surveys conducted during 1999 by Ryan (2000) and again in 2000 by Kirov (2001).

Specific objectives:

- To investigate change over time in nighttime driver/rider BAC levels;
- To monitor changes in drivers' BAC levels over time through replication of surveys undertaken in 1999 and 2000; and
- To review the existing survey methodology and analysis to accommodate current RBT practices and BAC limits legislation.
- To explore the effects of the back-calculation process on drink driving charges

1.3 REPORT OUTLINE

This report outlines the methodology used in the study, including a pilot test of the proposed research design. Roadside RBT data obtained from the designated police operated RBT sites is reported and analysed. Finally, conclusions and recommendations evolving from the research are presented.

2 METHODOLOGY

2.1 SURVEY SITES

A list of the 36 site locations used in the 1999 and 2000 surveys was obtained (see Appendix A). These sites, originally selected for the 1999 surveys, were chosen to provide a representative sample of nighttime drivers across the Perth metropolitan area and were based on the following selection criteria:

- Currently used police RBT bus RBT sites;
- Major traffic corridors from the CBDs of both Perth and Fremantle;
- Proximity to licensed drinking venues;
- No turn off (avoidance) points within visibility of the site;
- Satisfy OH&S requirements for safe RBT bus operations; and
- Twelve sites per metropolitan region (North, South, East).

2.2 SURVEY AND DATA COLLECTION

2.2.1 MONTH OF YEAR

Although it was not feasible to conduct this survey in spring, as were the previous two surveys (conducted in September/October), it was decided that the autumn months of April/May would provide a similar representation of socialisation patterns and thus drinking patterns. To further support replication of the previous two surveys, the busy social week of Easter was excluded.

2.2.2 DAYS AND TIMES

Data collection occurred at two police operated RBT bus sites on Thursday, Friday and Saturday nights over a six week period from the 19th April until the 26th May 2012.

The scheduled survey commencement times varied between 22:00 and 23:00 hours for the first site concluding at 23:30 and 00:30 respectively, and between 01:00 and 02:00 for the second site concluding at 02:00 and 03:00. Further details outlining the weekly survey dates and times are provided in 0.

Two sites within close proximity were surveyed each of the survey nights for 1.5 hours per site. The survey times at the second sites were delayed by half an hour, from those used in the original Ryan (2000) survey (see Appendix A), to accommodate travel and set up times for the RBT buses between sites as well as meal breaks for the police officers. Further details outlining site locations, region and direction of traffic being surveyed is provided in 0.

A pilot survey was conducted on Thursday 5th April 2012 to trial the proposed methodology; explore the staffing requirements for various sites, and to address potential occupational, health and safety (OH&S) requirements for the survey team. Following this pilot survey a Roadside Survey Risk Assessment and Management Plan

was finalised. Observation staff were briefed on confidentiality, the importance of adhering to the police instructions while onsite, and the survey and risk management protocols. The observers were positioned on the same side of the road as the police testing team but on the median strip (on larger roads) or the curb on smaller roads. This position was chosen so that the observers will be situated as close to the police testing team as feasible without obstructing the testing process while also sharing the safety benefits of the Police OH&S testing protocol (e.g. conspicuous lighting and lane blockades).

At these RBT bus operations there were up to eight police constables conducting the RBTs in the testing lane. Each observer collected data from two police officers (unless the officer was removed from the testing for other duties.

Survey data collection instruments, devised for a similar roadside RBT data collection project conducted in Melbourne (Clark et al., 2010), were modified to suit this current project (see 0).

The observers collected the following site related data:

- Date;
- Time commenced surveying; time completed surveying;
- Location (GPS if available from RBT bus otherwise street directory grid reference);
- Road type (primary or secondary arterial, residential, local);
- Traffic direction;
- Speed zone; and
- Conditions information, eg. street lights on/off, raining, daylight, dusk.

The survey data recorded for each individual driver stopped for an RBT included:

- Preliminary breath test(PBT) Device ID number;
- Time of RBT, for drivers who reported a positive BAC reading (above zero);
- Age (exact age was requested by police officers for all drivers and communicated to observer);
- Gender;
- Type of vehicle;
- If P or L plates were displayed; and
- Venue type of last alcohol beverage (was requested by police officers from drivers who record a positive BAC reading and communicated to observer).

2.2.3 SATELLITE VEHICLES

While an initial aim was to collect data from the mobile satellite vehicles associated with the RBT bus sessions, after thorough exploration it was deemed unfeasible for the following reasons. These associated vehicles can be difficult to identify as they can come from various police precincts and not necessarily be directly scheduled with the buses. This makes data tracking difficult and in addition, they do not currently collect the data necessary to support the research aims.

2.3 PROCEDURE

Initially the proposed survey site list was provided to WA Police to ascertain if these sites were still used by the Police to conduct RBT bus sessions and their suitability for the current survey. Thirty-five of the original sites were replicated in the current survey (see Appendix D), with only one site (E4) being relocated approximately one km up the same road, due to road works hindering the OH&S requirements pertaining to setting up an RBT bus site. Any modifications that occurred to the site location or survey schedule times are outlined in Appendix D. Observation staff were briefed on the survey and site protocol (see 0).

2.4 DATA MANAGEMENT AND ANALYSIS

All data was collected onsite at the scheduled sessions. The BAC data, for any driver who reported a positive BAC reading on the police PBT device, was verbally relayed to the observer from the police officer conducting the test. The evidentiary test information including: age, gender, BAC reading (post back-calculation), location type and postcode of place of last drink, was collected at the conclusion of each survey session and recorded on the survey observation sheet (see 0) alongside the drivers' initial roadside PBT record. Data was analysed using IBM SPSS Statistics Package 20.

3 RESULTS

3.1 DRIVER DEMOGRAPHICS

A total of 8,435 random breath tests were performed across the 36 sites scheduled over the six week period. Of the drivers tested 70.8% were males and 29.1% females (5,971 & 2,454 respectively, 10 missing data). The majority of drivers stopped for RBT were aged between 20-25 years (22.6%), (see Table 3.1.1) and full licence holders (see Table 3.1.2). The most common vehicle stopped was cars 8,366 (99.2%), followed by 34 motorcycles, 30 trucks, and 5 minibuses.

TABLE 3.1.1 AGE GROUPS FOR DRIVERS STOPPED AT RBT SITES

Age group (years)	Frequency	Percentage %
15-19	405	4.8
20-25	1,902	22.6
26-30	1,514	18.0
31-35	1,040	12.4
36-40	688	8.2
41-50	1,378	16.4
51-60	952	11.3
61-70	441	5.2
70+	92	1.1
Total	**8,412**	**100.0**

Note: 23 missing data

TABLE 3.1.2 LICENCE TYPE FOR DRIVERS STOPPED AT RBT SITES

Licence type	Frequency	Percentage %
Full licence	8,060	95.55
Red P-plate	81	0.97
Green P-plate	278	3.29
Learner	10	0.12
Unlicensed	4	0.05
Extraordinary	2	0.02
Total	**8,435**	**100.00**

3.1.1 BAC DISTRIBUTION

In the results section the term "driver" will be used as a generic term for all persons in control of a motor vehicle e.g. motorcycle rider. To support the comparison of data over the previous two and current time periods, throughout this section tables such as those used in Ryan (2000) and Kirov (2001) are presented. BAC legislation has changed over time since the initial Ryan surveys. The legal BAC has lowered from 0.08 g/100ml to 0.05 g/100ml for full licence holders, and since Kirov's surveys, a zero BAC limit for provisionally licensed drivers has been introduced. For these drivers, BACs below 0.02 g/100ml result in the issue of a Traffic Infringement Notice.

In recognition of these changes and the growing debate regarding the adoption of a 0.02 g/100ml or zero BAC limit across other road user groups, data relating to drivers with a BAC greater than or equal to 0.02 g/100ml has also been incorporated into this report.

If the PBT reading differed from the evidentiary reading by +/- 0.04g/100ml or greater (which may be due to the presence of mouth alcohol or an inaccurate roadside test sample), the evidentiary test reading was used in the analysis. This resulted in adoption of seven evidentiary readings replacing what were deemed to be exaggerated original PBT readings and eight evidentiary readings replacing PBT readings judged to be underestimations of actual BACs.

The BAC results showed that of the 8,435 drivers tested, 597 drivers (7.08%) returned a positive (> zero) BAC reading (see Table 3.1.3). Of the drivers with a positive BAC reading, 478 drivers (6%) were in the 0.001-0.049 g/100ml range. In total 119 (1%) drivers had a BAC ≥0.5 g/100ml, of these: 54% were in the 0.05-0.079 g/100ml BAC range; 39% 0.08-0.149 g/100ml; and 8% had a BAC reading of 0.150 g/100ml or greater. In total 344 (4%) drivers had a BAC ⩾0.02 g/100ml.

TABLE 3.1.3 DRIVER BAC DISTRIBUTION, APRIL/MAY 2012

Total tests (n)	Blood alcohol concentration (g/100ml)							
	Positive	**Zero BAC**	**0.001-0.049**	**0.05-0.079**	**0.08-0.149**	**0.150+**	**⩾0.02**	**≥0.05%**
8435	597	7838	478	64	46	9	344	119
%	*7.08*	*92.92*	*5.67*	*0.76*	*0.54*	*0.11*	*4.10*	*1.41*
% of those ≥0.05		-	-	*53.78*	*38.66*	*7.56*	-	-

As outlined in Table 3.1.4, four of the drivers detected with a BAC ≥0.05 g/100ml were provisional licence holders (1 red, 3 green). Of the 344 drivers with a BAC greater than or equal to 0.02 g/100ml, six were provisional licence holders (2 red, 4 green). Four unlicensed drivers were detected, three had a BAC ⩾0.02%, and two of these drivers had a BAC ≥0.05 g/100 ml.

TABLE 3.1.4 DRIVER BAC DISTRIBUTION BY LICENCE STATUS, APRIL/MAY 2012

Licence status	Number of tests	Blood alcohol concentration (g/100ml)						
		Zero BAC	0.001-0.049	0.05-0.079	0.08-0.149	0.150+	⩾0.02	≥0.05
Full licence	8060	7477	470	63	41	9	335	113
Learner	10	10	-	-	-	-	-	-
Red P	81	79	1	-	1	-	2	1
Green P	278	269	6	1	2		4	3
Extra ordinary	2	2	-	-	-	-	-	-
No valid licence	4	1	1	-	2	-	3	2
Total	8435	7838	478	64	46	9	344	119

Note: An Extraordinary licence is granted under special circumstances following licence disqualification and a zero BAC condition applies.

3.1.2 DAY OF THE WEEK

The driver BAC distribution (%) by day of the week is shown in Table 3.1.5. The greatest percentage of tests were obtained on Fridays (45%), followed by Saturdays (32%), with the least amount on Thursdays (23%). The percentage of drivers with a positive BAC was comparable on Fridays (7.4%) and Saturdays (7.8%), with fewer on Thursdays (5.3%). The percentage of drivers with a BAC ⩾0.02 g/100ml was comparable on Thursdays (3.28%) and Fridays (3.97%), with a greater percentage of drivers having a BAC ⩾0.02 g/100ml (4.80%) on Saturdays. The percentage of drivers with a BAC of 0.05 g/100ml or greater was similar across all three week days (1.36-1.46%). For the six provisional licence holders detected with a BAC ⩾0.02 g/100ml, one was detected on a Friday night, two on Thursday and three on Saturday.

TABLE 3.1.5 DRIVER BAC DISTRIBUTION (%) BY DAY OF THE WEEK, THURSDAY-SATURDAY, APRIL/MAY 2012

Day	Total tests n	Blood alcohol concentration (g/100ml)							
		Positive row %	Zero BAC row %	0.001-0.049 row %	0.05-0.079 row %	0.08-0.149 row %	0.150+ row %	⩾0.02 row %	≥0.05 row %
Thursday	1951	5.38	94.62	3.95	0.77	0.56	0.10	3.28	1.44
Friday	3820	7.43	92.57	6.07	0.76	0.52	0.08	3.97	1.36
Saturday	2664	7.81	92.19	6.35	0.75	0.56	0.15	4.80	1.46

3.1.3 TIME OF THE DAY

Two independent RBT sites were surveyed on each of the scheduled Thursday, Friday and Saturday nights over the six week period. Testing schedule times were initially pre-planned into 4 x 1.5 hour time periods, which included two start periods for first sessions (22:00-23:30 & 23:00-00:30 hrs) and two start periods for second sessions (01:00-02:30 & 02:00-03:30 hrs). However, these session times were commonly modified (up to 1hour 45minutes longer) to suit on-site police RBT priorities e.g. waiting for detected drivers to be processed through the evidentiary system before the site could be closed. Table 3.1.6 outlines the distribution of driver BACs by testing schedule time block, based on the earliest and latest RBT test time reported for each session.

There was a 47% decrease in the number of RBTs conducted in the second sessions compared to the first (2,715 & 5,720 respectively), this was a reflection of the reduced amount of traffic passing the sites in the early morning hours. Compared to the first sessions, there was a small increase in the percentage of drivers detected with positive BACs in the second sessions (6.93 to 7.36% respectively) and a greater proportion of drivers with illegal BACs.

There were 5,720 drivers tested between the hours of 21:45 and 00:45. Of these 61 drivers (1.06%) were detected with a BAC ≥0.05 g/100ml, representing an approximate 1:94 detection rate ("hit rate"), and 212 (3.70%) had a BAC ⩾0.02 g/100ml. There were 2,715 drivers tested between the hours of 01:00 and 04:45. Of these 58 drivers (2.13%) were detected with a BAC ≥0.05 g/100ml, representing an approximate 1:47 hit rate, and 132 (4.90%) had a BAC ⩾0.02 g/100ml. Focusing on the drivers detected within the higher BAC levels, 24 (43.63%) of the 55 drivers detected with a BAC ≥0.08 g/100ml and six (66.66%) of the nine drivers detected with a BAC ≥0.15 g/100ml were detected between 21:24 – 00:45 hrs. Of the six provisional licence holders detected with a BAC ≥0.02 g/100ml , one (red plate) was detected between 21:45 - 00:45 hrs, the other five (1 red – who is legally restricted from driving between 24:00 to 05:00 hrs & 4 green plates – unrestricted hours of driving) were detected between 01:00 – 04:45 hrs.

TABLE 3.1.6 TIME OF DAY AND BAC DISTRIBUTION OF DRIVERS, APRIL/MAY 2012

Time of day (hrs)	Total tests n	Blood alcohol concentration (g/100ml)							
		Positive row %	Zero BAC row %	0.001-0.049 row %	0.05-0.079 row %	0.08-0.149 row %	0.150+ row %	⩾0.02 row %	≥0.05 row %
21:45-00:45	5720	6.93	93.07	5.87	0.65	0.31	0.10	3.70	1.06
01:00-04:45	2715	7.36	92.64	5.23	0.99	1.03	0.11	4.90	2.13

3.2 DRIVERS WITH A PRELIMINARY BREATH TEST ≥0.05 G/100ML AND ⩾ 0.02 G/100ML .

This section describes the 122 drivers who recorded an illegal preliminary breath test, ≥0.05 g/100ml for full licence holders (n=113), and BAC ⩾0.02 g/100ml if under a zero BAC licence restriction (n=6) or unlicensed (n=3). Age and Gender

The gender and age distribution of drivers detected with BACs ≥0.05 g/100ml is reported in Table 3.2.1. The age groups presented in this table are similar to those presented in the Ryan (2000) and Kirov (2001) reports, to support data comparison over time. However following this, Table 3.2.2 has been included to provide a more detailed inspection of driver age brackets, such as novice drivers <26 years, as well as providing more age brackets for the drivers aged over 40 years.

The age range of drivers detected with an illegal BAC (≥0.05 g/100ml or ⩾0.02 g/100ml) was 16-64 years, 28% percent were female of which the majority (58%) were aged 20-29 years. Male drivers made up 72% of the drivers detected over the legal limit and similar to the females, the majority of these drivers were aged 20-29 years (52%), followed by drivers 40 years and over (28%). (See Table 3.2.3).

TABLE 3.2.1 GENDER AND AGE GROUP OF DRIVERS WITH AN ILLEGAL PRELIMINARY BREATH TEST (≥0.05 G/100ML OR ⩾0.02 G/100ML)

	Age group (years)					
Gender	**15-19**	**20-29**	**30-39**	**40+**		**Total**
	row %	**row %**	**row %**	**row %**	**n**	**col %**
Male	3.5	52.3	16.3	27.9	86	72.3
Female	6.1	57.6	18.2	18.2	33	27.7
% Total	4.2	53.8	16.8	25.2	119	100.0

Note: 3 missing cases due to missing age group data

As shown in Table 3.2.2 the majority of both males and females detected with an illegal BAC level were in the 20-25 year age bracket (38% & 46% respectively). A greater percentage of males aged between 41-49 years were detected (19%) followed by 26-29 year olds (14%), these two age brackets also reported the highest detection rates for female drivers (both 12%).

TABLE 3.2.2 GENDER AND AGE BRACKET OF DRIVERS WITH AN ILLEGAL PRELIMINARY BREATH TEST (≥0.05 G/100ML OR ⩾0.02 G/100ML)

Gender	Age group (years)									
	15-19	20-25	26-29	30-34	35-39	40-49	50-59	60-69	Total	
	row %	row %	row %	row %	row %	row %	row %	row %	n	col %
Male	3.5	38.4	14.0	7.0	9.3	18.6	5.8	3.5	86	72.3
Female	6.1	45.5	12.1	9.1	9.1	12.1	6.1	0	33	27.7
% Total	4.2	40.3	13.4	7.6	9.2	16.8	5.9	2.5	119	100.0

Note: 3 missing cases due to missing age group data

Table 3.2.3 outlines the number of drivers detected with a BAC ⩾0.02 g/100ml by age bracket. A total of 344 drivers were detected with a BAC ⩾0.02 g/100ml and 65% of these were males. The majority of drivers with a BAC ⩾0.02 g/100ml were aged 20-25 years (33% males, 25% females), followed by 26-29 years (14% males, 19% females). There were also a relatively high number of females aged 40-49 years (17%) with a BAC ⩾0.02 g/100ml .

TABLE 3.2.3 GENDER AND AGE BRACKET OF DRIVERS WITH A PRELIMINARY BREATH TEST ⩾0.02 G/100ML

Gender	Age bracket (years)									
	15-19	20-25	26-29	30-34	35-39	40-49	50-59	60-69	n	Total col %
	row %	row %	row %	row %	row %	row %	row %	row %		
Male	2.3	33.2	14.1	12.3	12.7	15.5	5.5	4.5	220	65.3
Female	2.6	24.8	18.8	10.3	12.8	17.1	11.1	2.6	117	34.7
%Total	2.4	30.3	15.7	11.6	12.8	16.0	7.4	3.9	337	100.0

Note: 7 missing cases due to missing age group data

3.2.1 BAC DISTRIBUTION BY GENDER

Table 3.2.4 shows the various illegal BAC levels in relation to driver gender. The majority of female drink drivers had a BAC below 0.08 g/100ml (73%) compared with males (48%), while the greater percentage of males (52%) had a BAC ≥0.08 g/100ml..

TABLE 3.2.4 DRIVER GENDER AND ILLEGAL BAC LEVEL RANGE

Gender	Blood alcohol concentration (g/100ml)					
	0.020-0.049	0.05-0.079	0.08-0.149	0.150+	≥0.05 or ⩾0.02%	
	row %	row %	row %	row %	n	col %
Male	1.1	46.6	44.3	8.0	88	72.1
Female	5.9	67.6	20.6	5.9	34	27.9
% Total	2.5	52.5	37.7	7.4	122	100.0

3.2.2 BAC DISTRIBUTION BY AGE GROUP

Table 3.2.5 outlines the BAC range of the detected drink drivers using the same age groups as the previous two surveys (1999, 2000) and Table 3.2.6 provides a more detailed inspection of their Age group distribution.

As shown in Table 3.2.5, the majority of drink drivers aged 20-29 years had BACs in the range of 0.05–0.149 g/100ml (92%). The most common illegal BAC range for the 30-39 and also the 40+ year olds was 0.05-0.079 g/100ml (50 & 70% respectively).

TABLE 3.2.5 DRIVER AGE GROUP AND ILLEGAL BAC LEVEL RANGE

Age (years)	Blood alcohol concentration (g/100ml)					
	0.020-0.049	0.05-0.079	0.08-0.149	0.150+	≥0.05 or ⩾0.02%	
	row %	row %	row %	row %	n	col %
15-19	40.0	0	60.0	0	5	4.2
20-29	1.6	48.4	43.8	6.3	64	53.8
30-39	0	50.0	30.0	20.0	20	16.8
40+	0	70.0	26.7	3.3	30	25.2
%Total	2.5	52.1	37.8	7.6	119	100.0

Table 3.2.6 provides further detail about the age brackets of the drink drivers detected. This shows that of the 64 drivers detected from the 20-29 year age group the majority were aged 20-25 years (40%) compared to the older 26-29 years group (13%). It also provides greater detail about the BAC levels of drivers within the various age brackets over 40 years.

TABLE 3.2.6 DRIVER AGE BRACKET AND ILLEGAL BAC LEVEL RANGE

Age (years)	Blood alcohol concentration (g/100ml)					
	0.020-0.049	0.05-0.079	0.08-0.149	0.150+	≥0.05 or ≥0.02	
	row %	row %	row %	row %	n	col %
15-19	40.0	0	60.0	0	5	4.2
20-25	2.1	45.8	45.8	6.3	48	40.3
26-29	0	56.3	37.5	6.3	16	13.4
30-34	0	66.7	33.3	0	9	7.6
35-39	0	36.4	27.3	36.4	11	9.2
40-49	0	70.0	30.0	0	20	16.8
50-59	0	57.1	28.6	14.3	7	5.9
60-69	0	100.0	0	0	3	2.5
%Total	2.5	52.1	37.8	7.6	119	100.0

3.3 THE EVIDENTIARY BREATH TESTING PROCESS

Of the 122 drivers detected with an illegal BAC reading from their roadside PBT reading, one driver (who recorded a PBT BAC reading of 0.1230 g/100ml) fled the scene prior to evidentiary testing and was unable to be apprehended. Seven drivers who underwent a second PBT breath test were allowed to go without further action. The remaining 114 drivers underwent evidentiary breath testing (see Table 3.3.1).

TABLE 3.3.1 OUTCOME OF PRELIMINARY BREATH TEST FOR DRIVERS ABOVE THE LEGAL BAC LIMITS

Outcome	n	%
Evidentiary test	114	95.0
2nd breath test (no further action)	7	5.7
Driver fled scene	1	0.8
Total	122	100.0

3.3.1 LAST PLACE OF DRINK

Table 3.3.2 outlines the "last place of drink" locations for drivers who underwent evidentiary testing, showing that 51% of drivers had consumed their last alcohol beverage at a licensed venue followed by 42% at a private residence.

TABLE 3.3.2 LAST PLACE OF DRINK LOCATION FOR EVIDENTIARY TESTED DRIVERS

Location	Frequency	Percentage %
Licensed venue	56	50.9
Private residence	46	41.8
Workplace	2	1.8
While driving	2	1.8
Other	4	3.7
Total	**110**	**100.0**

Note: 4 missing data

Table 3.3.3 outlines last place of drink locations for the various driver age brackets. The greatest proportion of drivers in the 20-25, 26-29, 30-34 and 40-49 year age brackets had come from a licensed venue (52%, 60%, 56%, 53% within this age bracket, respectively), in the 35-39 year age bracket many drivers had come from a private residence (67%).

TABLE 3.3.3 LAST PLACE OF DRINK LOCATION BY DRIVERS' AGE BRACKET IN YEARS

	Location				
Age (years)	**Licensed venue**	**Private residence**	**Workplace**	**While driving**	**Other**
15-19	2	3	0	0	0
20-25	23	17	1	1	2
26-29	9	5	0	1	0
30-34	5	4	0	0	0
35-39	2	6	0	0	1
40-49	10	8	1	0	0
50-49	3	3	0	0	1
60-69	1	0	0	0	0
Total	55	46	2	2	4

Note: 5 missing data

3.3.2 BACK-CALCULATION WHEN DRIVER BAC IS RISING.

As mentioned in 0 1.1, based on a premise that a driver's BAC will be on the 'rise' when stopped at an RBT site, in Western Australia evidentiary BAC readings are back-calculated to the driver's "time of last drink".

Estimates of the number of drivers whose BAC was actually on the rise at the time of detection were identified within our survey sample of 114 drivers who underwent an evidentiary test, based on a proxy measure of comparing the drivers' roadside PBT readings with their evidentiary readings. The results of these comparisons are presented in Table 3.3.4.

As indicated, 13 drivers (1%) had a rising BAC, 19 drivers (17%) produced the same steady BAC reading for both tests (PBT & evidentiary tests), and 82 drivers (71%) had a falling BAC. There are two points worth noting when interpreting these results, the evidentiary BAC readings used have already undergone back-calculation subtractions and therefore the differences between readings would actually be greater, and also the accuracy of BAC readings obtained using a PBT device are not as reliable as those obtained using the evidentiary test technology.

TABLE 3.3.4 BAC LEVEL MOVEMENT FOR EVIDENTIARY TESTED DRIVERS

Movement	n	%
Rise	13	11.4
Steady	19	16.7
Fall	82	71.9
Total	114	100.0

Table 3.3.5 shows the charges laid for drivers with a rising BAC. Of the 13 drivers with a rising BAC, 12 drivers were charged with illegal BACs and one driver was not charged (supervised away) as their back-calculated BAC placed them within the legal BAC limit range. The driver BAC rises (PBT to evidentiary) in this sample ranged between 0.001 to 0.027 g/100ml however, assuming a 30 minute back-calculation had already been undertaken and applied to the evidentiary reading; this range would be 0.009 to 0.035 g/100ml. The average BAC rise for driver's in this sample was 0.008 g/100ml, equal to the back-calculation amount. However when applied to individual drivers within the sample, assuming that a minimum of a 30 minute back-calculation had been applied, 8 of the 13 drivers whose BAC was on the rise faced a reduced BAC level charge and as mentioned one driver avoided a charge altogether, as a result of the back-calculation process.

3.3.3 BACK-CALCULATION WHEN DRIVER BAC IS STEADY.

Table 3.3.6 shows the charges laid for drivers with a steady BAC. There were 19 drivers whose BAC appeared to remain stable between the time of their roadside PBT reading and their evidentiary reading. However, as back-calculations would have already been applied to these evidentiary BAC readings (pre back-calculation BACs were not recorded) these drivers' actual BACs were probably rising. Assuming that a minimum 30 minute back-calculation had been applied, as a result of this back-calculation process seven drivers faced a reduced BAC level charge and three drivers were not charged (supervised away) as their back-calculated BAC placed them within the legal BAC limit.

TABLE 3.3.5 CHARGES LAID BY POLICE, DRIVERS WITH A RISING BAC

Evidentiary BAC reading (including back-calculation)	Charge																					
	0.02		0.05		0.06		0.7		0.08		0.09		0.11		0.13		0.15>		No charge		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
0.020-0.049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	7.7
0.05-0.079	-	-	-	-	1	33.3	2	66.7	-	40.0	-	-	-	-	-	-	-	-	-	20.0.	3	23.1
0.08-0.149	-	-	-	-	-	-	-	-	4	44.4	1	11.1	3	33.3	1*	11.1	-	-	-	-	9	69.2
0.150+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total n	-		-		1		2		4		1		3		1		-		1		13	
%		-		-		7.7		15.4		30.8		7.7		23.0		7.7		-		7.7		100.0

TABLE 3.3.6 CHARGES LAID BY POLICE, DRIVERS WITH A STEADY BAC

Evidentiary BAC result (including back- calculation)	Charge																					
	0.02		0.05		0.06		0.7		0.08		0.09		0.11		0.13		0.15		No charge		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
0.020-0.049	1#	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	75.0	4	21.0
0.05-0.079	-	-	1	14.3	2	28.6	1	14.3	-	-	-	-	-	-	-	-	-	-	-	-	4	21.0
0.08-0.149	-	-	-	-	-	-	-	-	1	-	3#	100.0	3	-	1	-	-	-	-	-	8	42.1
0.150+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	3	15.8
Total n	1		1		2		1		1		3		3		1		3		3		19	
%		5.3		5.3		10.5		5.3		5.3		15.7		15.7		5.3		15.7		15.7		100.0

TABLE 3.3.7 CHARGES LAID BY POLICE, DRIVERS WITH A FALLING BAC

Evidentiary BAC reading (including back- calculation)	Charge																					
	0.02		0.05		0.06		0.7		0.08		0.09		0.11		0.13		0.15		No charge		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
0.020-0.049	2*	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	91.7	24	29.3
0.05-0.079	-	-	16*	45.9	9	24.3	13*	27.0	-	-	-	-	-	-	-	-	-	-	-	-	38	46.3
0.08-0.149	-	-	-	-	-	-	-	-	4*#	21.0	6	31.6	5*	26.3	3	15.8	-	-	-	-	18	22.0
0.150+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	100.0	-	-	2	2.4
Total n	2		16		9		13		4		6		5		3		2		22		82	
%		2.4		19.5		11.0		15.9		4.9		7.3		6.1		3.7		2.4		26.8		100.0

Note: * denotes provisional driver; # denotes unlicensed driver

3.3.4 BACK-CALCULATION WHEN DRIVER BAC IS FALLING.

The back-calculation process is applied to all driver BACs irrespective of whether their actual BAC is on the rise or fall. As shown in Table 3.3.4 for 82 of the drivers in this sample it appears that their evidentiary BAC was falling compared to their roadside PBT, BAC result.

The back-calculation formula as outlined earlier in **Error! Reference source not found.** assumes that a driver's BAC level increases for two hours and then begins decreasing, at the same rate of 0.016 g/100ml per hour. Attempts are made to apply the back-calculation formula to accommodate instances where a driver's time of last drink exceeds 2 hours. For example, if a driver identifies that their time of last drink was 2 hours 45 minutes prior to being stopped at the RBT site, the 45 minutes (time >2 hrs) is then subtracted from the 2 hour (peak BAC rise time) resulting in the back-calculation being based on an interval of 1 hour 15 minutes. However, the reliability of this calculation method used when time of last drink is reported as >2 hours and <4hrs and the applicability of the back-calculation formula to instances where time of last drink is greater than 4 hours is questionable.

In this sample as a result of the back-calculation process, of the 82 drivers with a falling BAC, 22 drivers were not charged because their back-calculated BAC result placed them within the legal BAC limit. The remaining 60 drivers were charged with drink driving. The fall in drivers' BAC (PBT to evidentiary) in this sample ranged between 0.001 to 0.079 g/100ml however, assuming a 30 minute back-calculation had already been undertaken on the evidentiary reading, this range would be 0.09 to 0.087 g/100ml. The average BAC fall in this sample was 0.014 g/100ml. For drivers whose BAC is actually falling at the time they are stopped for RBT, the application of the back-calculation process results in a double subtraction from their roadside BAC reading. One subtraction from the application of the back-calculation process and the other subtraction as a result of the driver's BAC falling further during their wait for the evidentiary process.

Table 3.3.7 shows the charges laid for drivers whose BAC was falling. For the drivers whose BAC was falling, it is likely that their original PBT BAC reading would most accurately reflect their BAC level at the time they were operating a vehicle. Comparing the driver's PBT BAC with their evidentiary BAC (used to define their drink driving charge) it revealed that of the 60 drivers with a falling BAC who were charged, 14 drivers (23%) were charged with a BAC at the same charge level that they would have faced if their roadside PBT BAC reading had been used, the remaining 46 (77%) were charged with a BAC at a lower charge level than their roadside PBT BAC level.

To provide an indication of the effect the back-calculation process plays in reducing a driver's BAC charge when their BAC is falling, the difference between drivers' actual BAC charges and their roadside BAC is presented in Table 3.3.8. For 32 of the drivers their resulting BAC charge was reduced by one BAC charge level, for 10 drivers it was reduced by two BAC charge levels, for three drivers by three levels and one driver was charged with a BAC level four levels below their roadside PBT BAC result. These reductions in charges were due to the drivers' BAC level falling during the time between them being stopped at the roadside (PBT) and undertaking an evidentiary test. In addition their evidentiary BAC results included a further reduction (by a minimum of 0.008 g/100ml) through the application of the back-calculation process, which in these 60 cases incorrectly assumed the driver's BAC was on the rise.

TABLE 3.3.8 DRIVERS' RECORDED BAC CHARGE COMPARED TO BAC AT ROADSIDE, FOR DRIVERS WITH FALLING BACS

Evidentiary BAC level charged (post back-calculation)	PBT BAC level at roadside							
	0.15+	0.13	0.11	0.09	0.08	0.07	0.06	0.05
0.013	3							
0.11	2	3						
0.09		2	2					
0.08				3				
0.07			1	2	8			
0.06				2		5		
0.05				1		4	8	
0.02								-

Note: Based on 46 observations

3.3.5 COMPARISON OF THE SURVEY BAC RESULTS AND CHARGES LAID

In Table 3.3.9 drivers' original roadside PBT BAC readings are compared with the charges laid based on their evidentiary BAC reading. From the roadside PBT BAC reading results, 122 drivers were detected as being over the legal BAC limit, seven drivers faced 'no further action' due to producing a legal BAC in their second roadside PBT test, and one driver fled the scene prior to undergoing evidentiary testing. Of the remaining 114 drivers, 26 drivers were "supervised away" following an evidentiary BAC result that placed them within the legal BAC limit, 88 drivers (77%) were charged with exceeding the legal BAC limit. This implies that number of drivers charged for drink driving offences may under-estimate the roadside drink driving rate by around 23%.

TABLE 3.3.9 BAC DISTRIBUTION AND CHARGES LAID, DRIVERS WITH A PRELIMINARY BAC ABOVE THE LEGAL LIMIT

PBT BAC reading (g/100ml)	Charge				Total preliminary breath tests	
	0.020	0.05-0	0.080	0.150+		
	n	n	n	n	n	%
0.020-0.049	3	-	-	-	3	3.4
0.050-0.079	-	31	2	1	33	37.5
0.080-0.149	-	14	28	5	47	53.4
0.150+	-	-	-	5	5	5.7
Total	3	44	30	11	88	100.0

Note: 1 missing data – driver fled from scene prior to evidentiary testing
7 drivers faced "no further action" from 2nd PBT reading
26 drivers supervised away following legal BAC level in evidentiary test result

3.4 COMPARING THE RESULTS FROM 2012 WITH 2000 AND 1999 SURVEYS

A summary of the survey results for 1999, 2000 and 2012 is shown in Table 3.4.1. The numbers of drivers tested is comparable across all three surveys, 1999, 2000 and 2012 (8,616, 8,464 & 8,435 respectively) however, the number of drivers detected with a positive BAC in 2012 (7.1%) was half that recorded in the 1999 and 2000 surveys (14.9 & 14.7%). The percentage of drivers with a BAC ≥0.05 g/100ml but <0.8 g/100ml has decreased in this current survey (0.8%) compared to the previous two surveys (1.0 & 1.1%), as has the number of drivers with a BAC ≥0.08 g/100ml but <0.15 g/100ml (0.5%) compared to the previous surveys (0.8 & 0.9%). The percentage of drivers with a BAC 0.15 g/100ml or greater has remained constant across all three surveys (0.1%).

In 1999 females represented 25% of drivers detected driving with an illegal BAC, 35% in 2000, and 28% in this current 2012 survey. The most common driver age group with illegal BACs was 20-29 years across all three surveys. However, the additional age bracket analysis incorporated into this current analysis identified that the highest percentage of these drivers were aged 20 to 25 years (40.3%), with only 13.4% aged 26-29 years. In the 1999 and 2000 surveys, the second most frequent illegal BAC driver group was males aged 30-39 (23.2 and 28.3% respectively) however in this current survey the second most frequent group was males aged 41-50 years (25.2%). This result may reflect the twelve and thirteen year time lapse between the previous and current surveys, with the same higher risk group of drivers now in the corresponding older age group.

The percentage of drivers detected with a positive BAC across each of the three nights Thursday, Friday and Saturday in 2012 was approximately half that of the two previous surveys. In the previous surveys the highest percentage of drivers, within each of the illegal BAC level categories, were detected on Friday nights whereas the current survey reported a relatively even detection rate across all three days (Thurs., Fri. & Sat.).

Similar to the 1999 survey, in 2012, a greater percentage of drivers were detected with a positive BAC in the early hours of the morning (7.4%) compared to the late night session (6.9%). In the 2000 survey, there were a larger percentage of drivers with a positive BAC detected in the late night session. The percentage of drivers detected with a positive BAC across both testing sessions late night (6.9%) and early morning (7.4%), for the 2012 survey, was approximately half that of the previous two surveys (14.2, 14.9 late night & 16.2, 14.2 early morning). However, as found in both of the previous surveys, the greatest percentage of drivers detected with illegal BACs ≥0.05 g/100ml and also ≥0.08 g/100ml were detected in the early morning session times (after 1am).

TABLE 3.4.1 SUMMARY OF SURVEYED DRIVERS, 1999, 2000 AND 2012

Results	1999 n	%	2000 n	%	2012 n	%
No. of drivers tested	8,616	-	8,464	-	8,435	-
Drivers with a positive BAC	*1,207/8,093	14.9	*1,119/7,624	14.7	597/8,435	7.1
0.02-0.0499	Not avail.	-	Not avail.	-	3	0.04
0.05-0.079	88	1.0	89	1.1	64	0.8
0.08-0.149	66	0.8	77	0.9	46	0.5
0.15+	11	0.1	8	0.1	9	0.1
Total ≥0.05g/100ml (or ≥0.02 P,L& Unlic.)	165	1.9	174	2.1	122	1.4
Drivers with a positive BAC						
Thursday	343/2,654	12.9	270/2,363	11.4	105/1,951	5.4
Friday	518/2,831	18.3	*490/2,794	17.5	284/3,820	7.4
Saturday	*346/2,608	13.3	*359/2,467	14.6	208/2,664	7.8
Drivers with a BAC ≥0.02 (P,L& Unlic.)						
Thursday	Not avail.	-	Not avail.	-	-	-
Friday	Not avail.	-	Not avail.	-	2	0.05
Saturday	Not avail.	-	Not avail.	-	1	0.04
Drivers ≥0.05						
Thursday	34	1.3	42	1.8	15	0.8
Friday	69	2.4	77/3,144	2.4	29	0.8
Saturday	62/3,131	2.0	55/2,957	1.9	20	0.8
Drivers ≥0.08						
Thursday	9	0.3	21	0.9	13	0.7
Friday	45	1.6	39/3,144	1.2	23	0.6
Saturday	23/3,131	0.7	25/2,957	0.8	19	0.7
Drivers with a positive BAC						
10pm – 12:30am **	*732/5,156	14.2	*738/4,942	14.9	397/5,720	6.9
12:30am – 3am **	*475/2,937	16.2	*381/2,682	14.2	200/2,715	7.4
Drivers ≥0.02 (P,L&Unlic.)						
10pm – 12:30am **	Not avail.	-	Not avail.	-	-	-
12:30am – 3am **	Not avail.	-	Not avail.	-	3	0.1
Drivers ≥0.05						
10pm – 12:30am **	81/5,543	1.5	90/5,330	1.7	37	0.6
12:30am – 3am **	84/3,073	2.7	84/3,134	2.7	27	1.0
Drivers ≥0.08						
10pm – 12:30am **	31/5,543	0.6	39/5,330	0.7	24	0.4
12:30am – 3am **	46/3,073	1.5	46/3,134	1.5	31	1.1

Note: P, L and Unlicensed drivers over the 0.02 BAC limit are reported within their true BAC reading category

* Different denominator used due to missing data from two sites in 1999 and three sites in 2000.

** Testing schedule time for 2012 was 9:45pm -12:45am and 1am-4:45am

4 DISCUSSION

The aim of this research was to investigate changes over time in nighttime driver BAC levels in the Perth metropolitan area. This was undertaken by systematically obtaining breath alcohol readings from a sample of drivers (all road vehicle users), in Perth during April and May 2012, using roadside survey techniques at Police RBT sites. The results were then compared with the results from two similar previous surveys conducted in 1999 (Ryan, 2000) and 2000 (Kirov, 2001). For this current survey, 35 of the 36 sites were situated at the same location as those used in the 1999 surveys. The remaining one site was located on the same road (as in 1999), but due to road works making the site unsafe for setting up an RBT bus operation, the site was moved approximately 1km down the road. While the previous two surveys were conducted in September – October, this current survey was conducted during April – May. This survey was conducted over a six week period on Thursday, Friday and Saturday nights.

In this survey a total of 8,435 drivers were stopped and underwent an RBT, a similar number of drivers were tested in the two previous surveys 8,616 in 1999 (Ryan, 2000) and 8,464 in 2000 (Kirov, 2001). Compared to the previous two surveys the proportion of drivers detected with a positive BAC (7.1%) has halved (14.9% in 1999, 14.7% in 2000).

Of the 8,435 drivers tested in 2012, 1.4% were detected with an illegal BAC level. This represents a significant reduction in the number of drivers detected with an illegal BAC compared to both of the two previous survey findings of 2.1% of drivers in 2000 and 1.9% in 1999, especially considering that the current survey includes drivers governed by zero BAC limit legislation which was not in place in 1999 or 2000. A total of 4% of drivers had a BAC $\geqslant$0.02 g/100ml, for nine of these drivers (6 P-plate, 3 unlicensed) this was an illegal BAC level, six of these drivers were over 0.05 g/100ml. Amongst the drivers with illegal BACs there was a smaller proportion of drivers detected (0.8%) in the current survey within the 0.05-0.079 g/100ml range compared to the two previous surveys (1.0% & 1.1%). Similarly, in the 0.08-0.149 g/100ml BAC range a smaller proportion of drivers were detected in the current survey (0.5%) than in the 1999 survey (0.8%) and in 2000 (0.9%). The same proportion of drivers (0.1%) has been detected in ≥0.15 g/100ml BAC range across all three surveys.

The greatest number of RBTs were conducted on Friday nights (3,820), followed by Saturday nights (2,664), with the lowest number of tests undertaken on Thursday nights (1,951) due to reduced traffic volumes. Similarly, fewer drivers were detected with a positive BAC on Thursday nights (5.4%) compared to Friday and Saturday nights (7.4 & 7.8%). In the previous surveys the greatest proportion of drivers in both the 0.05-0.079 g/100ml and the ≥0.08 g/100ml BAC range were detected on a Friday nights, this was not apparent in this current survey with a relatively even proportion of drink drivers detected across the three weekdays (Thurs., Fri., & Sat.). Supporting

the findings of both previous surveys, a greater proportion of drink drivers were detected in the early morning (after 1am) testing sessions. These findings are important considering the limited amount of RBT that occurs in the early morning hours, with the majority of RBT bus schedules concluding around 1am. This may also be indicative of a shift in drink driving patterns in relation to the extended trading hours for alcohol outlets. It is important, both for specific and general deterrence purposes, that the highly visible RBT bus operations continue into the early morning to correspond with the closing times of late night entertainment venues.

The back-calculation process is applied to a driver's BAC result prior to the finalization of their evidentiary BAC results; Western Australia is the only Australian jurisdiction to adopt this practice. The justification behind the back-calculation process is to estimate a driver's BAC level at the time they were operating their vehicle (at the roadside) and thus subtract any rise in their BAC level occurring during delays in the evidentiary process. In this survey it was found that the application of the back-calculation process to the 11.4% of drivers whose BAC levels was identified as being on the 'rise' and the 16.7% of drivers with a 'steady' BAC reading, resulted in four drivers avoiding a drink driving charge and 15 drivers receiving a reduced BAC level charge.

However, similar to the findings of the two previous surveys, this survey identified that, for the majority of drivers who underwent an evidentiary breath test (71.9%), their BAC was 'falling' during this wait period and thus the wait period was advantageous in reducing their evidentiary BAC reading. Furthermore, the back-calculation process resulted in an additional subtraction to their already falling evidentiary BAC reading. As a result, 22 drivers avoided a drink driving charge and a further 46 drivers (77% of those charged who had a falling BAC) faced a reduced drink driving charge, ranging between one to four BAC charge levels. While a driver's perception of detection has been found to play a key role in deterring drink driving, research has found that successful avoidance of detection has a greater effect on a driver's decision to engage in illegal driving behavior (Watson, 2004). Further research is required to explore the effects of drivers avoiding drink driving charges (as a result of the back-calculation process) on their future drink driving behavior. All three surveys have identified that the majority of drivers detected with illegal BAC levels had a 'falling' BAC. This may be a reflection of drivers waiting for a period of time for their BACs to 'drop' before driving, but underestimating the time necessary for their original BAC to drop below illegal levels. Inadvertently, the current back-calculation process rewards this behavior.

Although it was not feasible to conduct this current survey in spring, as was the case with the previous two surveys (conducted in September/October), it was decided that the autumn months of April/May would provide a similar reflection of weather conditions and social activities and thus drinking patterns. To further support this replication, the busy social week of Easter was avoided. However, the overall reduction in drivers detected with an illegal BAC level within this current survey,

compared to the two previous surveys conducted in spring, may be indicative of seasonal effects on drink driving patterns. ABS (2013) data reported that alcohol sales in Western Australia during 2012 (as is common for all years available) were slightly higher in spring compared to autumn, although this difference was not as marked as occurs in summer (December). Ideally replication of this survey in both seasons would be desirable however; if the survey is to occur on an annual basis a final decision to conduct the survey in spring or autumn should be made.

In conclusion, this current survey has identified a reduction in the proportion of drivers detected with both positive (but legal) as well as illegal BAC levels, compared to data obtained in 1999 and 2000 in the Perth metropolitan region. It has also identified that early morning RBT operations detect the highest proportion of drink drivers. RBT operations should continue beyond the current scheduling hours into the early hours of the morning to accommodate the evolving changes in socialisation and alcohol consumption patterns. The implementation of the back-calculation process requires review as it appears to only meet its original objective for a small proportion of drivers whose BAC level is rising at the time of detection, but more commonly reduces or even negates drink driving convictions for the majority of drivers detected. The ongoing collection and analysis of data on drink driving levels and patterns is imperative for addressing this high risk illegal behavior. The identification of changes in driver BAC levels, high and low alcohol hours, and drink driving locations, plays a key role in the development of police enforcement strategies, and RBT resource allocation and deployment. This type of survey data also supports empirical evaluations of drink driving countermeasures. It is recommended that this survey be replicated on an annual basis to provide ongoing monitoring of drink driving patterns across Perth.

5 RECOMMENDATIONS

i. To maximize both general and specific deterrence, regular RBT enforcement schedules should be extended into the early hours of the morning to reflect the evolving changes in socialisation and alcohol consumption patterns.

ii. Future surveys should be conducted in a regular season (spring or autumn) to reduce the chance of seasonal variation in the results.

iii. This survey should be replicated on a regular basis (annual or maximum every three years), to support ongoing monitoring of drink driving patterns across Perth, and to inform police RBT enforcement and drink driving countermeasures.

iv. The implementation of the back-calculation process in Western Australian RBT practices does not achieve its desired aim, to the contrary, it has been found to favour drink drivers and therefore should be ceased.

6 REFERENCES

ABS (2013). *8501.0 - Retail Trade, Australia, Feb 2013.* Online at http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8501.0Feb%202013?OpenDocument, cited April 2013.

Clark, B., Diamantopoulou, K., & Cameron, M. (2010). *Roadside alcohol survey program in Melbourne*. Melbourne: Monash University Accident Research Centre

Keall, M. D., Frith, W. J., & Perkins, W. A. (1996). *The patterns of alcohol use by New Zealand drivers during the main drinking hours: survey results and methodology*. Proceedings Roads 96 Conference, Part 5. Melbourne: ARRB Transport Research Ltd, 299-314.

Kirov, C. (2001). *A roadside survey of drink drivers in 2000 in Perth: Western Australia, RR 109*. Perth: Road Accident Prevention Unit, The University of Western Australia.

Kloeden, C. N., & McLean, A. J. (1997). *Night-time drink driving in Adelaide: 1987-1997, Report 5/97*. Adelaide: Office of Road Safety, Department of Transport.

Mathijssen, M. P. M., & Noordzij, P. C. (1993). The decline of DWI and of alchol-related accidents in the Netherlands, 1983-1991. In H. D. Utzelman, G. Berghaus, & G. Kroj Eds. *Alcohol, Drugs and Traffic Safety – T92*. Cologne, Verlag TUV Rheinland, 1036-1043..

Ryan, G. A. (2000). *A roadside survey of drink drivers in Perth, Western Australia, RR 94*. Perth: Accident Prevention Research Unit, The University of Western Australia.

Watson, B. (2004). *How effective is deterrence theory in explaining driver behaviour: A case study of unlicensed driving*. Proceedings Road Safety Research, Policing and Education Conference, Perth 14-16 November.

APPENDIX A. ORIGINAL SURVEY SITE SCHEDULE RYAN (2000)

APPENDIX A. Schedule of Road Side Survey Sites

Date	Day		Location	Suburb	Site	Direction	Start Time	Finish Time
23/09/99	Thursday	i	Canning Highway - Canning Bridge just prior to Raffles TCL	Applecross	S6	North/East Bound	22:00	23:30
		ii	Mounts Bay Road - west of Brewery (in carpark)	Kings Park	S10	South/West Bound	00:30	02:00
24/09/99	Friday	i	Victoria Street - east of Junction Hotel	Midland	E8	West Bound	23:00	00:30
		ii	Welshpool Rd - cross McDowell St	East Cannington	E1	East & West Bound	01:30	03:00
25/09/99	Saturday	i	Great Eastern Hwy - Abernethy Rd (side road)	Belmont	E4	North/East Bound	22:00	23:30
		ii	Shepperton Rd - between Oats St & Welshpool Rd	East Victoria Park	E11	South Bound	00:30	02:00
30/09/99	Thursday	i	Karrinyup Rd - just east of Cedric St	Stirling	N6	East & West Bound	23:00	00:30
		ii	Ocean Reef Rd - just west of Trappers Drive	Edgewater	N9	East & West Bound	01:30	03:00
1/10/99	Friday	i	Leach Hwy - approach of Tonkin Hwy (under St lights)	Cloverdale	E3	North/East Bound	22:00	23:30
		ii	Guildford Rd - Lord St prior to TCL's	Mount Lawley	E12	East & West Bound	00:30	02:00
2/10/99	Saturday	i	Hampton Rd - Clontarf Rd	South Fremantle	S1	North & South Bound	23:00	00:30
		ii	Manning Rd - east of Elderfield Rd	Waterford	S7	East & West Bound	01:30	03:00
7/10/99	Thursday	i	Nicholson Rd - south of Spencer Rd	Ferndale	E10	North/East Bound	22:00	23:30
		ii	Great Eastern Hwy - Ivy St	South Guildford	E6	North & South Bound	00:30	02:00
8/10/99	Friday	i	Thomas St - Heytesbury Rd (3 lanes)	Subiaco	S11	South/West Bound	23:00	00:30
		ii	Stirling Hwy - near Dingo Flour Mills	North Fremantle	S12	North & South Bound	01:30	03:00
9/10/99	Saturday	i	Beach Rd - cross Redcliffe Ave	Girrawheen	N7	East Bound	22:00	23:30
		ii	Morley Drive - Byfleet St just east of intersection near Tonkin Hwy	Morley	N4	East & West Bound	00:30	02:00
14/10/99	Thursday	i	Riverside Dr - No. 4 carpark	East Perth	S9	East Bound	23:00	00:30
		ii	South St - Findlay Rd	Leeming	S5	East & West Bound	01:30	03:00
15/10/99	Friday	i	Scarborough Beach Rd - prior to Hutton St opposite Drake St	Osborne Park	N2	East & West Bound	22:00	23:30
		ii	Lord St cnr Chertsey St, west of Walcott St	Mount Lawley	N1	North & South Bound	00:30	02:00
16/10/99	Saturday	i	Not worked	-	-	-	-	-
		ii	Kalamunda Rd - prior to Midland Rd, opposite David St	Maida Vale	E5	North & South Bound	01:30	03:00
20/11/99	Saturday	i	Lake Rd just north of Zenobia Tce	Gosnells	E9	North & South Bound	23:00	00:30
21/10/99	Thursday	i	Alexander Drive - just south of Yirrigan Drive	Dianella	N5	North Bound	22:00	23:30
		ii	Marmion Ave - just north of Beach Rd/Parnell Ave	Marmion	N11	North & South Bound	00:30	02:00
22/10/99	Friday	i	Wanneroo Rd - north of McDonald St opposite Hodgson St	Joondanna	N3	North & South Bound	23:00	00:30
		ii	Hepburn Ave - just west of Liburne Road	Duncraig	N10	East Bound	01:30	03:00
23/10/99	Saturday	i	Canning Hwy - Cantray Ave	Applecross	S3	East Bound	22:00	23:30
		ii	Leach Hwy - east of cemetery prior to Carrington St	Palmyra	S4	West Bound	00:30	02:00
28/10/99	Thursday	i	Resolution Drive - Harold St	Ascot	E7	North Bound	23:00	00:30
		ii	Tonkin Hwy - Roe Hwy under bridge	Wattle Grove	E2	South/East Bound	01:30	03:00
29/10/99	Friday	i	South St - Chamberlain St	Hilton	S2	East Bound	22:00	23:30
		ii	Canning Hwy - Taylor St	Victoria Park	S8	South/West Bound	00:30	02:00
6/11/99	Saturday	i	West Coast Hwy - North of Ventnor St	Scarborough	N12	South Bound	23:00	00:30
		ii	Wanneroo Rd - just south of Gnangara Rd	Kingsley	N8	North Bound	01:30	00:30

APPENDIX B. SURVEY SITE LOCATIONS AND SCHEDULE, 2012

Day	Site order	Location	Suburb	Site	Traffic direction	Start time	Finish time
Thursday 19/4	1	Cannington Hwy - Cannington Bridge just prior to Raffles TCL	Applecross	S6	North/East bound	22:00	23:30
	2	Mounts Bay Road - west of Brewery (in carpark)	Kings Park	S10	South/West bound	1:00	2:30
Friday 20/4	1	Victoria Street - east of Junction Hotel	Midland	E8	West bound	23:00	0:30
	2	Welshpool Rd - cross McDowell St	East Cannington	E1	East & West bound	2:00	3:30
Saturday 21/4	1	Great Eastern Hwy - Brighton Rd	Rivervale	E4	North/East bound	22:00	23:30
	2	Shepperton Rd - between Oats St & Welshpool Rd	East Victoria Park	E11	South bound	1:00	2:30
Thursday 26/4	1	Karrinyup Rd - just east of Cedric St	Stirling	N6	East & West bound	23:00	0:30
	2	Ocean Reef Rd - just west of Trappers Dve	Edgewater	N9	East & West bound	2:00	3:30
Friday 27/4	1	Leach Hwy - approach of Tonkin Hwy (under street lights)	Cloverdale	E3	North/East bound	22:00	23:30
	2	Guilford Rd - Lord St prior to TCL's	Mount Lawley	E12	East & West bound	1:00	2:30
Saturday 28/4	1	Hampton Rd - Clontarf Rd	South Fremantle	S1	North & South bound	23:00	0:30
	2	Manning Rd - east of Elderfield Rd	Waterford	S7	East & West bound	2:00	3:30
Thursday 3/5	1	Nicholson Rd - south of Spencer Rd	Ferndale	E10	North/East bound	22:00	23:30
	2	Great Eastern Hwy - Ivy St	South Guilford	E6	North & South bound	1:00	2:30
Friday 4/5	1	Thomas St - Heytesbury Rd (3 lanes)	Subiaco	S11	South/West bound	23:00	0:30
	2	Stirling Hwy - near Dingo Flour Mills	North Fremantle	S12	North & South bound	2:00	3:30
Saturday 5/5	1	Beach Rd - cross Redcliffe Ave	Girrawheen	N7	East bound	22:00	23:30
	2	Morley Dve - Byfleet St just east of intersection near Tonkin Hwy	Morley	N4	East & West bound	1:00	2:30
Thursday 10/5	1	Riverside Dve - No.4 carpark	East Perth	S9	East bound	23:00	0:30
	2	South St - Findlay Rd	Leeming	S5	East & West bound	2:00	3:30
Friday 11/5	1	Scarborough Beach Rd - prior to Hutton St opposite Drake St	Osbourne Park	N2	East & West bound	22:00	23:30
	2	Lord St cnr Chertsey St, west of Walcott St	Mount Lawley	N1	North & South bound	1:00	2:30
Saturday 12/5	1	Lake Rd just north of Zenobia Tce	Gosnells	E9	North & South bound	23:00	0:30
	2	Kalamunda Rd - prior to Midland Rd, opposite David St	Maida Vale	E5	North & South bound	2:00	3:30
Thursday 17/5	1	Alexander Dve - just south of Yirrigan Dve	Dianella	N5	North bound	22:00	23:30
	2	Marmion Ave - just north of Beach Rd/Parnell Ave	Marmion	N11	North & South bound	1:00	2:30
Friday 18/5	1	Wanneroo Rd - north of McDonald St opposite Hodgson St	Joondanna	N3	North & South bound	23:00	0:30
	2	Hepburn Ave - just west of Liburne Rd	Duncraig	N10	East bound	2:00	3:30
Saturday 19/5	1	Cannington Hwy - Cantray Ave	Applecross	S3	East bound	22:00	23:30
	2	Leach Hwy - east of cemetery prior to Cannington St	Palmyra	S4	West bound	1:00	2:30
Thursday 24/5	1	Resolution Dve - Harold St	Ascot	E7	North bound	23:00	0:30
	2	Tonkin Hwy - Roe Hwy under bridge	Wattle Grove	E2	South/East bound	2:00	3:30
Friday 25/5	1	South St - Chamberlain St	Hilton	S2	East bound	22:00	23:30
	2	Cannington Hwy- Taylor St	Victoria Park	S8	South /West bound	1:00	2:30
Saturday 26/5	1	West Coast Hwy - north of Ventnor St	Scarborough	N12	South bound	23:00	0:30
	2	Wanneroo Rd - just south of Gnangara Rd	Kingsley	N8	North bound	2:00	3:30

APPENDIX C. SURVEY OBSERVATION SHEETS

Site Details Form

Date ☐☐/☐☐/☐☐

Time – Commence ☐☐:☐☐ am/pm

Time – Complete ☐☐:☐☐ am/pm

Site order: ☐ **1st site for night** ☐ **2nd site for night**

Survey Observers_____

_____

_____

Traffic Count

15 min		1 hr 15 min	
30 min		1 hr 30 min	
45 min		1 hr 45 min	
1 hour		2 hours	

Testing Vehicle ☐ car ☐ Booze bus ☐ Other (please explain)

_____

Location

Street name and nearest intersection _____

_____

UBD Grid Reference ☐☐☐:☐☐☐ eg. 68:G4

GPS _____

Road Type ☐ Primary Arterial ☐ Secondary Arterial ☐ Collector ☐ Local/Residential
(see UBD Map Symbols)

Traffic Direction (eg. north, west)_____

Street Lights ☐ On ☐ Off ☐ None

Speed Zone _____ km/hr

Conditions ☐ clear ☐ cloudy ☐ raining ☐ other _____

Date		Commenced:			Time finished:		Time commenced:					Time finished:	
PBT No:							PBT No:						
Time	Age	Gender	Plates displayed	Vehicle type	Evidentiary or 2nd test	last place of drinking/notes	Time	Age	Gender	Plates displayed	Vehicle type	Evidentiary or 2nd test	last place of drinking/notes

APPENDIX D. MODIFICATIONS TO SURVEY LOCATIONS AND TIMES, 2012

20th April Site E1- East Cannington

Instead of Welshpool Rd, we located the survey on Orrong Rd, which is parallel to Welshpool Rd. Traffic was still surveyed East and West bound. The change was made because Orrong Rd has been substantially upgraded in recent years and is now the preferred route for travel East out of Perth and West into Perth from the hills and to connect with Roe Hwy. Little if any traffic would have used Welshpool Rd at that the time of the survey.

21st April Site E4- Belmont

Surveying was suspended for 20 min due to a substantial build up of traffic. The line was opened and traffic allowed to proceed without testing. Survey time was reduced from 90 minutes to around 70 minutes.

28th April Site S1- Sth Fremantle

Surveying was suspended for 25 minutes due to heavy rain. The survey time was reduced from 90 minutes to around 75 minutes.

28th April Site S7- Waterford/Manning

Start and end times delayed due to mechanical malfunction with the RBT bus. Start time delayed from 2.30am to 3.10am and finish time extended from 4.00am to 4.40am.

5th May Site N4- Morley

Start and end times delayed due to processing of drivers from earlier site that night and interruptions (15 minutes) due to rain. Start time delayed from 1.30am to 2.00am and finish time extended from 3.00am to 3.45am.

19th May Site S3- Applecross (Cantray Avenue)

End time extended from 11.30pm to 11.45pm to make up for a reduction in officers on the line from six to two for 15 minutes. Officers removed themselves from the line to assist with the control of drivers and passengers affected by alcohol and drugs.

19th May Site S4- Palmyra/O'Connor

Start and end times delayed due to processing of drivers from earlier site that night. Start time delayed from 1.30am to 2.15am and finish time extended from 3.00am to 3.45am.

24th May Site E7- Ascot

Original site of Resolution Drive (and Harold Street which no longer exists) could not be used due to road works. Survey shifted further north (around 300-400 metres) to section of Grandstand Rd. Traffic still surveyed heading North.

APPENDIX E. ROADSIDE SURVEY PROTOCOL

Site Preparation

- Arrive at site 20 minutes before scheduled data collection time

- Provide explanation of study to Officer in charge of operations and brief explanation to assisting officers, reassure them that this data is not related to measuring their performance (brief explanatory statement)

- Team leader fills in the information on the Site details form and the other observers copy that information onto their forms

- In the Survey Observer, details put an asterisk next to the observer whose survey data it is

- Decide which position in RBT testing line or which officer(s) each surveyor will be monitoring – for data collection convenience if collecting data from 2 officers select one's standing next to each

- Synchronize time piece with PBT device of officer your monitoring, if 2 officers being monitored and PBT device times not identical, synchronize time piece with one device and record at top of survey sheet (in the corresponding PBT column) the amount of difference in time for other PBT device. eg. PBT ID no: 041965, 30 seconds later or earlier

- Explain to officers that you are matching your data with their PBT device and ask if they:

  - Could stay in the same position in the testing line where possible
  - If someone else replaces them on the line if they could hand over their PBT device to the replacement officer for data reliability (record any uncertainties or officer changes as a note in the margin on the survey sheet)

- Record PBT device No: on top of survey sheet use left column for one device and right column for the other device. If only monitoring one police officer use only the one vertical column

Survey position

- For booze bus operations there will normally be 3-4 observers. Each observer can monitor up to 2 police officers on a testing line.

- If for any reason staff rotate during the survey shift, care must be taken that data is clearly marked and the PBT device is clearly identified (it is probably easier to hand over your survey sheets to the other person, mark with *change of observer and initials in the margin).

- Position yourself in a safe position away from any traffic flow

- Keep OH&S risk management strategies in mind when selecting data collection position

- For bus operations it is preferable to work from the nature strip, however if it is necessary to work from the median strip, it must be within the area zoned off for testing and care must be taken not to step back into the traffic flow on the other side of the road.

- Make sure you position will not interfere with the police officers' RBT testing procedures (check with officers if your position is suitable for them)

- You will need to be in a position to be able to view driver and this may depend on available lighting (if you are unable to clearly identify the drivers gender/age when testing on dimly lit back streets you may ask the testing officer to assist with this information if they are willing to assist

Data collection

Time	Age	Gender	Plates displayed	Vehicle type	Evidentiary or 2nd test	last place of drinking/notes

Roadside survey datasheet

For age place a "D" next to the age if you are definite eg. The police officer asked the driver.

Gender – M or F

Plates Displayed – Y or N

Vehicle type leave blank unless motorcycle "M" or Light Truck "LT" or heavy truck "HT"

Evidentiary test – just tick if taken for evidentiary or second test, as this test will be conducted by another officer and we can access the data later

Last place of drinking – collect only for positive BACs – home "H", friends house, "FH", pub "P", restaurant/café "R".

Notes can be placed in this column as well eg. Officer left line at …. time, returned to line at ….time.

- For any positive but legal BACs, ask the officer for the, age and last place of drinking
- If data from one PBT device fills the entire column on the survey sheet turn to the next page and record both devices on the new page (do not flip back to finish off a column for the other device just leave it blank and continue on new page)
- If you miss a vehicle place a single line through the next line on survey sheet (note *M in the notes)
- If you miss any individual data eg. Gender, put a diagonal line through that square (do not try to guess as this makes data matching more difficult)
- For anything you are unsure about put a note on the column on the form with arrows pointing to the relevant time or car if helpful
- If one of the Officers you are monitoring stops testing for awhile jot a note on the next line of the survey form eg. stopped testing for 10 min, evidentiary testing, or meal break

Trouble shooting

Learner drivers and passengers

- If a leaner driver is tested by an officer you are monitoring **record data if they also test the passenger** just record data on the next line and write a note *P in the margin
- If 2 officers test a learner driver and passenger and both are being monitored by you note *P for the passenger data and draw a line connecting these two tests
- If another officer (that you are not monitoring) tests the passenger just note that they were tested by another officer note *P Other in the margin next to the leaner driver data
- If the officer you are monitoring doesn't test the learner driver but does test the passenger note that passenger only tested *P only

Missed data

- If a whole test was missed place a line through the survey row and note * M in the margin

- If one or more variables are missed put a diagonal line through that individual square eg. gender /

Traffic count

- The traffic count is only for passing cars not tested and traveling in the direction of the testing

- If cars are being tested traveling in both directions include untested cars that pass in either direction for the traffic count

- For busy testing sites it is recommended that the traffic count be recorded every 5 minutes and then calculated into 15 minute sections to record on the Site Details Form at the end of the data collection session

Cars stopped for further testing or evidentiary (this may not be as relevant if the testing officer remains on the line but worth noting just in case)

- If a car is stopped for a borderline BAC reading and asked to wait for a second test record the first test data (write a note * 1st test in the margin)

- Record the second test only if an officer you are monitoring does the second test (write a note *2nd test in margin) and if possible a line linking it with the first test you already have on the survey sheet.

- If the first test was not done by an officer you are monitoring but the 2nd test is then record the test (write a note *2nd test only in the margin)

- When an officer you are monitoring leaves the testing line to follow up on an evidentiary test then continue to record data of the other officer you were monitoring and record *ET on the survey sheet in the departing officers column

- Resume recording that officers data when they return to the testing line

- * remember to record traffic count of any passing untested cars during this time

Terminated testing sessions (eg poor weather or police decide to stop the testing station)

- If this occurs it is important for the team leader to discuss with the Officer in charge the likelihood of testing resuming and the expected time frame

- If testing does cease earlier than scheduled then clearly record this finish time on the Survey Site Forms with a brief explanation

- If possible for data reliability, cost effectiveness and data comparison with future surveys it is preferable that surveying continues for the full time allocated (eg. 1.5 hours/site) however, safety and OH&S protocol are the first priority

- If the testing is temporarily stopped for rain, meal breaks etc. within the first hour to hour and a half of data collection the team leader will decide whether to wait for possible resumption of testing or to cease data collection

- If there is a chance that the testing will resume after the rain stops then the team should wait up to about 45 minutes or additionally check to see if the second site will be operating if the rain ceases