Centre for Automotive Safety Research

Annual performance indicators of enforced driver behaviours in South Australia, 2008

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ABSTRACT

This report was produced to quantify performance indicators for selected enforced driver behaviours (drink driving, drug driving, speeding and restraint use) in South Australia for the calendar year 2008. The level of random breath testing (RBT) in South Australia in 2008 decreased slightly but remained at a relatively high level. The proportion of tests conducted using mobile RBT continued to increase. The detection rate, based on evidentiary testing, decreased slightly in 2008 but remained at a relatively high level that was similar to those in other Australian jurisdictions. The level of drug testing doubled in 2008 due to the expansion and decentralisation of the drug testing program. Testing rates per head of population continued to be the highest in Australia. The drug detection rate fell slightly in 2008, as did the level of drug driving among fatally injured drivers. Methylamphetamine continued to be the most commonly detected drug. The number of hours spent on speed enforcement increased slightly in 2008 to the highest level recorded. The number of speeding detections increased for all types of detection devices but speed camera detections increased the most. Detections per thousand vehicles passing a speed camera increased by almost 70 per cent, most likely due to a lowering of the speed limit tolerance. Systematic speed surveys found reductions in travelling speeds on almost all road types. Restraint offences increased by 26 per cent in 2008. Restraint use in serious and fatal crashes remained lower in rural regions than in the metropolitan area. Males were more likely to be charged with a restraint offence and less likely to be wearing a restraint in a fatal or serious injury crash. Spending on publicity increased for all four enforced driver behaviours in 2008.

KEYWORDS

Law enforcement, Performance indicators, Driver behaviour, Drink driving, Restraint usage, Speeding, Drug driving

Summary

The Centre for Automotive Safety Research at the University of Adelaide has been engaged by the Department for Transport, Energy and Infrastructure (DTEI) to produce an annual report quantifying the performance indicators for selected enforced driver behaviours (drink driving, drug driving, speeding and restraint use) in South Australia since 1996. The present report examines performance indicators for the calendar year 2008.

For each of the driver behaviours, information was collected on the current levels and outcomes of police enforcement operations, the involvement of the specific driver behaviour in fatal and serious casualty crashes, and the extent of any publicity and advertising during the year. Additionally, any information available from on-road surveys was examined.

The establishment of consistent performance indicators for drink driving, drug driving, speeding and restraint use will assist in optimising enforcement operations and related publicity, and may assist in reducing road trauma on South Australian roads. The main findings from the performance indicators for enforced behaviours in 2008 are summarised below.

DRINK DRIVING

In 2008, the level of random breath testing in South Australia decreased slightly but remained at a relatively high level. The decrease was concentrated in the metropolitan area; the level of testing remained stable in rural areas. The overall level of testing exceeded the annual target and equated to testing approximately 61 per cent of licensed drivers in South Australia. Regarding the method of RBT, the proportion of tests conducted using static RBT decreased while the proportion of mobile testing increased.

South Australian detection rates (drink drivers detected per 1,000 drivers tested), based on evidentiary testing, decreased in 2008 but remained at a relatively high level. A decrease was observed in rural areas. The overall detection rate for screening tests also decreased in 2008. While detection rates for screening tests decreased in metropolitan and rural areas and for both static and mobile RBT, the most notable decrease was for mobile testing in the metropolitan area. Overall, South Australia had comparable drink driving detection rates (per thousand tested) to other jurisdictions.

Consistent with previous years, mobile RBT was more efficient in detecting drink drivers than static RBT. The ratio of mobile to static RBT detection rates suggested that mobile RBT was particularly advantageous in detecting drink drivers in rural regions, particularly after midnight. Static RBT was predominantly conducted at highly visible times (i.e. 4pm to 10pm) to enhance the deterrent effect of RBT. A greater proportion of testing was conducted on days when drink driving rates were highest (i.e. Fridays and Saturdays).

Crash data suggested that there was an increase in the involvement of alcohol in fatal crashes (38% of drivers had an illegal BAC) and serious injury crashes (25% of drivers had an illegal BAC) in 2008. However, the BAC of drivers was unknown for a considerable percentage of serious injury crashes (39%) and some fatal injury crashes (8%).

In 2008, spending on anti-drink driving publicity increased slightly (by 17%), due to greater expenditure on media. The first of two campaigns focused on deterrence by emphasising that drink drivers can be caught anytime, anywhere. The second campaign highlighted society's disapproval and rejection of drink drivers.

DRUG DRIVING

Legislation allowing random drug testing in South Australia was introduced in July 2006 and so drug testing and detection data are available for only two full years. Consequently, any findings about the effectiveness of drug testing operations should be regarded as preliminary.

In 2008, 25,889 random drug tests were conducted, equating to 2.4 per cent of licensed drivers in South Australia. The majority of these tests were conducted in the metropolitan area. The level of drug testing doubled that of the previous year due to the expansion of drug enforcement operations and resources in mid 2008. In comparison to other Australian jurisdictions, South Australia had the highest testing rate per head of population.

Around 21 drivers per 1,000 tested were confirmed positive (by evidentiary laboratory analysis) for at least one of the three prescribed drugs, which was slightly lower than the previous year. Methylamphetamine was the most commonly detected drug followed by THC (the active component of cannabis) and MDMA (ecstasy) although it is not possible to determine whether the higher rate of methylamphetamine detection reflects higher use of this drug, or whether this is due to the screening tests detecting methylamphetamine more reliably than the other drugs. Random drug testing detection rates were 2.7 times higher than random alcohol breath testing detection rates in 2008. Detection rates were similar in metropolitan and rural regions.

Of the fatally injured drivers who were drug tested in 2008 (92%), 20 per cent tested positive for the prescribed drugs, a level that was lower than previous years. This finding in combination with the lower detection rates suggests that there was a lower level of drug driving in South Australia in 2008.

Following a year without any anti-drug driving mass media campaigns, a new campaign was developed in 2008 that aimed to increase the perceived risk of detection. Analysis of drug tests results of drivers fatally injured in a crash and offence data suggest that publicity campaigns should continue to target male drivers.

SPEEDING

The number of hours spent on speed enforcement in South Australia (excluding dual purpose red light/speed cameras) increased by seven per cent in 2008. Slight increases in speed detection hours were evident in both the metropolitan area and rural regions but the increase was confined to non-camera devices with camera hours remaining relatively static. Contrary to these major trends, there was a small decrease in speed camera hours in rural areas.

The total number of speed detections increased in 2008 with around 40 per cent of licensed drivers in South Australia detected for speeding (including red light/speed cameras). Increases in detections were recorded for speed cameras, red light/speed cameras, and non-camera devices. Detection rates (excluding red light/speed camera detections) per hour of enforcement and per 1,000 vehicles passing speed cameras increased in 2008, with the latter increasing by 68 per cent. Speed camera detection rates increased in both the metropolitan area and rural regions, while non-camera devices detection rates remained at a similar level to the previous year. The increase in speed camera detection rates is likely to be attributable to the reduction in the speed camera tolerance level, enacted in October 2007. Speed camera detection rates per 1,000 vehicles passing were higher in rural areas than in the metropolitan area suggesting that speeding is more prevalent in rural areas.

The identification of speed as a contributing factor in road traffic crashes cannot always be directly determined and is often under-reported as a crash cause. In response to this problem the NSW Road Traffic Authority developed a method to provide an estimate of the role of speeding in crashes. Speed was found to be a factor in 36 per cent of fatal crashes in 2008, a level similar to the previous year. Of the drivers at fault in these crashes, the majority (87%) were male suggesting that males should remain a target group for speed enforcement and supporting publicity.

The systematic measurement of vehicle speeds at 130 sites across South Australia in 2008 showed reductions in speeds for all road types with the exception of 80km/hr Adelaide metropolitan arterial roads. This data further supports the suggestion that the increased detection levels observed in 2008 were due to the reduction in the speed camera tolerance level rather than an increase in the prevalence of speeding.

The development of a new anti-speeding media campaign along with the continuation of an existing campaign in 2008 resulted in a significant increase in publicity expenditure. The message focused on changing the perception that driving a small amount (i.e. 5km/h) over the speed limit is not dangerous.

RESTRAINT USE

As in previous years, determining the effectiveness of restraint use enforcement was problematic because of the lack of information on specific hours of restraint enforcement undertaken in 2008. The number of restraint offences provides some indication of the level of enforcement. Restraint offences in 2008 increased by 26 per cent. Part of this increase may be due to increased enforcement surrounding the introduction of new legislation in March 2008, which made drivers responsible for the restraint use of their passengers, regardless of the age of the passengers.

Observational surveys provide data that could assist in determining the effectiveness of restraint use enforcement but no surveys were undertaken in 2008. Crash data indicated that 60 per cent of fatally injured occupants were wearing a restraint in 2008 but wearing rates for vehicle occupants involved in crashes are difficult to interpret because of the confounding nature of the relationship between crash injury and wearing rates in crashes (wearing restraints reduces injury).

Although overall restraint usage rates in 2008 are unknown, the higher likelihood of males being charged with restraint offences and of being unrestrained in fatal and serious injury crashes indicates that males remain an important target for restraint use enforcement.

The longer duration of the restraint use publicity campaign in 2008 resulted in an increase in spending by 160 per cent. The campaign aimed to demonstrate the risk of seriously injuring or killing other occupants in the vehicle when unrestrained and to reinforce penalties for failing to wear a restraint.

Contents

1 Introduction

Performance indicators assist in the identification of driver behaviour trends and enable the assessment of the effectiveness of enforcement measures. The Centre for Automotive Safety Research at the University of Adelaide was engaged by the Department for Transport, Energy and Infrastructure to examine the performance indicators of selected enforced driver behaviours in South Australia on an annual basis.

The specific aim of this report was to assess performance indicators related to drink driving, drug driving, speeding and restraint use in South Australia for the calendar year 2008. The findings from this report are important for the evaluation and planning of future enforcement operations concerned with these driver behaviours.

For each of the driver behaviours, information was collected on the current levels of police enforcement operations and detections, current levels of the involvement of the specific driver behaviour in fatal and serious casualty crashes, and the extent of any publicity and advertising during the year. In addition, any information available from on-road surveys was reported.

The first section of the report examining drink driving continues on from other annual reports discussing the operations and effectiveness of RBT (White & Baldock, 1997; Baldock & Bailey, 1998; Hubbard, 1999; Wundersitz & McLean, 2002). From 2002 onwards, the annual report also evaluated two other major enforceable behaviours, speeding and restraint use (see Wundersitz & McLean, 2004; Wundersitz et al., 2007; Baldock et al., 2007; Wundersitz & Baldock, 2008a, Wundersitz & Baldock, 2008b). As random roadside drug testing commenced in South Australia in 2006, drug driving enforcement data is also included in this series of reports (Wundersitz *et al.*, 2009).

In this report RBT data are presented from 1999 to 2008, speeding and restraint use data are included for the years 2000 to 2008 and drug data are available for 2007 and 2008.

2 Drink driving and random breath testing

The first section of this report describes the operation and effectiveness of random breath testing (RBT) in South Australia for the calendar year 2008 in terms of the number of tests, the percentage of licensed drivers tested, detection rates, and alcohol involvement in serious and fatal road crashes. To enable a comparison between South Australian practices and those of the police in other Australian jurisdictions, RBT statistics from all Australian states and territories are provided. In addition, anti-drink driving publicity campaigns operating during 2008 are reviewed.

2.1 RBT practices and methods of operation

Random breath testing (RBT) is a form of drink driving enforcement that was first introduced into Australia in the state of Victoria in 1976 (Harrison *et al.*, 2003). Other states introduced RBT in the 1980s, with South Australia first implementing RBT in 1981.

Random breath testing is primarily an enforcement strategy designed to deter drivers from driving with an illegal blood alcohol concentration (BAC) (i.e., general deterrence). A secondary aim is the detection of drink drivers (i.e., specific deterrence). Homel (1990) argued that for RBT to be successful, it must increase a driver's perceived likelihood of detection when drinking and driving, the perceived certainty of punishment if detected, and the perceived speed of punishment once detected. Based on general behaviour modification principles and Homel's (1990) deterrence model, the effectiveness of RBT can be improved by high visibility, strategic enforcement, sustained high levels of testing, sufficiently severe penalties and supportive publicity.

The Traffic Intelligence Section of the South Australian Police (SAPOL) provided the following information about RBT operations. In South Australia, RBT operations are conducted using either 'static' or 'mobile' methods. Traditional static or stationary RBT involves setting up checkpoints on the side of the road. Motorists passing these points are randomly selected to be pulled over to the side of the road where they must submit to a preliminary breath test.

Mobile RBT was first introduced in New South Wales in late 1987 and has subsequently been introduced into all Australian states. Mobile RBT allows police in any mobile vehicle (i.e., car or motorcycle) to stop vehicles at random and breath test the driver. An important part of RBT is that any driver may be pulled over and breath tested without any suspicion that the driver is impaired by alcohol. South Australian parliament passed a Bill in June 2003 legislating the use of mobile testing during 'prescribed periods' which included long weekends, school holidays and four other periods during the year. In June 2005, legislation passed through state parliament enabling mobile random breath testing to be conducted on a full-time basis rather than only during prescribed periods. Consequently, 2008 is the third year in which data for full-time mobile testing is available for the entire 12-month period.

All general patrol and traffic vehicles are equipped with a preliminary breath testing device (949 alco-testers were available in 2008). Drivers who register a blood alcohol level over the prescribed limit on the screening test are required to submit to a further test on more accurate apparatus to determine an 'evidentiary' BAC level, used in prosecution. At static RBT sites, evidentiary testing is either conducted in special vans (16 vans available in 2008), a smaller version of the traditional booze bus, or at a suitably equipped police station.

Drivers testing over the legal limit with mobile RBT are usually driven to the nearest police station or static RBT site.

Evidentiary testing must be completed within two hours of the last known time of driving. Those found to be over the prescribed limit for the evidentiary test are officially recorded as having exceeded the prescribed concentration of alcohol. The number of evidentiary breath testing instruments available for use in South Australia increased to 107 in 2008 (99 in 2007).

Drink drive enforcement is the responsibility of the SA Police 14 Local Service Areas (LSAs) in South Australia, six of which are located in the Adelaide metropolitan area and eight in rural regions. A Commander in each LSA has the responsibility for ensuring drink driving enforcement targets are met and that the operations are efficient and effective. A number of corporate traffic operations specifically targeting drink/drug drivers were conducted in 2008: Operation Consequence – February, August/September, Operation Raid (Country LSA's) – November/December). A number of other corporate traffic operations targeted the "fatal five", including drink driving.

In South Australia, the prescribed BAC limit has been 0.05g/100ml since July 1991. If apprehended with a BAC level of 0.05 to 0.079g/ml, the fully licensed driver incurs a Traffic Infringement Notice (TIN), an expiation fee, and a penalty of three demerit points. In July 2008 the demerit point penalty increased to four demerit points and the expiation fee increased from $164 to $420. Drivers convicted of a second or subsequent offence at this BAC level also receive a licence suspension for a minimum of three months. If detained with a BAC level of 0.08g/ml or higher the driver will: immediately lose their licence for six months (12 months if BAC is 0.150g/ml or above), be required to make a court appearance, receive a court imposed fine, and incur five demerit points (6 demerit points if BAC is 0.150g/ml or above). The amount of the fine and length of licence disqualification is dependent on the actual BAC level and previous offences.

2.1.1 Number of tests performed

The following sections examine RBT in terms of levels of testing and detections, based on data from SAPOL. To provide a complete picture of the operation and effectiveness of RBT in South Australia, the following data represent a combination of both static and mobile testing. Table 2.1 and Figure 2.1 summarise the changes in the number of random breath tests conducted for the last decade from 2000 to 2008 for metropolitan and rural areas. Rural testing refers to testing conducted outside the Adelaide metropolitan area and includes regional cities such as Mount Gambier and Port Augusta.

Table 2.1
Number of random breath tests in South Australia, 2000-2008

Year	Metro	Rural	Total	% difference from previous year
2000	326,168	208,405	534,573	-4.9
2001	290,853	250,282	541,115	1.2
2002	387,867	294,664	682,531	26.1
2003	334,338	274,331	608,649	-10.8
2004	364,856	288,477	653,333	7.3
2005	399,612	247,246	646,858	-1.0
2006	399,967	290,920	690,891	6.8
2007	389,251	289,031	678,282	-1.8
2008	371,785	289,294	661,079	-2.5

A testing target was set at 600,000 tests per year in South Australia from 1999 to 2005. In 2006, the testing target was increased to 612,000 (combined static and mobile) with the intention that an average of one in every two licensed drivers is tested in South Australia. The testing target was further increased to 660,000 in 2008.

The total number of tests (661,079) conducted in 2008 exceeded the target. This level of testing was slightly less than the previous year but still at a relatively high level. Similar to the previous year, RBT testing levels decreased in the metropolitan area (4.5%) and remained relatively stable in rural areas.

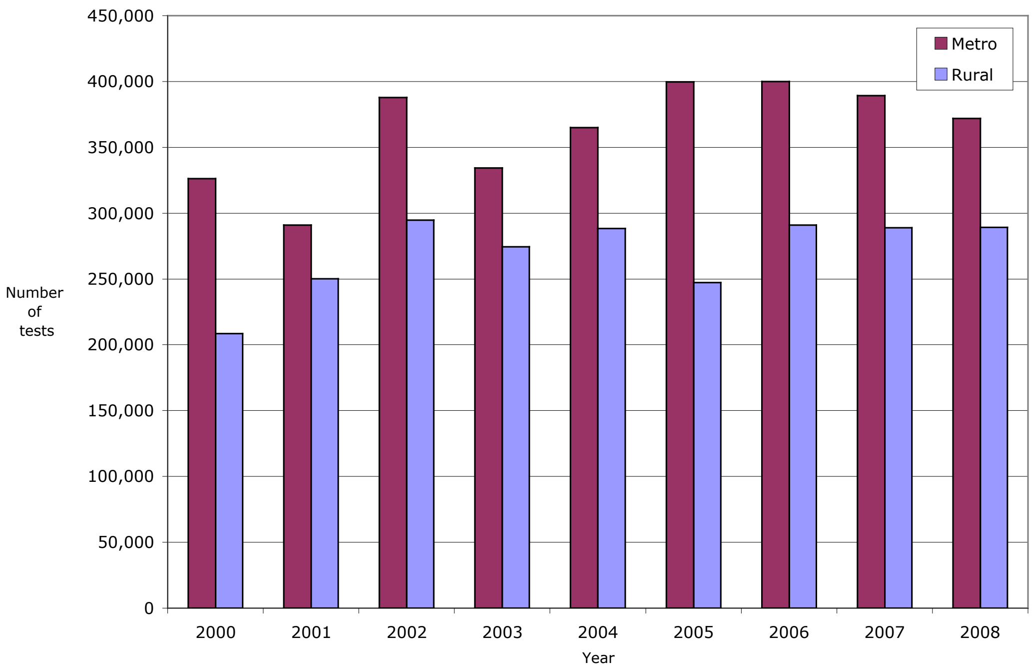

Figure 2.1
Number of random breath tests in South Australia, 2000-2008

The number of random breath tests conducted by static and mobile testing methods from 2004 to 2008 is summarised in Table 2.2. Since the introduction of full time mobile RBT operations in June 2005, the proportion of mobile testing has increased each year, reaching a level of around 28 per cent in 2008.

Table 2.2
Number of random breath tests conducted in South Australia by testing method, 2004-2008

Year	Static	Mobile	Total	% Mobile
2004	607,303	46,030	653,333	7.0
2005 [a]	567,710	79,148	646,858	12.2
2006	576,261	114,630	690,891	16.6
2007	530,939	147,343	678,282	21.7
2008	477,273	183,806	661,079	27.8

[a] Data for 2005 differs from the previous report due to recent improvements in data extraction.

DAY OF WEEK

The number of random breath tests performed on each day of the week, as a percentage of all tests in a year, is shown in Table 2.3 for the years 2000 to 2008. Consistent with previous years, the greatest proportion of testing was performed on Friday and Saturday in 2008.

Table 2.3
Random breath tests performed by day of week, 2000-2008
(expressed as a percentage of total tests each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2000	13.0	9.1	7.4	10.1	23.4	18.8	18.1
2001	12.8	7.0	7.8	12.6	22.7	19.1	17.9
2002	12.0	9.8	9.1	12.4	20.1	19.1	17.6
2003	13.9	8.2	12.3	13.4	18.3	16.6	17.4
2004	12.6	7.5	7.5	14.6	21.2	18.4	18.2
2005	13.6	7.3	7.7	13.2	20.2	21.8	16.1
2006	10.1	10.1	8.3	10.4	20.3	24.0	16.7
2007	12.7	6.9	10.1	10.2	19.4	26.1	14.8
2008	10.5	9.0	11.5	11.2	17.7	25.1	14.9

Table 2.4 shows that the distribution of testing by day of week for static and mobile RBT in 2008 was similar to previous years with both forms of testing being conducted predominantly on Friday and Saturday.

Table 2.4
Random breath tests performed by day of week in 2004-2008 (expressed as a percentage of total tests each year) for static and mobile RBT

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2004							
Static	12.7	7.6	7.6	14.9	21.3	17.8	18.1
Mobile	11.9	6.1	5.8	9.6	20.2	26.7	19.6
2005							
Static	13.9	7.1	7.7	13.8	20.5	21.2	15.8
Mobile	11.0	8.8	7.6	9.1	18.7	26.4	18.5
2006							
Static	10.1	10.2	8.0	10.1	20.4	24.0	17.2
Mobile	10.5	9.1	9.7	11.7	20.1	24.3	14.6
2007							
Static	13.2	6.2	10.1	9.6	19.1	26.7	15.1
Mobile	11.1	9.1	9.8	12.2	20.2	23.8	13.9
2008							
Static	10.1	8.4	11.6	10.7	17.4	26.2	15.5
Mobile	11.3	10.7	11.4	12.6	18.5	22.3	13.3

TIME OF DAY

The percentage of tests performed from 2000 to 2008 by time of day is presented in Table 2.5. In 2008, RBT was conducted most commonly between 4pm and 10pm, indicating that there was a slight shift in testing hours to earlier in the evening compared to the previous year. There were relatively low levels of testing between midnight and 6am, a pattern broadly consistent with previous years.

Table 2.5
Random breath tests performed by time of day, 2000-2008 (expressed as a percentage of total tests each year)

Year	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
2000	3.9	3.1	1.8	18.9	9.9	13.9	13.1	24.9	10.5
2001	3.8	6.4	1.5	17.4	10.7	13.9	10.8	22.4	13.1
2002	4.0	2.5	2.2	20.6	11.4	15.0	11.3	22.2	10.8
2003	5.5	2.3	1.5	21.2	11.1	14.3	12.6	20.5	10.9
2004	4.2	2.3	1.9	20.6	12.0	12.0	12.5	21.7	12.9
2005	5.6	2.9	2.1	20.4	11.2	11.2	15.0	17.1	14.6
2006	4.2	3.1	2.4	22.4	10.0	11.6	17.4	17.1	11.8
2007	5.7	6.6	2.4	18.3	8.9	8.8	14.9	18.3	16.1
2008	5.1	2.5	2.3	24.8	9.5	12.6	15.4	17.4	10.5

Time of day testing data from 2004 to 2008 is shown in Table 2.6 separately for static and mobile RBT. In 2008, police conducted static RBT most frequently during the late afternoon and early evening (i.e. from 4pm to 10pm). Mobile testing was conducted at similar times to static testing but was more common than static between 10pm and 2am.

Table 2.6
Random breath tests performed by time of day in 2004-2008 (expressed as a percentage of total tests in the year) for static and mobile RBT

Year	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
2004									
Static	3.7	2.2	2.0	20.7	12.3	12.3	12.3	21.8	12.8
Mobile	10.4	3.4	1.5	18.4	8.1	8.8	14.7	19.9	14.6
2005									
Static	4.8	2.8	2.2	20.6	11.7	11.4	15.3	17.2	14.1
Mobile	11.1	3.6	1.8	18.9	7.8	9.3	13.0	16.4	18.0
2006									
Static	3.2	3.1	2.6	22.0	10.2	12.2	18.1	17.4	11.2
Mobile	9.0	3.2	1.4	24.1	9.1	8.9	13.7	15.8	14.8
2007									
Static	4.7	7.7	2.6	17.1	8.5	8.3	14.7	19.4	16.9
Mobile	9.0	2.8	1.9	22.7	10.2	10.3	15.8	14.2	13.2
2008									
Static	3.5	2.4	2.3	25.1	9.7	13.4	15.7	18.8	9.1
Mobile	9.0	3.0	2.3	23.9	9.1	10.4	14.6	13.8	13.9

Table 2.7 shows the percentage of RBT tests per month for static and mobile testing in 2008. There were few discernable patterns by month for static or mobile testing. Lower levels of static testing were observed during the winter months, probably due to the effects of wet weather. Generally, higher levels of testing were recorded in March and December (and August for static testing), months in which drink driving advertising campaigns were aired.

Table 2.7
Random breath tests by month in 2008 (expressed as a percentage of total tests in the year) by location for static and mobile RBT

Month	Static			Mobile		
	Metro	Rural	Total	Metro	Rural	Total
Jan	8.6	10.4	9.4	7.2	9.1	8.1
Feb	8.0	6.8	7.5	7.2	7.0	7.1
Mar	9.3	12.8	10.8	10.4	10.5	10.5
Apr	6.6	7.0	6.8	6.8	7.0	6.9
May	5.1	6.9	5.9	7.1	6.8	7.0
Jun	6.3	4.4	5.5	8.5	5.6	7.1
Jul	4.4	4.4	4.4	6.4	6.4	6.4
Aug	11.8	9.1	10.7	7.8	9.4	8.6
Sep	7.5	8.4	7.9	7.2	9.1	8.1
Oct	9.1	8.2	8.7	11.2	8.2	9.8
Nov	9.3	8.2	8.8	10.2	9.2	9.7
Dec	14.0	13.4	13.8	9.9	11.7	10.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

2.1.2 Percentage of licensed drivers tested

The number of licensed drivers and percentage of licensed drivers tested in South Australia for the years 2000 to 2008 is presented in Table 2.8 and in Figure 2.2. The testing target level of 1 in 2 drivers has been exceeded each year over the last decade. Around 61 per cent of licensed drivers were tested in 2008, a slight decrease from the previous year.

Table 2.8
Number and percentage of licensed drivers tested in South Australia, 2000-2008

Year	Number of tests	Number of licensed drivers [a]	% of licensed drivers tested
2000	534,573	1,028,083	52.0
2001	541,115	1,045,077	51.8
2002	682,531	1,046,878	65.2
2003	608,649	1,052,030	57.9
2004	653,333	1,072,374	60.9
2005	646,858	1,093,550	59.2
2006	690,891	1,042,774	66.3
2007	678,282	1,073,103	63.2
2008	661,079	1,085,503	60.9

Note. Licence information could only be extracted for the financial year to June 30.
[a] Source: 1997-2005 DRIVERS database, Registration and Licensing Section, DTEI.
2006-2007 TRUMPS database, Registration and Licensing Section, DTEI.

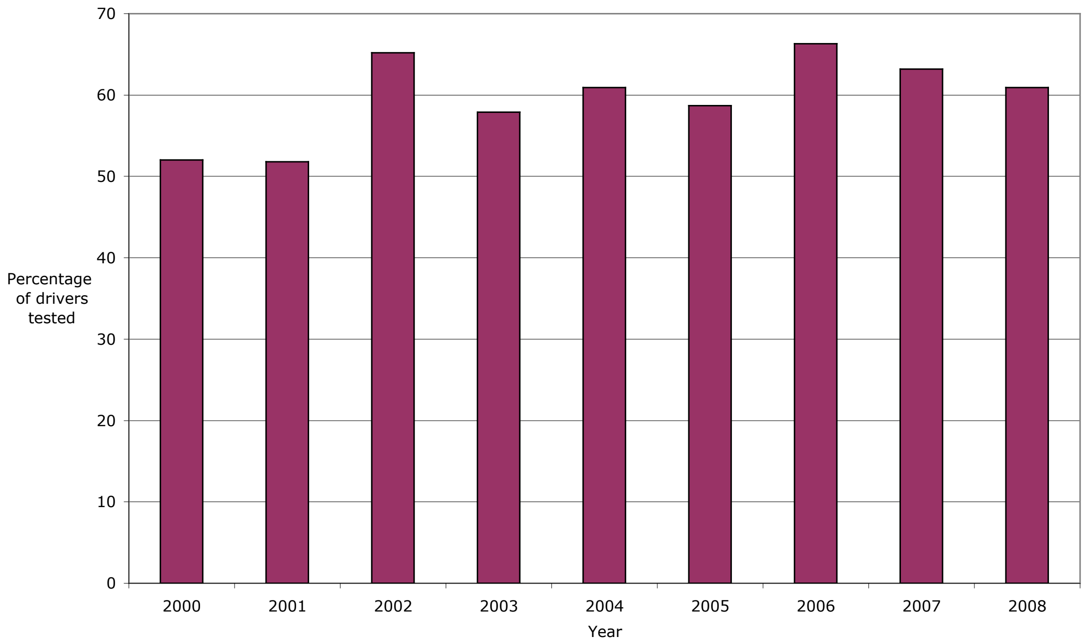

Figure 2.2
Percentage of licensed drivers tested, 2000-2008

2.1.3 Interstate comparisons

To establish standards against which South Australian practices may be assessed, information was collected on the levels of RBT conducted in other Australian jurisdictions. Table 2.9 shows the levels of overall RBT in all Australian jurisdictions, including South Australia, with total numbers expressed, where possible, in terms of the relative contributions of mobile and static testing methods. Consistent with previous years, the highest levels of RBT were conducted in New South Wales, Victoria and Queensland. Note that in New South Wales, the level of testing increased by over 20 per cent. In South Australia, the proportion of RBT that was conducted using mobile testing methods was lower than Tasmania, Western Australia and Queensland but higher than the remaining two jurisdictions that provided data.

Table 2.9
Number of random breath tests conducted in Australian jurisdictions in 2008, by testing method

Jurisdiction	Static	Mobile	Total	% Mobile
South Australia	477,273	183,806	661,079	27.8
New South Wales	3,302,867[a]	851,840	4,154,707	20.5
Queensland	1,847,480[b]	867,060	2,714,540	31.9
Tasmania	218,135	481,177	699,312	68.8
Victoria	2,855,509[c]	907,254	3,762,763	24.1
Western Australia	297,983[d]	363,192	661,175	54.9
Northern Territory	UK	UK	111,156	UK
Australian Capital Territory	UK	UK	85,997	UK

[a] Total includes tests conducted by RBT buses.
[b] Total includes 76,829 tests conducted using RBT 'booze buses'.
[c] Total includes 1,430,043 tests conducted using RBT 'booze buses'.
[d] Total is only tests conducted using RBT 'booze buses'.
NB: UK = unknown

A more appropriate measure of RBT levels in different jurisdictions can be gained by adjusting RBT numbers for the number of drivers in each jurisdiction. To avoid any difficulties associated with differences in licensing conditions across jurisdictions, a simpler measure is breath tests per head of population. As population here refers to total population, and not driving age population, the figures in Table 2.10 will not be of great value beyond the context of the table. That is, they only provide a means by which to compare jurisdictions. When RBT levels are expressed as rates per head of population (Table 2.10), the highest rates of RBT were reported for Tasmania, followed by Victoria and Queensland. South Australia's level of RBT was similar to the level reported in 2007 (43%), and higher than levels in the ACT and Western Australia. The pattern of results in 2008 are relatively similar to those reported for 2007 (see Wundersitz *et al.*, 2009) although the proportion tested has increased in New South Wales and Victoria.

Table 2.10
Number of random breath tests conducted in Australian jurisdictions in 2008, as a percentage of population

Jurisdiction	Total	Pop 2008 [a]	% of Pop
South Australia	661,079	1,612,000	41.0
New South Wales	4,154,707	7,041,400	59.0
Queensland	2,714,540	4,349,500	62.4
Tasmania	699,312	500,300	139.8
Victoria	3,762,763	5,364,800	70.1
Western Australia	661,175	2,204,000	30.0
Northern Territory	111,156	221,700	50.1
Australian Capital Territory	85,997	347,800	24.7

[a] Source: Estimated resident population data from Australian Bureau of Statistics (2009) *Australian Demographic Statistics, December 2008.* Catalogue No 3101.0.

2.2 Levels of drink driving

2.2.1 RBT detections

The number of RBT detections in South Australia for the years 2000 to 2008 is shown in Table 2.11. Note that RBT detections in this table refer only to drivers who recorded an illegal BAC using evidentiary testing. Drivers who tested over the limit on the initial screening test but who were under the limit on the evidentiary test are not included in the table. With the exception of 2006, the number of RBT detections increased each year from 2000 to 2007. In 2008, the number of detections decreased by nine per cent but remained at a relatively high level.

Table 2.11
Number of RBT detections in South Australia, 2000-2008

Year	Number of RBT detections	Per cent change from previous year
2000	1,495	NA
2001	2,002	33.9
2002	2,108	5.3
2003	2,725	29.3
2004	3,503	28.6
2005	4,973	42.0
2006	4,419	-11.1
2007	5,835	24.3
2008	5,313	-8.9

2.2.2 RBT detection rates

There is no single sufficient measure of the effectiveness of RBT operations but RBT detection rates and the percentage of drivers with illegal BACs involved in serious and fatal crashes provide an estimate of the effectiveness of RBT. A lower detection rate may indicate greater effectiveness of RBT and other drink driving countermeasures, although it must be acknowledged that detection rates are also affected by operational factors such as the locations, times and types of RBT enforcement used.

The RBT detection rates for metropolitan and rural areas from 2000 to 2008 are presented in Table 2.12 and Figure 2.3 in terms of the number of drivers found to be over the legal limit per thousand tested. In this case, drivers are only included if they recorded an illegal BAC using evidentiary testing. The overall RBT detection rate in 2008 decreased slightly but continues to be at a relatively high level of eight per 1,000 tested. The decrease in the detection rate is primarily due to a decrease in the rural detection rate. The metropolitan detection rate remains at the highest level recorded in the table.

Table 2.12
RBT detection rates, 2000-2008
(number of drivers detected with an Illegal BAC per 1,000 tested)

Year	Metro	Rural	Total
2000	3.2	2.1	2.8
2001	5.4	1.8	3.7
2002	4.0	1.9	3.1
2003	5.8	2.9	4.5
2004	6.5	3.9	5.4
2005	8.3	6.7	7.7
2006	7.1	5.5	6.4
2007	9.4	7.4	8.6
2008	9.4	6.3	8.0

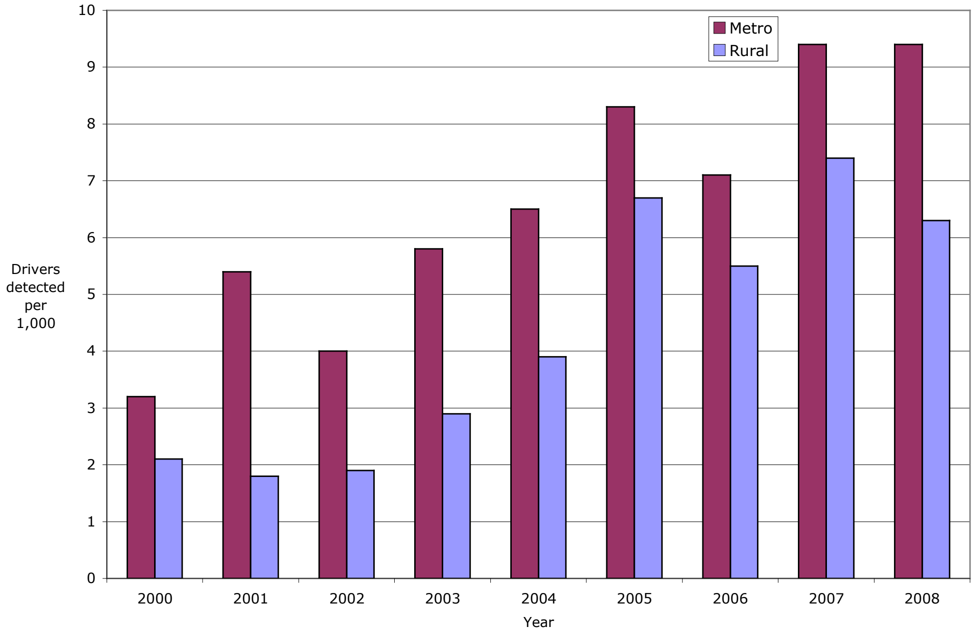

Figure 2.3
RBT detection rates per 1,000 tests, 2000-2008

Table 2.13 shows the detection rates associated with static and mobile RBT in metropolitan and rural areas from 2004 to 2008. Note that the detection rates in Table 2.13 represent the percentage of drivers tested who were over the legal limit on the *screening* test, while the figures in Table 2.12 represent the percentages of drivers over the legal BAC limit on the *evidentiary* test. Evidentiary test numbers were not available for mobile and static RBT separately. Percentages of drivers detected over the limit on screening tests will exceed the number detected over the limit on later, evidentiary tests (i.e. the BAC of some drivers detected over the limit on a screening test may be lower, and could reduce to a legal level on a later evidentiary test).

A total of 6,040 drivers were detected with an illegal BAC by a screening test in 2008. Consistent with the detection rate based on evidentiary testing, the overall detection rate for screening tests decreased from 10.6 per cent in 2007 to 9.1 per cent in 2008. Table 2.13 shows that static and mobile detection rates in 2008 were the lowest recorded since 2004, the first 12 month period in which mobile testing operated. The greatest decrease in detection rates was recorded for mobile testing in the metropolitan area. Mobile RBT continues to detect a greater percentage of drink drivers than static RBT. Static and mobile detection rates were highest in metropolitan areas, consistent with previous years. With the exception of 2006, the ratio of mobile to static RBT detection rates indicates that mobile RBT is more effective in rural areas.

Table 2.13
RBT detection rates (screening test only), 2004-2008
(number of drivers detected with an Illegal BAC per 1,000 tested)
for static and mobile RBT, by location

Year and location	Static	Mobile	Ratio of mobile to static
2004			
Metro	8.3	38.7	4.7
Rural	2.2	25.4	11.5
Total	5.7	29.0	5.1
2005			
Metro	8.6	32.4	3.8
Rural	2.9	27.4	9.4
Total	6.6	29.3	4.4
2006			
Metro	9.9	57.4	5.8
Rural	6.1	34.0	5.6
Total	8.4	43.5	5.2
2007			
Metro	6.4	40.7	6.4
Rural	2.8	22.4	8.0
Total	5.0	30.5	6.1
2008			
Metro	6.0	23.8	4.0
Rural	2.1	18.9	9.0
Total	4.4	21.5	4.9

TIME OF DAY

RBT detection rates (evidentiary test results) by time of day, shown in Table 2.14, indicate that the highest detection rates in 2008, for both metropolitan and rural areas, were between midnight and 6am. This is consistent with previous years.

Table 2.14
RBT detection rates by time of day, 2004-2008
(number of drivers detected with an Illegal BAC per 1,000 tested)

Year	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
2004									
Metro	37.7	29.0	36.7	3.0	0.9	4.1	2.4	3.5	4.9
Rural	21.2	71.7	16.7	0.7	0.9	1.7	2.9	3.9	10.9
Total	31.1	35.5	30.0	1.9	0.9	2.3	2.7	3.6	6.1
2005									
Metro	Data not available								
Rural	Data not available								
Total	Data not available								
2006									
Metro	38.5	27.1	31.8	14.2	1.5	3.8	2.4	5.7	5.0
Rural	34.3	92.5	23.3	8.4	1.0	2.1	4.2	5.7	8.6
Total	36.8	35.6	29.6	11.7	1.2	2.7	3.0	5.7	6.0
2007									
Metro	31.0	16.4	33.5	3.6	1.5	5.0	7.4	8.1	6.8
Rural	40.4	46.2	51.3	2.3	1.2	3.5	3.0	6.8	9.1
Total	34.2	22.0	35.9	3.1	1.3	4.1	4.6	7.6	7.6
2008									
Metro	38.3	49.0	44.8	3.6	2.5	3.5	4.0	8.1	9.1
Rural	34.0	63.4	20.6	1.6	1.2	1.9	3.3	5.2	14.7
Total	36.6	53.0	34.7	2.7	1.7	2.6	3.8	7.0	10.8

Detection rates by time of day for mobile and static RBT are presented in Table 2.15. Again, note that these detection rates, unlike those in Table 2.14, are *not* for drivers detected with illegal BACs in evidentiary tests but are for drivers detected with illegal BACs in the initial screening test. Therefore, the figures in Table 2.15 will generally be higher than those in Table 2.14. Similar to evidentiary testing data, higher RBT detection rates were observed at night from 10pm to 6am in both the metropolitan area and rural regions and for both mobile and static detection methods.

Table 2.15
RBT detection rates (screening test only) in 2008
(number of drivers detected with an Illegal BAC per 1,000 tested) by time of day and location

Method	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
Static									
Metro	14.1	16.6	17.7	1.9	4.0	3.6	5.6	4.9	10.3
Rural	9.2	10.8	6.2	1.1	1.0	1.6	1.8	2.8	7.6
Total	12.9	16.3	14.6	1.5	1.9	2.4	4.2	4.2	9.7
Mobile									
Metro	47.6	60.8	37.6	9.6	13.0	17.1	19.8	21.6	36.6
Rural	42.9	51.1	27.9	7.4	13.0	11.7	17.4	22.8	26.8
Total	45.6	58.4	35.9	8.6	13.0	14.5	18.5	22.0	31.2
Both									
Metro	28.3	28.8	23.6	3.9	7.0	7.6	8.6	8.2	16.9
Rural	30.6	39.3	10.6	2.8	3.8	3.5	7.0	7.9	19.3
Total	29.1	30.0	20.5	3.4	4.8	5.2	7.9	8.1	17.7

To determine whether there were any combinations of location (metro or rural) and time of day in which mobile RBT was more likely than static RBT to detect drink drivers, the ratio, for each location and time of day combination, of mobile to static RBT detection rate was calculated. The results, displayed in Table 2.16, indicate that mobile RBT is more effective in detecting drink drivers in rural areas from 2pm to 10pm. There was no discernable pattern for the metropolitan area.

Table 2.16
The ratio of mobile to static RBT detection rates in 2008, by location and time of day

Location	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
Metro	3.4	3.7	2.1	5.1	3.2	4.8	3.5	4.4	3.5
Rural	4.7	4.7	4.5	6.7	12.6	7.2	9.6	8.2	3.5
Total	3.5	3.6	2.5	5.6	7.0	6.2	4.4	5.3	3.2

DAY OF WEEK

Table 2.17 shows detection rates by day of week for static and mobile RBT, presented separately for metropolitan and rural testing. Detections here are for drivers testing positive on the screening test rather than on the evidentiary test. Overall, detection rates were higher from Friday to Sunday, reflecting the same day of week pattern for mobile testing. For static testing, detection rates were higher on Saturday and Sunday. These trends were evident in metropolitan and, to a slightly lesser extent, in rural areas.

Table 2.17
RBT detection rates (screening tests only) in 2008
(number of drivers detected per 1,000 tested) by day of week and location

Method	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Static							
Metro	3.1	4.3	3.7	4.5	5.4	8.1	8.7
Rural	0.9	2.1	1.4	2.3	2.0	2.8	2.4
Total	2.2	3.6	2.7	3.4	3.8	5.9	6.2
Mobile							
Metro	12.1	17.5	20.2	22.9	26.6	32.7	29.6
Rural	12.4	16.2	20.3	20.4	20.2	20.3	18.4
Total	12.2	17.0	20.3	21.8	23.2	25.4	24.7
Both							
Metro	5.8	8.5	8.3	10.6	11.0	12.7	13.6
Rural	4.4	7.1	6.6	7.5	7.8	8.3	6.7
Total	5.2	8.0	7.5	9.2	9.4	10.7	10.8

RBT DETECTION RATES BY MONTH

Static and mobile RBT detection rates by month are displayed in Table 2.18 for both metropolitan and rural areas. Note, again, that these detection rates refer to the results of screening tests. For static testing, detection rates were higher during the first two months of the year. In contrast, mobile testing rates were highest in February and May.

Table 2.18
RBT detection rates by month in 2008
(number of drivers detected with an Illegal BAC per 1,000 tested), by location

Month	Static			Mobile		
	Metro	Rural	Total	Metro	Rural	Total
Jan	8.0	2.2	5.3	25.5	19.5	22.3
Feb	9.2	2.6	6.6	28.4	24.0	26.3
Mar	7.0	1.4	4.2	18.9	19.1	19.0
Apr	3.8	1.6	2.8	22.7	18.4	20.6
May	4.9	1.9	3.4	31.1	18.4	25.2
Jun	5.8	1.9	4.5	18.3	20.9	19.3
Jul	5.5	3.2	4.5	24.6	18.8	21.8
Aug	6.3	2.5	5.0	28.7	21.2	24.8
Sep	6.1	1.8	4.1	20.6	14.1	17.1
Oct	5.4	2.8	4.4	19.6	12.6	16.8
Nov	4.4	2.2	3.5	26.4	21.0	24.0
Dec	5.5	2.0	4.1	24.8	19.6	22.1
Total	6.0	2.1	4.4	23.8	18.9	21.5

RBT DETECTION RATES BY SEX

Table 2.19 shows the detection rates for males and females from 2000 to 2008, based on evidentiary testing data and the number of licensed drivers of each gender. The detection rate is expressed in terms of the number of licence holders because police do not record the sex of drivers tested who do not have an illegal BAC. Note that the sum of the number of male and female licence holders differs from the number of licence holders in Table 2.8 because there were 5568 cases for which sex was unknown. However, the difference does not affect the pattern of drink driving activities evident in the data.

The ratio of male to female drink drive detection rates in 2008 indicates that, on average, males are almost four times more likely to be detected than females. This trend is consistent with previous years and reinforces the notion that drink driving continues to be a problem among male drivers.

Table 2.19
Number of licence holders, RBT detection rate and comparative ratio of detection rate by sex, 2000-2008

Year	Male			Female			
	Licence holders	Detected by RBT	RBT detection rate (per thousand licensed)	Licence holders	Detected by RBT	RBT detection rate (per thousand licensed)	Ratio of male to female RBT detection rate
2000	542,811	1,197	2.21	480,120	299	0.62	3.56
2001	553,141	1,561	2.82	486,509	441	0.91	3.10
2002	552,451	1,665	3.01	488,723	443	0.91	3.31
2003	553,702	2,170	3.92	492,448	555	1.13	3.47
2004	563,389	Data not available		502,828	Data not available		
2005	574,093	Data not available		512,926	Data not available		
2006	535,440	3,485	6.51	501,470	934	1.86	3.50
2007	553,341	4,609	8.33	514,047	1,226	2.38	3.50
2008	519,648	4,173	8.03	560,287	1,140	2.03	3.96

Note. The number of licence holders was obtained from the DRIVERS database from 1999-2005. From 2006, data was obtained from TRUMPS, Registration and Licensing Section, DTEI.

RBT DETECTIONS BY BAC READING

The number of drink drivers detected by RBT in metropolitan and rural regions by BAC category is presented in Table 2.20. The table includes all drivers detected during evidentiary testing because BACs are not recorded for the screening test. Consequently, BAC readings are not available separately for static and mobile RBT. Note that the BAC categories changed in 2006.

A number of BAC readings were recorded in the range from 0.001 to 0.049mg/L. These low readings may be attributed to some drivers having special licence conditions (i.e. truck, taxi, learner, provisional licence drivers) requiring a zero BAC. For these drivers, any positive BAC reading was regarded as illegal. Similar to the previous year, around 18 per cent recorded a high BAC level, that is, a BAC of 0.150mg/L and above. Rural regions recorded a greater proportion of drivers with a high BAC level (23%) than the metropolitan area (17%).

Table 2.20
Number of drivers detected by RBT by BAC category and region, 2006-2008

	RBT BAC readings (mg/L)					
Year	0.001-0.049	0.050-0.079	0.080-0.149	0.150+	Refused	Total
2006						
Metro	285	827	1,321	388	0	2,821
Rural	145	360	742	351	0	1,598
2007						
Metro	429	981	1,691	577	23	3,701
Rural	219	418	1,031	489	17	2,174
2008 [a]						
Metro	390	906	1,592	577	28	3,493
Rural	174	376	833	414	21	1,818

[a] The BAC reading for two drivers was unknown.

2.2.3 Interstate comparisons

RBT detection data were obtained from all Australian jurisdictions and are shown in Table 2.21. Again, for ease of comparison, these are expressed in terms of detections per head of population. Some jurisdictions provided screening test data and others provided evidentiary test data. Consequently, Table 2.21 is split into screening and evidentiary testing detections to allow meaningful comparisons. South Australian RBT detections are given for both screening and evidentiary testing.

The screening test data show that Queensland had the highest number of RBT detections in 2008 and, when adjusted for population, the highest screening detection rate. All jurisdictions had a higher screening detection rate than South Australia. For evidentiary testing, the detection rate for South Australia was higher than New South Wales but lower than the other four jurisdictions for which data are available.

Table 2.21
RBT detections in 2008 in Australian jurisdictions

	Jurisdiction	RBT Detections	% of Population
Screening	South Australia	6,040	0.37
	Queensland [a]	34,809	0.80
	Western Australia [b]	14,530	0.66
	Victoria [c]	26,862	0.50
Evidentiary	South Australia	5,313	0.33
	New South Wales	21,748	0.31
	Western Australia [d]	13,758	0.62
	Tasmania	4,490	0.90
	Australian Capital Territory	1,806	0.52
	Northern Territory	3,520	1.59

Source: Estimated resident population data from Australian Bureau of Statistics (2009) *Australian Demographic Statistics, December 2008.* Catalogue No 3101.0

[a] Includes 715 detections conducted at a booze bus (evidentiary testing).

[b] Includes 4,573 detections conducted at a booze bus.

[c] Includes 5,698 detections conducted at a booze bus (evidentiary testing).

[d] Includes 3,801 detections conducted at a booze bus

A detection rate taking into account the number of drivers tested is a better indicator of the effectiveness of RBT enforcement than rates per head of population. Data were available to calculate RBT detection rates per thousand drivers tested in all Australian jurisdictions. South Australian detection rates per thousand tested are compared to rates in other jurisdictions for static and mobile methods in Table 2.22. Once again, to make meaningful comparisons, detection rates are given separately for screening and evidentiary testing. For testing with screening devices, South Australia had a detection rate that was higher than Victoria but lower than Queensland and Western Australia. The detection rate for mobile RBT in South Australia was comparable to the other jurisdictions for which data were available. With respect to evidentiary testing, South Australia's overall detection rate was comparable to other jurisdictions: higher than two jurisdictions and lower than three jurisdictions.

Table 2.22
RBT detection rates, 2008, (number of drivers detected with an illegal BAC per thousand tested) for selected Australian jurisdictions for static and mobile

Testing	Jurisdiction	Static	Mobile	Total
Screening	South Australia	4.4	21.5	9.1
	Queensland	9.3	20.3	12.8
	Western Australia	15.3	27.4	22.0
	Victoria [a]	2.9	20.5	7.1
Evidentiary	South Australia	UK	UK	8.0
	New South Wales	1.9	18.3	5.2
	Western Australia	12.8	27.4	20.8
	Tasmania	2.9	8.0	6.4
	Australian Capital Territory	UK	UK	21.0
	Northern Territory	UK	UK	31.7

[a] Includes 5,698 detections conducted at a booze bus (evidentiary testing).

Overall, compared to other Australian jurisdictions, in 2008 South Australia had a relatively low rate of testing per head of population, a comparable proportion of tests conducted using mobile methods, low drink driving detection rates per capita but comparable detection rates per thousand tested.

2.2.4 Blood alcohol levels of seriously and fatally injured drivers

The BAC levels of drivers and motorcycle riders involved in road crashes provide another measure or estimate of the effectiveness of random breath testing. If road users have been deterred from drink driving, then the percentage of seriously and fatally injured drivers with a zero BAC, or a BAC under .05, would be expected to increase and, conversely, the percentage of drivers with higher BAC levels should decrease.

When calculating these percentages, only drivers with a known BAC are considered. Not all crash involved drivers have a known BAC due to limitations in the matching process for forensic blood samples with the DTEI Traffic Accident Reporting System (TARS) database and the infrequency with which police record BAC data for drivers (Kloeden, McLean & Holubowycz, 1993).

The BAC distribution of drivers who were fatally injured in a road crash and for whom a BAC was recorded is presented in Table 2.23. The results for 2008 are indicative of relatively high levels of alcohol involvement in fatal crashes. Almost 38 per cent of fatally injured drivers had a BAC above 0.05 which was the second highest level recorded in the table. The percentage of drivers with a BAC level above 0.100 increased from 25 per cent in 2007 to 34 per cent in 2008. However, the relatively small number of fatalities means that the results will fluctuate from year to year more than the results for serious injuries (see Table 2.24 for serious injuries). The proportion of known BAC levels increased in 2008 to almost 92 per cent, an improvement on the level recorded in previous years.

Table 2.23
Percentage of drivers and motorcycle riders fatally injured in road crashes by known BAC category, 2000-2008

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
2000	71.15	3.85	0.96	1.92	9.62	11.54	0.96	25.00	104	97.20	107
2001	66.27	3.61	1.20	2.41	13.25	12.05	1.20	30.11	83	94.32	88
2002	62.20	3.66	3.66	0.00	21.95	7.32	1.22	34.15	82	89.13	92
2003	70.37	3.70	3.70	1.23	14.81	4.94	1.23	25.91	81	91.01	89
2004	60.00	4.21	3.16	1.05	17.89	11.58	2.11	35.79	95	95.00	100
2005	55.41	10.81	1.35	1.35	10.81	20.27	0.00	33.78	74	80.43	92
2006	54.29	5.71	4.29	1.43	20.00	11.43	2.86	40.00	70	87.50	80
2007	62.50	7.14	0.00	5.36	19.64	3.57	1.79	30.36	56	84.85	66
2008	55.36	7.14	1.79	1.79	16.07	17.86	0.00	37.50	56	91.80	61

Table 2.24 shows the percentage of drivers seriously injured by known BAC level. A seriously injured person is defined as ‘a person who sustains injuries and is admitted to hospital as a result of a road crash and who does not die as a result of those injuries within 30 days of the crash’ (Transport Information Management Section, Transport SA, 2001). During 2008, 25 per cent of drivers seriously injured in a crash had a BAC of .050 or greater, which was the highest level recorded during the last decade. The percentage of drivers with a BAC above 0.100 in 2008 was 20 per cent, comparable to previous years. Note that the percentage of seriously injured drivers with a BAC above 0.100 was considerably lower than the percentage above this BAC level for fatally injured drivers (34%, refer to Table 2.23). The percentage of known BAC levels for seriously injured drivers in 2008 increased but remained at a relatively low level (61%).

In summary, these results are indicative of a higher level of alcohol involvement in fatal and serious injury crashes during 2008 compared to previous years.

Table 2.24
Percentage of drivers and motorcycle riders seriously injured in road crashes by known BAC category, 2000-2008

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
2000	81.22	2.96	1.91	0.35	10.61	2.96	0.00	15.83	575	64.03	898
2001	73.94	3.91	2.44	2.12	12.05	5.21	0.33	22.15	614	63.43	968
2002	78.02	2.18	2.52	1.68	12.08	3.36	0.17	19.81	596	65.64	908
2003	77.44	2.74	1.71	1.37	12.65	4.10	0.00	19.83	585	63.24	925
2004	77.38	3.04	2.28	0.76	13.12	3.42	0.00	19.58	526	62.22	845
2005	75.15	2.74	1.76	1.57	14.09	4.11	0.59	22.11	511	66.36	770
2006	74.02	3.74	2.43	2.06	14.02	3.74	0.00	22.24	535	63.02	849
2007	75.66	2.45	1.02	1.84	15.13	3.89	0.00	21.89	489	57.60	849
2008	72.14	2.59	2.59	2.81	15.33	4.32	0.22	25.27	463	60.92	760

2.2.5 Roadside drink driving surveys

Both roadside breath alcohol surveys and random breath testing operations provide a useful measure of the distribution of drivers’ BAC levels. Information from roadside surveys is particularly useful because the surveys are not accompanied by enforcement. No roadside drink driving surveys have been undertaken in South Australia since 1997 (see Kloeden & McLean, 1997).

2.3 Anti-drink driving publicity

Two anti-drink driving campaigns were conducted in 2008. The first campaign in 2008 used two slogans, “You Don’t Know Where. You Don’t Know When” and “Catch You Later”. The campaign ran for just over a month, beginning in early March. It was designed to increase public awareness that drivers can be randomly breath tested by police anywhere at anytime, even if they are only travelling a short distance. The risk of losing your drivers licence and the impact this would have on lifestyle, work and family life was highlighted. The importance of responsible drinking and planning appropriate transport after drinking was also emphasised. The primary target audience included drivers aged 16 to 39 years old and was skewed towards males. The secondary target audience included all drivers above the age of 40.

A television commercial from interstate was adapted for South Australia and focused on building a “sense of paranoia” around drink driving. The commercial depicted a driver becoming aware that he could be breath tested anywhere at any time. Radio advertisements reinforcing the campaign slogan were broadcast on youth skewed stations, predominantly Thursday night, Friday night and Saturday morning. An online advertisement appeared on AFL.com and hotmail.com towards the end of the week. Images from the television commercial were used on buses in the metropolitan area. Bathroom advertising promoting the television advert were distributed through pubs and clubs in metropolitan and rural areas. Urinal stickers were used only in the metropolitan area.

The second campaign that ran in 2008 used the slogan “Everyone Hates Drink Drivers”. The campaign was designed to reflect society’s anger towards those who drink drive and emphasise that they belong to a group that is marginalised and seen as undesirable. It was hoped that this would shift drink drivers away from weighing up the risk versus the reward to considering how their actions reflect on them and cause society to reject them, regardless of the consequences. The primary target audience was 20 to 39 year old males and the secondary target audience was 40 to 55 year old males. Both the primary and secondary target audiences were skewed towards people in rural areas.

A television commercial was produced that demonstrated the social disapproval associated with drink drivers. Billboards were used in the CBD and wider metropolitan area reinforcing the campaign slogan. Posters and complimentary stickers were placed in the bathrooms of pubs and clubs. Banner advertisements were placed on websites with a link to a dedicated drink driving page on the Motor Accident Commission website with a forum for public debate. Text messages were sent to the mobile phones of a dance music radio station’s subscribers.

The campaign was run over two phases in 2008. Each phase ran for about a month, the first beginning in mid September and the second in early December.

In 2008 an estimated $711,198 was spent on anti drink driving advertising, an increase of 17 per cent from the last reported campaign costs in 2007 ($605,911, see Wundersitz & Baldock, 2009). The 2008 production costs were slightly lower ($239,051) than the previous year ($261,413) and so the increased expenditure on anti drink driving publicity was due to extra spending on media.

3 Drug driving

3.1 Drug driving enforcement and operations

Victoria was the first jurisdiction in the world to introduce legislation for the random drug screening of drivers in December 2004. The legislation made it an offence to drive with any level of methylamphetamine (MA, 'speed', 'ice', 'crystal meth') or Delta-9-tetrahydrocannabinol (THC, the active component of cannabis) in the blood or saliva. In September 2006, methylenedioxymethamphetamine (MDMA, ecstasy) was added to the Victorian legislation (Boorman, 2007).

Random roadside saliva testing is now conducted in most states in Australia (see Table 3.1). It is carried out to detect recent drug use, rather than driver impairment. That is, in Australia, a 'zero tolerance' approach is used, whereby no amount of the drug tested for is allowed to be present.

Table 3.1
Chronology of introduction of random roadside drug testing legislation in Australian jurisdictions

Australian jurisdiction	Year legislation introduced
Victoria	December 2004
Tasmania	July 2005
South Australia	July 2006
New South Wales	December 2006
Western Australia	October 2007
Queensland	December 2007

In South Australia, random drug testing of drivers for THC and methylamphetamine began in July 2006. MDMA was added later to the legislation in September 2006. Any driver in South Australia may be required to undertake a random roadside saliva test, and this includes the passenger acting as a 'qualified supervising driver' for a learner driver. Random drug testing sites are set up similarly to static RBT sites but signage clearly states that drug testing is being undertaken. Some drug testing sites are random while others are more targeted, selected on the basis of crash data or the area being known to have a drug problem.

Random drug testing is combined with breath testing for alcohol. Therefore, drug testing can occur anywhere and at anytime where breath alcohol testing is permitted. The drug testing procedure begins after a driver has provided a sample of breath for an alcohol test. The procedure for drug testing itself occurs in three stages. Drivers are required to complete a saliva screening test which involves licking an absorbent swab until the saliva sample is collected. The sample is screened at the roadside by the Securetec Drugwipe II Twin device while the driver is still seated in their car. This process takes approximately 5 minutes. If the first test is positive, the driver is required to leave their vehicle to accompany police for further testing in the drug truck or police station. At this stage, the driver will be required to undertake a second oral fluid test using the Cozart Drug Detection System. Finally, if positive results are recorded on this second test, the oral fluid is divided into two separate portions and a sample is submitted to the Forensic Science Centre for further laboratory analysis. The total process takes approximately 30 minutes.

Results from the laboratory analysis take approximately two weeks to obtain. If the results confirm the presence of THC, methylamphetamine or MDMA, police will charge the driver on the basis of driving with ‘a prescribed drug (THC or methylamphetamine or MDMA) in oral fluid or blood’. All saliva and blood samples are destroyed after prosecution proceedings are completed.

Drivers who test positive for THC or methylamphetamines are advised by police not to drive until the drug is no longer detectable in their system (up to 5 hours for THC and up to 24 hours for methylamphetamines and MDMA). If the driver is alone, police will assist in arranging alternative transport. All drivers who test positive are given a driver direction notice that directs them not to drive based on suspicion about their fitness to drive (Section 40(k), Road Traffic Act). Violation of the driver direction notice incurs a maximum fine of $5000.

Drivers found with a prescribed drug in oral fluid or blood are given increasing court based penalties based on whether the offence is a first, second, third or subsequent offence within a prescribed period of five years. In 2008, drivers incurred three demerit points and received a $313 expiation fee. Alternatively, they could elect to go to Court and dispute the fee but risk receiving a higher court fine if they lost the case. For a first offence the court fine ranged from $500 to $900. Second offence court imposed penalties included a $700 fine (minimum) and a licence disqualification of not less than six months. Drivers committing a third offence received a $1100 court fine and licence disqualification of not less than 12 months. All subsequent offending drivers received the same fine and a licence disqualification for 24 months. On 1 July 2008 the expiation fee for driving with a prescribed drug increased to $420 and all demerit points for this offence increased from three to four. Police acknowledge that most offenders elected to pay the expiation fee.

Under the current legislation, a driver who is pulled over for a random roadside saliva test is required to undertake the test, with penalties applied for refusal. In 2008, if it was the driver’s first offence and he/she failed to undertake the test, a fine of $500, six demerit points and a court imposed licence disqualification of not less than six months were applied. Second and subsequent offences involved a fine of $1100 and licence disqualification for not less than 24 months.

During 2007 random roadside drug testing was conducted by a group of 13 traffic police, who were specifically trained to conduct driver drug testing full time. One truck was dedicated to drug testing throughout South Australia. In 2008, roadside drug testing operations were expanded significantly with a testing target set at 40,000 tests for the financial year 2008/2009. An integral part of this expansion was decentralisation. Approximately 260 traffic enforcement members from LSA’s throughout South Australia were trained to conduct drug testing from February to October 2008. The core group of 13 specialist drug testers continued to monitor and oversee drug testing operations by providing training and extra resources when needed. The Traffic Support Branch was responsible for providing LSA’s with testing targets but it was the responsibility of individual LSA’s to determine where, when and how the testing was undertaken.

A corporate traffic operation ‘Operation Consequence’ specifically targeted drug/drink drivers in February and August/September 2008.

3.1.1 Number of tests performed

Based on data from SAPOL, the following sections explore drug driving in terms of levels of random roadside drug testing and confirmed detections. Table 3.2 shows the number of random drug tests conducted in South Australia from 2007, the first calendar year for which 12 months of data were available, to 2008. In 2008, the total number of drivers drug tested doubled that of the previous year, equating to approximately 2.4 per cent of licensed drivers. A greater number of tests were undertaken in the metropolitan area (79%) than in rural regions, consistent with the previous year.

Table 3.2
Number and percentage of licensed drivers drug tested in South Australia, 2007-2008

Year	Metro	Rural	Total	No. of licensed drivers	% of licensed drivers tested
2007	9,753	2,575	12,328	1,073,103	1.15
2008	20,505	5,384	25,889	1,085,503	2.38

DAY OF WEEK

Table 3.3 shows the number of drug tests performed on each day of the week as a percentage of all tests in 2008. Generally, the greatest proportion of testing was performed on weekends. While this trend was evident in both metropolitan and rural areas, testing was more evenly distributed throughout the week in the metropolitan area.

Table 3.3
Drug tests performed by day of week, 2008 (expressed as a percentage of total tests each year)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Metro	12.9	14.9	11.9	13.6	10.2	18.4	18.0
Rural	12.8	8.5	11.4	10.2	16.1	25.4	15.6
Total	12.9	13.6	11.8	12.9	11.5	19.8	17.5

TIME OF DAY

The distribution of drug tests by time of day, as shown in Table 3.4, indicates that drug testing in 2008 was predominantly conducted from 10am to 10pm. Very little drug testing was conducted in rural areas at night and in the early hours of the morning (i.e. 10pm to 6am).

Table 3.4
Drug tests performed by time of day, 2008 (expressed as a percentage of total tests each year)

	12-2 AM	2-4 AM	4-6 AM	6-8 AM	8–10 AM	10-12 AM	12-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
Metro	3.0	0.7	0.8	2.1	8.3	16.3	12.6	9.0	13.5	13.2	17.0	3.4
Rural	0.4	0.0	0.7	2.5	8.5	16.0	14.9	18.8	14.7	11.4	9.0	3.1
Total	2.5	0.6	0.8	2.2	8.3	16.2	13.1	11.0	13.8	12.9	15.3	3.4

TESTING BY MONTH

The distribution of drug tests performed by month in 2008 is presented in Table 3.5. Drug testing increased as the year progressed, particularly from August onwards, in both the metropolitan and rural areas. This increase is attributable to the decentralisation and expansion of drug testing operations that began in July 2008.

Table 3.5
Drug tests performed by month of year, 2008 (expressed as a percentage of total tests each year)

Month	Metro	Rural	Total
Jan	4.6	3.2	4.3
Feb	3.1	2.7	3.0
Mar	3.3	3.2	3.3
Apr	2.3	3.5	2.5
May	2.2	9.9	3.8
Jun	7.5	2.0	6.4
Jul	8.5	5.2	7.8
Aug	11.3	14.7	12.0
Sep	11.5	9.9	11.2
Oct	16.1	15.1	15.9
Nov	13.2	17.8	14.2
Dec	16.4	12.8	15.6
Total	100.0	100.0	100.0

3.1.2 Interstate comparisons

Information on the levels of drug testing conducted in other Australian jurisdictions was collected to provide standards with which South Australian practices might be compared. To provide a measure of drug testing levels in different jurisdictions, drug testing numbers are adjusted for population in each jurisdiction. Drug tests per head of population are given in Table 3.6 rather than tests per licensed driver to avoid differences in licensing conditions across jurisdictions. As drug testing is a relatively new enforcement activity, this was the first year that some jurisdictions had testing data for the entire calendar year.

In comparison to other jurisdictions, South Australia conducted the greatest number of tests and also had the highest testing rate per head of population (1.61%), followed by Victoria (0.47%).

Table 3.6
Number of random drug tests conducted in Australian jurisdictions in 2008, as a percentage of population

Jurisdiction	Total	Pop 2007 [a]	% of Pop
South Australia	25,889	1,612,000	1.61
New South Wales	20,333	7,041,400	0.29
Queensland	11,217	4,349,500	0.26
Tasmania	474	500,300	0.09
Victoria	25,005	5,364,800	0.47
Western Australia	9,109	2,204,000	0.41

[a] Source: Estimated resident population data from Australian Bureau of Statistics (2008) *Australian Demographic Statistics, December 2008.* Catalogue No 3101.0.

3.2 Levels of drug driving

3.2.1 Confirmed positive drug detections

As mentioned in Section 3.1, current random roadside drug testing in South Australia is designed to detect three types of illicit drugs: methylamphetamines (i.e. ‘speed’), THC (i.e.

cannabis) and MDMA (i.e. 'ecstasy'). Unlike breath alcohol testing, there are no legal concentration levels for the prescribed drugs. Test results are given as either positive or negative for drugs. The number of confirmed positive drug detections in 2008 by type of drug is shown in Table 3.7. A confirmed positive drug detection refers to a positive drug test result from forensic testing in the laboratory. The results indicate that many drivers tested positive for more than one drug. A total of 166 drivers tested positive for a combination of two of the three prescribed drugs and 18 tested positive to all three drugs. Methylamphetamine was the drug type detected most frequently.

Table 3.7
Confirmed positive drug detections by drug type, 2008

Drug	Detections
Methylamphetamine	202
THC	148
MDMA	18
Combination	166
All prescribed drugs	18
Total	552

DETECTIONS BY SEX

The number of confirmed positive detections for males and females in 2008 is shown in Table 3.8. Around 81 per cent of the confirmed positive detections were for males and this proportion was relatively consistent in metropolitan and rural areas. Note that sex is not recorded for testing data so detection rates could not be calculated. Consequently, these data should be interpreted cautiously because it may be the case that more male drivers were tested.

Table 3.8
Confirmed positive drug detections by sex, 2008

Sex	Metro	Rural	Total
Female	64	16	80
Male	383	89	472
Total	447	105	552

DETECTIONS BY AGE GROUP

Table 3.9 indicates that detections were more prevalent among drivers aged 20 to 49 years, particularly drivers aged 30 to 39 years (not the youngest drivers). Similar to the detection data by sex in Table 3.8, there were no comparable testing data to calculate detection rates among the different age groups and so these findings should be interpreted with caution.

Table 3.9
Confirmed positive drug detections by age group, 2008

Age Group (yrs)	Metro	Rural	Total
0-15	0	0	0
16-19	16	5	21
20-24	69	13	82
25-29	82	15	97
30-39	177	44	221
40-49	89	24	113
50-59	14	4	18
60 +	0	0	0
Total	447	105	552

3.2.2 Detection rates

Drug detection rates provide an estimate of the effectiveness of roadside drug testing. Detection rates, based on the number of drivers detected with an illegal drug per thousand tested, are presented in Table 3.10. In 2008, approximately 21 drivers per 1000 tested were confirmed positive for the illicit drugs tested, a level that is slightly lower than the previous year. There was little variation in the detection rate in metropolitan and rural areas.

Table 3.10
Confirmed positive drug detection rates (per 1,000 tested) in South Australia, 2007-2008

Year	Metro		Rural		Total	
	No. of detections	Detection rate	No. of detections	Detection rate	No. of detections	Detection rate
2007	236	24.20	59	22.91	295	23.93
2008	447	21.80	105	19.50	552	21.32

DETECTION RATES BY DAY OF WEEK

Table 3.11 shows that drug detection rates were relatively consistent across the week but were slightly higher on Thursdays and lowest on Tuesdays. While drug detection rates in the metropolitan area were spread evenly throughout the week, rural detection rates fluctuated, most likely due to the smaller number of tests conducted in rural areas.

Table 3.11
Confirmed positive drug detections per 1,000 tests by day of week, 2008

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Metro	18.89	16.64	21.30	25.44	23.33	23.10	23.55
Rural	16.01	6.55	17.89	36.43	24.17	17.58	17.84
Total	18.30	15.33	20.62	27.25	23.58	21.63	22.49

DETECTION RATES BY MONTH

The distribution of drug detection rates by month is displayed in Table 3.12. Detection rates were higher in February and March and lower during the last three months of the year. Detection rates by month for rural areas are more variable due to the small number of tests and detections.

Table 3.12
Confirmed positive drug detections per 1,000 tested by month of year, 2008

Month	Metro	Rural	Total
Jan	19.23	17.65	18.99
Feb	33.33	27.78	32.30
Mar	26.35	46.24	30.37
Apr	25.42	26.60	25.76
May	33.56	13.11	22.43
Jun	23.96	38.10	24.86
Jul	24.00	21.43	23.65
Aug	24.19	15.13	21.88
Sep	22.90	29.96	24.20
Oct	19.39	19.66	19.44
Nov	15.49	14.61	15.26
Dec	20.26	14.47	19.27
Total	21.80	19.50	21.32

3.2.3 Drug driving in fatal crashes

The number of drivers and motorcycle riders testing positive for illegal drugs in road crashes can also be used as a measure of the effectiveness of roadside drug testing. If motorists were deterred from drug driving, the percentage of crash involved drivers with a positive drug test would be expected to decrease. Positive drug test results for fatally injured drivers from 2000 to 2008 are presented in Table 3.13. Note that drug test data for drivers seriously injured in a crash are not reported due to difficulties with obtaining the data and matching records. A positive result means that a driver has been detected with one or a combination of the three prescribed drugs tested for in random drug testing: methylamphetamine, THC or MDMA.

Similar to BAC levels, positive drug test results are derived from the analysis of blood and are acquired directly from forensic toxicology reports. Drug results are entered into the TARS crash database, manually matched to fatal crashes by name and age of driver, and date of crash. Table 3.13 shows that around 8 per cent of drivers killed in a fatal crash were not tested for the presence of drugs. Of the fatally injured drivers who were drug tested, 20 per cent returned a positive result in 2008. This proportion was slightly lower than previous years.

Table 3.13
Drug test results of fatally injured drivers and riders by location, 2000-2008

	Number of positives			% of tested	Number	
Year	Metro	Rural	Total	positive	tested	Total fatalities
2000	7	10	17	27.0	63	107
2001	8	9	17	26.2	65	88
2002	3	14	17	25.0	68	92
2003	3	6	9	12.3	73	89
2004	13	13	26	29.9	87	100
2005	10	8	18	24.3	74	92
2006	9	8	17	23.6	72	80
2007	3	11	14	25.0	56	66
2008	6	5	11	19.6	56	61

Table 3.14 shows that for the nine-year period recorded, the majority of fatally injured drivers who tested positive for drugs were male.

Table 3.14
Drug test results of fatally injured drivers and riders by sex, 2000-2008

	Males		Females			
Year	N	% of no. tested	N	% of no. tested	Number tested	Total fatalities
2000	16	94.1	1	5.9	63	107
2001	14	82.4	3	17.6	65	88
2002	15	88.2	2	11.8	68	92
2003	7	77.8	2	22.2	73	89
2004	25	96.2	1	3.8	87	100
2005	17	94.4	1	5.6	74	92
2006	17	100.0	0	0.0	72	80
2007	14	100.0	0	0.0	56	66
2008	10	90.9	1	9.1	56	61

3.3 Anti-drug driving publicity

An anti-drug driving campaign was developed in 2008 using the slogan 'If you do drugs and drive you will get caught. That's the reality'. The campaign aimed to increase the perceived risk of being caught by increasing awareness that police have the technology to detect drugs and are actively targeting drug driving. It also sought to inform people that drugs impair a driver's ability to drive safely. The campaign was targeted at drivers aged 20 to 40 years, especially males, and ran for a month beginning in early November.

A television commercial depicted the distorted perception of reality experienced by a drug driver before a police siren brings back the reality of enforcement. Radio advertisements and posters on buses were used to reinforce this message. Print advertisements were placed in street press to target different illicit drugs and informed users of the differing effects associated with them.

A total of $308,333 was spent on the drug driving campaign in 2008, of which $205,000 covered production costs. This campaign will continue into 2009.

4 Speeding

This section explores performance indicators for speed enforcement. Current speed enforcement methods of operation are discussed, followed by an examination of the number of drivers being detected for speed offences. Next, the two primary outcome measures for speed enforcement are investigated: changes in speed-related crashes and covertly measured on-road vehicle speed distributions. Finally, anti-speeding campaigns operating in 2008 are described.

4.1 Speed enforcement practices and levels of operation

Effective speed enforcement is necessary to create high levels of specific deterrence (through high levels of apprehension and punishment) and general deterrence (through the belief in the high likelihood of encountering enforcement). Current theories of speed management in Australia argue that balanced methods of covert and overt, and fixed/static and mobile enforcement are required to deter motorists, both specifically and generally (McInerney, *et al*, 2001; Wundersitz *et al*, 2001, Zaal, 1994). Speed enforcement must also be prolonged and intensive to obtain maximum effect. Furthermore, speed enforcement needs to be supported by regular anti-speeding publicity (Elliot, 1993).

The effectiveness of different speed enforcement programs can vary with the road environment in which they operate. Research evidence suggests that the covert operation of mobile speed cameras reduces casualty crash frequency on arterial roads in metropolitan areas and country towns, and to a lesser extent, on highways in rural areas (Cameron & Delaney, 2006). Hand-held laser guns have been found to reduce casualty crash frequency (but not crash severity) on arterial roads in metropolitan Melbourne (Fitzharris *et al.*, 1999) while mobile radar devices have been found to reduce casualty crashes on rural roads (Goldenbeld & Van Schagen, 2005). Fixed speed cameras have been shown to reduce casualty crashes in black spot areas (e.g. Gains *et al.*, 2003) and reduce travelling speeds on rural freeways (Retting et al., 2008).

Speed cameras (including dual purpose red light cameras) and non-camera operations (i.e., laser devices, hand held radars, and mobile radars in police vehicles) are the two broad types of speed enforcement currently employed in South Australia. The Traffic Intelligence Section of SA Police has provided the following information about speed enforcement operations.

SPEED CAMERA OPERATIONS

Speed cameras were introduced into South Australia in June 1990. The speed cameras are currently operated by the Traffic Camera Unit that is under the command of the Traffic Support Branch. There were 18 mobile speed cameras available for use in 2008 and they were expected to operate for a target of 3,060 hours per month. Two cameras were deployed in rural areas each week. The speed cameras operate from unmarked vehicles to give some degree of anonymity and covertness to the operations but signs may be placed after the location to advise that a camera has been passed to enhance general deterrence effects.

It has been argued (e.g. Rothengatter, 1990) that automatic speed detection devices such as speed cameras, provide no immediate punishment (i.e., the fine arrives in the mail), and consequently reduce the potential deterrent effect of the enforcement. However, the literature suggests that the most important aspect of punishment as a deterrent is the *certainty* of detection, rather than severity or immediacy of sanctions (Homel, 1988; Pogarsky, 2002). Automatic devices that do not cease operating while a ‘ticket’ is being written better achieve this certainty of punishment.

Each day, a list of camera locations is produced by a computer program, based on road crash statistics weighted for the involvement of speed in the crashes. The program can be adjusted to schedule locations that are the subject of speeding-related complaints and locations that are known for high levels of speeding. The locations of some speed cameras (though not precise times of operations) are also provided in advance to a media outlet for publication/broadcasting in return for road safety publicity and support. Some major speed detection operations are also advertised in advance in order to raise the profile of speed enforcement practices.

Red light cameras have the ability to record vehicle speeds in addition to recording the running of red lights at intersections. In dual purpose mode, red light cameras recorded speeding offences from December 2003. Information provided by DTEI indicates that at the beginning of 2008 there were 54 dual purpose red light/speed cameras: 45 in the metropolitan area and 9 in rural regions. There were 44 digital cameras fixed at specific sites and 13 wet film cameras that were rotated between 21 sites. A further 10 cameras began operation in the later half of 2008, all of which were digital cameras placed in the metropolitan area.

NON-CAMERA OPERATIONS

During non-camera operations, the speeds of vehicles are measured and offending drivers are pulled over to the side of the road to be issued a fine. Mobile and hand held radars are used more frequently on open roads, with few operating in the metropolitan area. The numbers of non-camera detection devices used in metropolitan and rural areas during 2008 are summarised in Table 4.1. The number of mobile radars increased in 2008 (there were an additional 92 devices), making them the most common form of non-camera speed detection in South Australia.

Table 4.1
Non-camera detection devices used in South Australia, 2008

Non-camera detection devices	Metro	Rural	Total
Lasers	60	104	164
Mobile Radars	0	219	219
Handheld Radars	0	36	36

The coordination of police operated speed detection is managed by SAPOL Local Service Areas (LSAs). Each LSA Commander is given a target number of hours of speed detection to be performed with an expectation that over a year there will be, on average, a minimum of one hour of activity per instrument, per shift. The State Coordination Group Traffic sets speed detection targets. Police using non-camera devices for speed detection have discretionary power when determining speed limit tolerance levels.

The locations and times of non-camera speed detection activity are determined by the local knowledge of patrol officers and supported by statistical information supplied by intelligence officers. These intelligence officers have access to information on road crashes and the amount of speed detection activity in an area as well as complaints about speeding motorists. A team of motorcycle officers involved in specialist task-force-style operations also spend a significant amount of time on speed detection activity.

4.1.1 Number of hours of speed detection

The total number of hours spent on speed detection in South Australia for both metropolitan and rural areas, using any means, from 2000 to 2008, is depicted in Figure 4.1. The location of the speed detection device determines whether speed detection hours are recorded as metropolitan or rural.

In 2008, the total number of speed detection hours for South Australia increased by approximately seven per cent to the highest level in the recording period (123,236). The increase in speed detection hours was observed in metropolitan (10.3%) and rural areas (3.9%). Note that the hours of operation of dual purpose red light cameras were unavailable and so are not included here, or in any of the following tables.

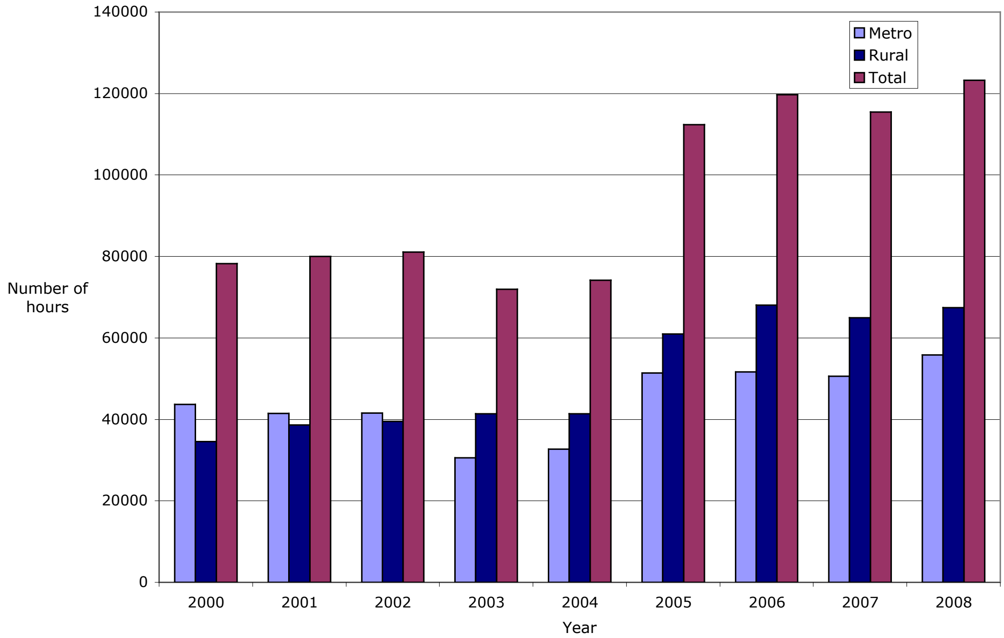

Figure 4.1
Number of speed detection hours in South Australia, 2000-2008

Table 4.2 summarises the hours spent on speed detection for speed cameras only, from 2000 to 2008 in metropolitan and rural areas. Speed cameras were used predominantly in the metropolitan area. The numbers of hours for speed camera operation have remained relatively stable over the past three years. In 2008, the number of hours was similar to the previous year, remaining at a relatively high level. The total exceeds the target number of speed camera detection hours (36,720). While a slight increase was recorded in the metropolitan area (4%) the number of hours in rural regions decreased (12%).

Table 4.2
Number of hours for speed detections by speed cameras in South Australia, 2000-2008

Year	Camera			% difference from previous year
	Metro	Rural	Total	
2000	31,928	4,017	35,945	NA
2001	30,456	4,959	35,415	-1.0
2002	28,972	4,646	33,628	-5.1
2003	18,444	3,551	21,995	-34.6
2004	20,455	4,145	24,600	11.8
2005	25,353	4,680	30,030	22.0
2006	31,103	8,674	39,777	32.5
2007	28,937	9,609	38,546	-3.1
2008	30,051	8,421	38,472	-0.2

In contrast to speed cameras, non-camera devices were used more widely in rural areas (see Table 4.3). Non-camera devices include laser guns, mobile radar and handheld radar. In contrast to the two previous years, the total number of non-camera hours increased (10%) in 2008 to the highest levels seen in the period shown in Table 4.3. An increase in hours was reported in the rural regions (7%) and the metropolitan area (19%).

Table 4.3
Number of hours for speed detections by non-camera devices in South Australia, 2000-2008

Year	Non-Camera			% difference from previous year
	Metro	Rural	Total	
2000	11,726	30,528	42,254	NA
2001	10,968	33,632	44,600	5.6
2002	12,602	34,861	47,463	6.4
2003	12,148	37,847	49,995	5.3
2004	12,271	37,267	49,539	-0.9
2005	26,021	56,261	82,282	66.1
2006	20,556	59,373	79,929	-2.9
2007	21,637	55,316	76,953	-3.7
2008	25,739	59,025	84,764	10.2

DAY OF WEEK

The number of hours spent on speed detection from 2000 to 2008 by day of week is presented in Table 4.4 for speed cameras and in Table 4.5 for non-speed camera devices. Speed detection hours are given in terms of the percentage of all hours undertaken in a year. For both methods of speed detection, the number of hours was spread evenly throughout the week and was relatively consistent from year to year.

Table 4.4
Number of speed detection hours for speed cameras by day of week, 2000-2008
(expressed as a percentage of total hours each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total (%)
2000	13.2	14.6	15.0	14.5	14.2	14.8	13.7	100
2001	13.5	14.2	15.1	14.3	14.6	15.0	13.4	100
2002	13.7	14.5	15.2	14.5	14.0	14.5	13.6	100
2003	14.0	13.8	15.2	15.1	14.0	14.5	13.5	100
2004	13.0	14.9	15.5	15.2	14.5	14.1	12.8	100
2005	14.1	14.7	14.6	14.8	14.3	14.8	12.7	100
2006	13.6	14.1	14.6	15.2	15.0	14.2	13.2	100
2007	14.1	14.1	14.8	14.6	14.8	14.6	13.1	100
2008	13.8	14.6	14.9	14.7	14.1	14.5	13.5	100

Table 4.5
Number of speed detection hours for non-camera devices by day of week, 2000-2008
(expressed as a percentage of total hours each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total (%)
2000	14.2	13.8	12.6	14.3	16.9	15.0	13.4	100
2001	14.2	13.2	12.6	14.0	16.7	15.3	14.0	100
2002	13.7	13.1	13.5	14.5	16.4	15.7	13.1	100
2003	13.2	12.4	12.8	14.9	17.3	16.1	13.3	100
2004	14.4	12.7	13.0	14.2	15.9	15.6	14.2	100
2005	14.4	12.4	11.8	14.4	15.5	16.2	15.2	100
2006	14.1	14.0	13.5	14.8	15.7	14.4	13.5	100
2007	14.1	13.7	14.6	14.5	15.4	14.1	13.6	100
2008	14.0	14.0	14.8	14.8	15.8	13.7	12.9	100

TIME OF DAY

Figure 4.2 displays the speed detection hours (expressed as a percentage of the total hours each year) for all speed detection devices by the time of day, for 2008 and the five year average from 2003 to 2007. There was little variation in the distribution of speed detection hours by time of day each year. The majority of speed detection was conducted from 6am to 8pm. There is a noticeable dip in the distribution of detection hours around lunchtime (12 – 2pm) compared to other times of the day. During 2008 there was a lower proportion of detection hours at night from 8pm to midnight compared to the previous five years.

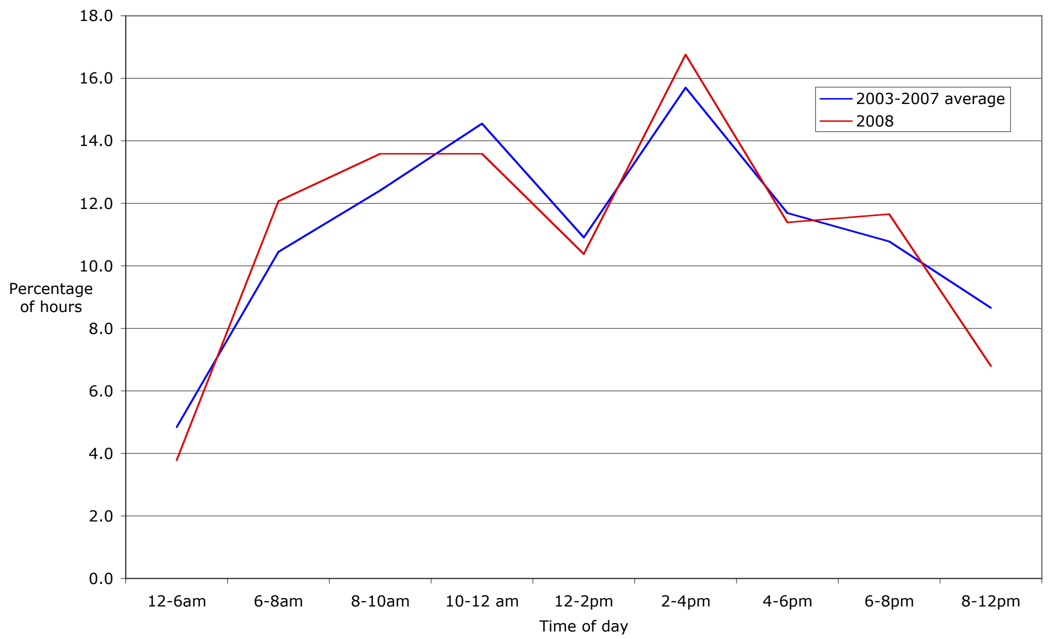

Figure 4.2
Hours spent on speed detection in South Australia by time of day

The distribution of hours spent on speed detection by time of day is presented separately for speed cameras (Table 4.6) and for non-camera devices (Table 4.7). In 2008, the distribution of speed camera hours by time of day was comparable to that in previous years. Speed cameras were operated most frequently during the hours before and after school (i.e. 6 – 8am and 2 – 4pm) and from 6 to 8 pm. They were operated least frequently at night and in the early hours of the morning (8pm – 6am).

Table 4.6
Number of speed detection hours for speed cameras by time of day, 2000-2008
(expressed as a percentage of total hours each year)

Year	Midnight - 6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4 –6 PM	6 –8 PM	8 PM-Midnight
2000	0.8	13.4	14.0	12.9	7.5	18.9	13.8	12.6	6.1
2001	0.1	16.1	14.2	12.7	5.7	18.6	13.1	13.1	6.4
2002	0.1	18.0	14.1	11.7	5.4	18.8	14.4	11.4	6.2
2003	0.2	18.5	13.3	12.5	5.0	18.3	14.8	11.3	6.0
2004	0.2	16.4	13.2	12.8	5.3	18.4	15.1	11.8	6.7
2005	0.4	21.5	9.4	15.0	3.1	24.4	7.9	16.1	2.1
2006	0.1	24.2	6.8	17.7	2.2	25.0	4.3	19.0	0.6
2007	<0.0	26.0	7.9	15.0	1.9	25.7	5.4	17.8	0.4
2008	0.1	24.5	8.6	13.5	1.7	27.1	5.6	18.5	0.7

Non-camera devices were operated predominantly from 8am to 6pm. The pattern of non-camera speed detection hours resembled that of the previous year. Relative to camera operations, non-camera devices were more frequently operated at night and in the early hours of the morning (8pm-6am) but used less frequently between 6 and 8am. The dip in the percentage of hours spent on speed detection between 12 and 2pm, noted in Figure 4.2, was apparent only for speed camera detection, consistent with previous years.

Table 4.7
Number of speed detection hours for non-camera devices by time of day, 2000-2008 (expressed as a percentage of total hours each year)

Year	Midnight-6 AM	6 –8 AM	8 –10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4-6 PM	6-8 PM	8 PM-Midnight
2000	5.3	6.6	11.3	13.0	12.2	12.9	13.7	10.4	14.7
2001	6.0	4.4	13.0	13.2	13.6	12.8	13.7	9.5	13.7
2002	7.2	4.7	12.3	12.3	13.0	13.3	14.4	9.7	13.2
2003	7.4	4.4	12.9	15.1	14.2	12.5	12.3	8.8	8.9
2004	7.2	4.5	12.8	13.3	14.2	12.5	13.5	9.3	12.7
2005	7.2	5.5	13.1	14.7	14.4	11.9	12.4	8.7	12.1
2006	6.3	6.4	15.1	16.3	15.2	12.7	12.0	7.5	8.4
2007	6.1	6.0	15.3	14.9	14.7	11.9	13.4	8.6	9.1
2008	5.5	6.4	15.9	13.6	14.3	12.1	14.0	8.6	9.6

DETECTION HOURS BY MONTH

Table 4.8 shows the distribution of speed detection hours by month for speed camera and non-camera devices in 2007 and 2008. Both speed camera and non-camera devices were operated relatively evenly throughout 2008. Note that the target of 3,060 hours of detection per month for speed cameras was not met in June, July, September, October and November.

Table 4.8
Number of speed detection hours by month for speed cameras and non-camera devices in 2007 and 2008 (expressed as a percentage of total hours each year)

Month	2007			2008		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	8.6	7.5	7.9	9.8	9.3	9.4
Feb	8.1	6.6	7.1	8.4	8.8	8.7
Mar	9.6	8.2	8.7	9.2	10.3	9.9
Apr	9.0	7.8	8.2	8.6	7.4	7.8
May	8.6	7.4	7.8	8.6	6.8	7.4
Jun	7.6	6.7	7.0	7.8	7.0	7.3
Jul	6.3	8.3	7.6	7.4	7.1	7.2
Aug	6.0	9.3	8.2	8.2	8.9	8.6
Sep	8.2	8.8	8.6	7.9	8.7	8.4
Oct	10.1	8.8	9.2	7.4	8.6	8.2
Nov	9.0	9.5	9.3	7.4	8.1	7.9
Dec	8.9	11.1	10.4	9.2	9.1	9.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

4.2 Levels of speeding

4.2.1 Number of speed detections

Table 4.9 presents the number of speed detections, by speed cameras and non-cameras, in South Australia for the years 2000 to 2008. Inspection of the number of speed detections divided by the number of licensed drivers in South Australia indicates that approximately 40 per cent of licensed drivers were detected for a speeding offence in 2008. Note that a new database was used to extract the number of licensed drivers in 2006. Consequently, the percentage of detected licensed drivers from 2006 to 2008 is not directly comparable with previous years.

The total number of detections increased by 30 per cent in 2008. Speed camera detections increased considerably (42%) while non-camera detections increased slightly (9%). Dual purpose red light/speed cameras operated for the first time in December 2003. Data from the dual purpose cameras indicates that the number of speed detections increased by more than 100% from 2004 to 2008 and by 19% in 2008 relative to 2007.

As noted in Section 4.1.1, the number of hours of operation of non-camera devices was greater than the number of hours of operation of conventional speed cameras but the number of drivers detected by non-camera devices was less than a quarter of the number detected by speed cameras. The greater number of detections occurring with speed cameras is most likely attributable to the greater efficiency of cameras. Speed cameras check the speeds of all passing vehicles whereas the operator of non-camera devices selects which vehicles' speeds will be checked. Note also that non-camera devices are used more in rural areas that are characterised by lower levels of traffic density.

Table 4.9
Number and percentage of licensed drivers detected speeding in South Australia, 2000-2008

Year	Number of speed camera detections	Number of red light speed camera detections	Number of non-camera detections	Total number of detections	Number of licensed drivers [a]	% of licensed drivers detected
2000	219,202		40,520	259,722	1,028,083	25.3
2001	226,879		41,105	267,984	1,045,077	25.6
2002	184,765		45,702	230,467	1,046,878	22.0
2003	118,280		50,039	168,319	1,052,030	16.0
2004	118,114	51,127	47,926	217,167	1,072,374	20.3
2005	84,565	51,038	48,171	183,774	1,093,550	16.8
2006	137,370	67,255	46,966	251,591	1,042,774 [b]	24.1
2007	180,866	100,563	44,805	326,234	1,073,103 [b]	30.4
2008	258,198	119,407	48,795	426,400	1,085,503 [b]	39.3

Note. Licence information could only be extracted for the financial year to June 30.

[a] Source: DRIVERS database, Registration and Licensing Section, DTEI

[b] Source: TRUMPS database, Registration and Licensing Section, DTEI

4.2.2 Speeding detection rates

Speeding detection rates provide an indication of the current levels of compliance with speed limits. A lower detection rate may indicate the greater deterrent effectiveness of speed detection methods. However, detection rates may also be affected by speed enforcement operational practices and factors such as locations, volumes of traffic and type of speed detection, as well as exceptional factors such as changes in speed limits. It should be noted that on 1 October 2007 there was a reduction in the speed limit tolerance applied to detections of violations using speed cameras. That is, motorists could be detected as speeding for exceeding the speed limit by a smaller minimum amount than previously. This new tolerance was used throughout 2008.

In this section, speeding detection rates are defined as the number of drivers detected for speeding per hour of enforcement. Table 4.10 summarises speeding detection rates for camera and non-camera devices for metropolitan and rural areas, for the years 2000 to

2008. If the speeding detection rate is interpreted as the level of speeding behaviour, the results suggest that speeding has increased (by 28%) in 2008 but has decreased (by 25%) since the year 2000.

The overall increase in the speed camera detection rate in 2008 of 42 per cent was comprised of increases in both metropolitan (44%) and rural areas (28%). The non-speed camera detection rate remained stable at a relatively low level. These trends are similar to the previous year.

As noted previously, the main reason for this greater detection rate of speed cameras is likely to be their greater efficiency. Speed cameras continuously check speeds of all vehicles and deliver automated punishment via the mail. In comparison, non-camera devices are not capable of checking the speeds of all passing vehicles and it takes time (at least five minutes) for police to pull over and charge speeding offenders when operating these devices.

The metropolitan area reported higher detection rates than rural regions for both methods of detection. The greater volume of traffic in the metropolitan area is probably responsible for the higher detection rate rather than a greater prevalence of speeding. Detection rates based on traffic volumes are examined in Section 4.2.3. Note that the overall difference in detection rates between cameras and non-camera devices may also be partly attributable to the greater number of speed cameras in the metropolitan area where traffic volumes are much greater.

Table 4.10
Speeding detection rates, 2000-2008 (number of drivers detected speeding per hour)

Year	Camera			Non-Camera			Overall
	Metro	Rural	Total	Metro	Rural	Total	Total
2000	6.26	4.79	6.10	1.68	0.68	0.96	3.32
2001	6.67	4.79	6.41	1.67	0.68	0.92	3.35
2002	5.71	4.15	5.49	1.73	0.69	0.96	2.84
2003	5.69	3.77	5.38	1.95	0.70	1.00	2.34
2004	5.08	3.41	4.80	1.87	0.67	0.97	2.24
2005	2.99	1.88	2.82	0.93	0.43	0.59	1.18
2006	3.72	2.50	3.45	1.11	0.41	0.59	1.54
2007	5.13	3.37	4.69	0.93	0.45	0.58	1.95
2008	7.39	4.30	6.71	0.92	0.43	0.58	2.49

DAY OF WEEK

The following tables show detection rates per hour and have been separated by detection method because of the differences in detection rates noted above. Table 4.11 shows that during 2008, speed camera detection rates were at their highest on Friday and Saturday, as was the case in previous years. Speed camera detection rates were at their lowest from Tuesday to Thursday. Rates per day were higher in 2008 compared to 2007, reflecting the overall increase noted in Table 4.10.

Table 4.11
Speeding detection rates per hour for speed cameras by day of week, 2000-2008

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2000	5.66	5.25	6.03	5.42	6.02	7.01	7.32
2001	5.52	5.56	6.05	6.49	6.41	7.45	7.45
2002	6.04	4.73	4.99	4.82	5.19	6.65	6.14
2003	4.88	4.76	4.86	5.04	5.44	6.05	6.71
2004	4.31	4.84	4.22	4.36	4.90	5.69	5.38
2005	2.73	2.58	2.33	2.73	2.86	3.10	3.46
2006	3.24	3.37	3.27	3.53	3.63	3.93	3.15
2007	4.16	4.44	4.18	4.72	5.18	5.43	4.70
2008	6.88	6.39	6.14	6.23	7.23	7.70	6.44

Detection rates for non-camera devices by day of the week from 2000 to 2008 are shown in Table 4.12. Similar to previous years, 2008 detection rates were very consistent across the days of the week.

Table 4.12
Speeding detection rates per hour for non-camera devices by day of week, 2000-2008

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2000	0.97	0.92	0.93	0.91	0.90	0.97	1.15
2001	0.90	0.87	0.86	0.92	0.94	0.92	1.04
2002	0.95	0.95	0.97	0.94	0.93	0.99	1.03
2003	1.00	1.12	1.18	0.88	0.92	0.93	1.06
2004	0.94	0.92	0.97	0.96	0.94	0.99	1.04
2005	0.58	0.59	0.57	0.58	0.57	0.57	0.63
2006	0.60	0.57	0.58	0.57	0.56	0.60	0.64
2007	0.58	0.58	0.57	0.56	0.59	0.57	0.62
2008	0.59	0.59	0.55	0.56	0.56	0.57	0.63

Table 4.13 shows the total detections for dual purpose red light/speed cameras by day of week from 2004 to 2008 (detections per hour could not be calculated). In 2005 and 2006, motorists were much more likely to be detected speeding by red light cameras on weekdays than during the weekend although there were a large number of detections for which day of week was unknown. In contrast, during 2007 and 2008 there were more red light camera speed detections on weekends than weekdays. Note that detection data are difficult to interpret without data for hours of operation.

Table 4.13
Speeding detections for red light/speed cameras by day of week, 2004-2008

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2004	6,650	6,061	6,380	6,359	7,312	9,335	9,030
2005	7,691	7,974	8,024	8,339	7,467	756	18
2006[a]	10,879	10,675	10,661	10,959	9,521	942	33
2007	12,923	12,609	12,708	12,796	13,637	18,212	17,678
2008	15,793	14,469	14,861	15,327	16,184	21,322	21,451

[a] Day of week was unknown for 10,769 red light/speed detections

TIME OF DAY

The speeding detection rates for speed cameras by time of day from 2000 to 2008 are presented in Table 4.14. Speed camera detection rates during 2008 were relatively consistent across the day for all but two time periods: 2-4pm, which has a higher detection rate and 6-8pm; which has a lower detection rate. The low number of hours of operation during the early morning may contribute to highly variable detection levels at this time from year to year.

Table 4.14
Speeding detection rates per hour for speed cameras by time of day, 2000-2008

Year	Midnight-6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4-6 PM	6-8 PM	8 PM-Midnight
2000	4.61	7.21	6.25	5.64	6.08	6.90	5.82	5.17	4.56
2001	3.67	7.16	7.42	7.27	6.61	7.76	6.04	3.41	3.34
2002	1.66	5.14	6.26	5.61	5.99	5.91	6.16	3.70	4.74
2003	1.16	5.40	5.70	6.14	5.49	6.56	5.15	3.70	3.16
2004	4.87	4.90	4.55	5.09	4.86	6.15	4.98	3.47	2.73
2005	1.26	3.08	3.30	2.99	2.54	3.37	2.84	1.47	1.26
2006	1.41	3.42	3.21	3.40	3.27	4.82	3.11	2.00	1.64
2007	9.75	4.83	4.17	4.35	3.71	6.54	4.05	2.65	3.54
2008	7.43	7.27	5.64	6.14	5.00	9.23	6.21	3.64	6.32

Table 4.15 shows the speeding detection rates for non-camera devices by time of day for the years 2000 to 2008. In 2008 detection rates with non-camera devices were highest from 8pm to 6am. The large change in detection rates at these times of day from previous years suggests that there is a high degree of variability due to the low number of hours of operation during these times.

Table 4.15
Speeding detection rates per hour for non-camera devices by time of day, 2000-2008

Year	Midnight-6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4-6 PM	6-8 PM	8 PM-Midnight
2000	0.88	0.97	0.95	0.94	1.05	0.91	0.94	0.99	0.96
2001	0.55	1.08	0.95	0.94	0.91	0.79	1.08	1.04	0.88
2002	0.69	1.01	1.01	1.00	1.00	0.83	1.05	1.05	0.96
2003	0.71	1.17	1.13	0.94	0.91	1.06	1.14	1.00	0.97
2004	0.62	1.09	1.06	0.97	0.93	0.85	1.18	1.01	0.93
2005	0.35	0.66	0.67	0.59	0.57	0.52	0.72	0.58	0.54
2006	0.35	0.59	0.61	0.59	0.54	0.56	0.73	0.62	0.62
2007	0.36	0.58	0.63	0.59	0.55	0.54	0.72	0.56	0.56
2008	0.81	0.59	0.63	0.59	0.56	0.56	0.72	0.56	0.82

The numbers of speeding detections for red light cameras by time of day from 2004 to 2008 are presented in Table 4.16. Detections were highest during the day between 10am and 4pm but these data are difficult to interpret without data for hours of operation.

Table 4.16
Speeding detections for red light/speed cameras by time of day, 2004-2008

Year	Midnight-6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4-6 PM	6-8 PM	8 PM-Midnight
2004	8,713	4,948	4,612	4,810	5,298	4,714	4,843	5,288	7,901
2005	7,308	4,974	5,099	5,492	5,831	5,782	5,018	5,043	6,491
2006	7,540	5,860	7,022	8,470	9,038	8,343	7,065	6,344	7,567
2007	11,707	8,891	10,178	12,192	13,204	12,741	10,972	9,249	11,429
2008	12,286	10,043	12,420	14,538	15,756	15,252	13,656	12,142	13,314

DETECTION RATES BY MONTH

The speeding detection rates by month for speed cameras and non-camera devices for 2007 and 2008 are shown in Table 4.17. Detection rates for cameras increased in October 2007 and have remained around this level throughout 2008. The most likely explanation for this is the reduction of the speeding tolerance at the beginning of October 2007.

Table 4.17
Speeding detection rates per hour by month
for speed cameras and non-camera devices, 2007 an008

Month	2007			2008		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	3.55	0.54	1.63	7.32	0.59	2.77
Feb	4.06	0.59	1.91	7.29	0.61	2.64
Mar	3.99	0.55	1.82	7.18	0.63	2.53
Apr	3.48	0.57	1.64	6.54	0.56	2.62
May	3.62	0.55	1.68	5.87	0.53	2.47
Jun	3.65	0.56	1.69	6.19	0.55	2.45
Jul	3.57	0.61	1.43	7.27	0.54	2.71
Aug	3.95	0.61	1.43	6.35	0.54	2.26
Sep	3.68	0.62	1.60	7.18	0.60	2.52
Oct	6.51	0.63	2.77	7.04	0.57	2.40
Nov	7.69	0.57	2.87	6.18	0.56	2.20
Dec	7.41	0.57	2.52	6.06	0.59	2.31
Total	4.69	0.58	1.95	6.71	0.58	2.49

4.2.3 Speed camera detection rates per 1,000 vehicles passing

Variations in speed detection rates per hour may be attributed to changes in traffic volume. Traffic volume is an important consideration, particularly when comparing the detection rates of high volume metropolitan streets with low volume rural roads. Speed cameras record the actual number of vehicles passing each camera detection point. To determine whether the higher detection rates in metropolitan areas may be attributed to greater traffic volumes, in this section speed detection rates are calculated based on the number of speeding vehicles per 1,000 vehicles recorded passing the detection point. Equivalent data were not available for non-speed camera devices.

Speeding detection rates per 1,000 vehicles passing a speed camera for the years 2000 to 2008 are shown in Table 4.18. Consistent with detection rates per hour of speed enforcement, detection rates per vehicle passing increased in 2008 (by 68%) to the highest level recorded in the Table. These results could indicate much higher levels of speeding in

2008 but it is likely that the increase in detections reflects the reduction in the speed limit tolerance.

Detection rates per vehicle passing are higher in rural regions than in the metropolitan area, suggesting a greater prevalence of speeding in rural areas. This could be due to a number of factors, including lower traffic volumes in rural areas allowing for a greater opportunity for drivers to freely choose their own travelling speed or a lower perceived risk of being detected. The substantial increase in the detection rate per vehicles passing was twice as great in the metropolitan area (71% increase) than in rural areas (34% increase).

Table 4.18
Number of vehicles passing speed cameras and speeding detection rates (per 1,000 vehicles passing), 2000-2008

Year	Metro		Rural		Total detection rate
	No. of vehicles	Detection rate	No. of vehicles	Detection rate	
2000	18,167,492	11.01	847,851	22.68	11.53
2001	17,048,361	11.91	1,017,770	23.35	12.56
2002	15,262,875	10.84	975,159	19.78	11.38
2003	9,354,235	11.21	751,501	17.80	11.70
2004	10,009,446	10.40	789,065	17.92	10.94
2005	9,847,889	7.69	792,058	11.13	7.95
2006	12,094,519	9.57	1,342,133	16.14	10.22
2007	12,018,107	12.35	1,603,790	20.22	13.28
2008	10,528,044	21.09	1,336,892	27.07	21.76

Speeding detection rates per 1,000 vehicles passing by day of week and time of day for speed cameras in the years 2001 to 2008 are shown in Table 4.19 and Table 4.20 respectively. In 2008, higher speeding detection rates were recorded on weekends, a finding generally consistent with previous years. With respect to the time of day, there was no discernable pattern. In contrast to all but the previous year, detection rates were quite high from midnight to 6am. Note that in these early hours of the morning, speed cameras operated for a short period of time in metropolitan areas only.

Table 4.19
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by day of week, 2001-2008

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2001*	11.39	11.11	11.52	12.85	12.37	14.14	14.80
2002*	12.69	9.95	10.24	9.84	10.33	13.85	13.11
2003	11.18	9.88	10.43	10.21	11.68	14.10	15.20
2004	9.80	10.65	9.54	10.09	10.76	13.34	12.86
2005	7.63	6.94	6.65	7.72	7.49	9.07	10.84
2006	9.60	9.33	9.54	9.57	9.90	12.95	11.48
2007	11.66	12.07	11.08	12.48	12.95	18.60	15.94
2008	22.28	19.60	17.86	19.66	21.59	29.02	24.88

*Data unavailable but rates calculated using data for other variables

Table 4.20
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by time of day, 2001-2008

Year	Midnight-6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon-2 PM	2-4 PM	4-6 PM	6-8 PM	8 PM-Midnight
2001*	9.25	14.21	14.26	11.75	13.59	13.16	11.70	9.50	8.88
2002*	15.80	11.13	13.29	9.93	11.79	10.18	12.10	10.85	11.56
2003	5.71	11.49	13.30	11.25	12.69	11.49	11.46	11.21	11.43
2004	7.47	11.75	11.46	10.11	10.04	11.66	11.00	10.14	8.87
2005	10.27	8.99	10.15	7.50	8.60	7.59	7.65	6.12	6.52
2006	6.97	10.21	12.21	9.40	15.38	10.66	9.92	9.03	9.57
2007	90.59	13.72	16.63	11.22	18.97	14.13	13.22	10.71	16.05
2008	81.70	22.84	23.26	17.21	22.60	24.68	23.62	16.39	25.64

*Data unavailable but rates calculated using data for other variables

Figure 4.3 shows speed detection rates per 1,000 vehicles passing by month of the year for the years 2004 to 2008. There is no discernable pattern across the five years. Consistent with detection rates per hour, the detection rate in 2008 remained at the higher level first observed in October 2007, when the speeding tolerance was reduced for all speed cameras.

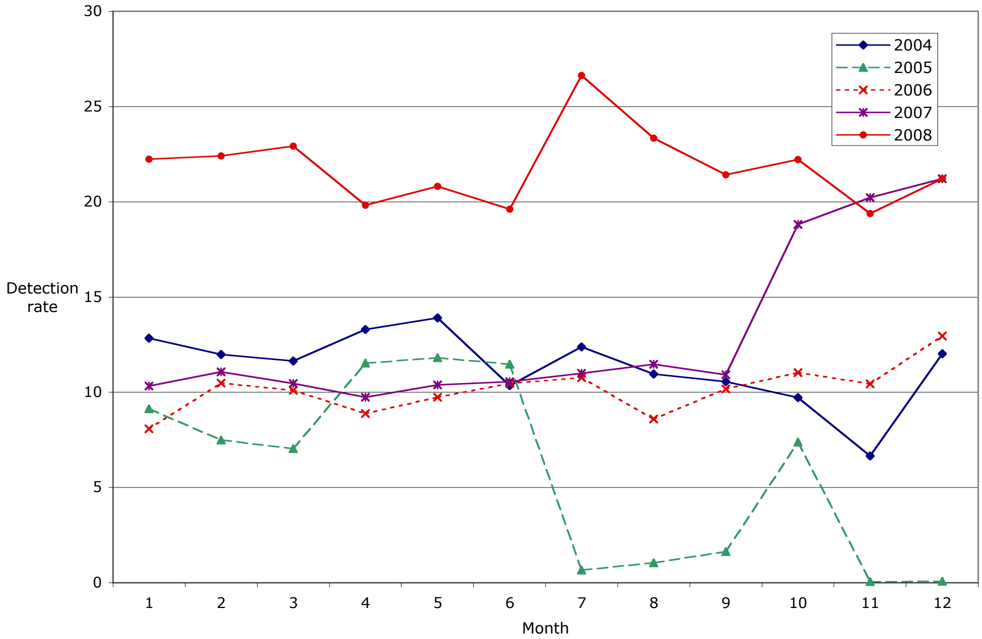

Figure 4.3
Speed camera detection rate (per 1,000 vehicles passing) in South Australia by month, 2004–2008

4.2.4 'Excessive speed' as the apparent error in serious and fatal crashes

The effectiveness of speed enforcement may be estimated by the involvement of 'excessive speed' in crashes. In the DTEI TARS database, one driver in each crash is assigned a single 'apparent error' indicating what the police reported as the primary error made by the driver. In a multiple vehicle crash only one driver is assigned an apparent error. One of these possible apparent errors is 'excessive speed'. Drivers do not typically readily admit to police that they were travelling at an excessive speed at the time of the crash. This means that crash-involved vehicles will only be classified with an apparent error of 'excessive speed' when there are reliable witnesses to excessive speed or when excessive speed is clearly indicated by vehicle damage or tyre marks. The apparent error of 'excessive speed' is therefore an underestimate of speeding in crashes and probably represents only cases of very high speeding rather than speeding in general. Fatal crashes involving more than one vehicle are usually investigated to a greater extent (i.e. by specially trained police) than less severe crashes. However, illegal speed is still unlikely to be listed as the sole apparent error unless it is clearly excessive and considered to be more important than other factors.

'Excessive speed' was listed as the major driver error in approximately six per cent of fatal crashes and 1.5 per cent of serious injury crashes in 2008. The small number of fatal crashes and the issues mentioned above make it hard to draw any real conclusions about the involvement of speed in these crashes. In any case, these are likely to be underestimates of the percentage of speed related crashes. Given that the involvement of speeding in crashes cannot be determined directly from police crash records, the NSW Roads and Traffic Authority developed a set of criteria for determining whether or not a crash is considered as having involved speed as a contributing factor (NSW Centre for Road Safety, 2008). Using the NSW Road Traffic Authority definition[1], DTEI determined that 36 per cent of fatal crashes in 2008 could be considered as involving speed as a contributing factor. Of these crashes, 58% were in the Adelaide metropolitan area and the remaining 42% were in rural areas. The majority of the drivers deemed at fault in these speed related crashes were male (87%).

4.2.5 On-road speed surveys

Speed monitoring independent of enforcement activities provides an indication of what travelling speeds motorists are adopting on the road network. This is of critical importance if we are to determine if our current approach to speed countermeasures is effective. As mentioned in previous reports, the systematic monitoring of speeds is not widespread in Australia.

A systematic and ongoing method of measuring vehicle speeds was introduced in South Australia in 2007 to assess the effects of speed reduction countermeasures and to monitor the speed behaviour of South Australian motorists over time. The collection of speed data at 130 sites (includes sites with historical measurements and new sites) is described by Kloeden and Woolley (2010) in the CASR report "Vehicle speeds in South Australia 2008". Speed data were collected for one week in 2008 at each of the selected sites and summary volume, speed statistics and speed distributions were analysed for each of the road types surveyed. Sites were located in metropolitan Adelaide and in rural regions.

To summarise the Kloeden and Woolley (2010) report, in 2008 all road types showed a reduction in travelling speeds with the exception of 80 km/hr arterial roads in the Adelaide metropolitan area. The average reduction in speed across all roads surveyed was 0.76 km/hr relative to 2007. For further details, see the full report.

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[1] A motor vehicle is assessed as having been speeding if it satisfies the conditions described below:
(a) The vehicle's controller (driver or rider) was charged with a speeding offence; or the vehicle was described by police as travelling at excessive speed; or the stated speed of the vehicle was in excess of the speed limit.
(b) The vehicle was performing a manoeuvre characteristic of excessive speed, that is: while on a curve the vehicle jack-knifed, skidded, slid or the controller lost control; or the vehicle ran off the road while negotiating a bend or turning a corner and the controller was not distracted by something or disadvantaged by drowsiness or sudden illness and was not swerving to avoid another vehicle, animal or object and the vehicle did not suffer equipment failure.

4.3 Anti-speeding publicity

A major role of anti-speeding publicity is to support enforcement activities. Research suggests that anti-speeding television advertising at moderate intensity with supporting enforcement can reduce on-road speeds (e.g. Woolley, Dyson & Taylor, 2001). Two anti-speeding campaigns occurred in 2008.

The '5k's Slower' campaign developed in 2007 attempted to change the perception that driving a small amount over the speed limit is not dangerous. It also attempted to refocus the consequences of speeding on the injury outcomes rather than being caught by the police. The campaign also sought to demonstrate that the amount of time saved by speeding 5 to 10km/hr over the speed limit is minimal. The target audience was young drivers, especially males. Motorcyclists were also included in the target audience.

A television commercial from Victoria was adapted for use in South Australia. The advertisement focused on the injury outcomes of a crash when driving 5km/hr over the speed limit. The television commercial also appeared in metropolitan and rural cinemas. Radio advertisements and billboards were used to reinforce the message. Print advertisements featured in the Stock Journal to ensure rural coverage while bus shelters and the backs of buses were designed to target metropolitan drivers. Online advertisements reflecting those used on the bus shelters, buses and billboards were placed on various sites including ninemsn messenger and hotmail.

The campaign was implemented in three periods, two of which occurred in 2008. The first commenced in early February and the second commenced in early April, each lasting for approximately a month.

The new campaign that was developed in 2008 was known as 'Creepers'. This campaign also focused on low level speeding. The main objective was to inform low level speeders that travelling at any speed above the legal speed limit is speeding and can be harmful. It also attempted to get drivers to slow down by concentrating on driving at or below the legal speed limit. The target audience was 16 to 29 year olds, especially males.

Teaser television commercials were used in the week proceeding the official start of the campaign that used statements such as 'There are creepers amongst us' coupled with graphic visuals of the potential injury outcomes to a 'creeper'. The full length television commercial also used real crash footage, some graphic, to emphasise the reality of the injury outcomes of low level speeding. Radio advertisements were aired at times when the target audience was most likely to be driving and directly asked the driver if they were 'creeping' and prompted them to check their speed. Messages on bus shelters and the backs of buses were used to reach metropolitan drivers and billboards were used to reach rural drivers. In addition to the standard advertisements on the back of buses, advertisements that covered the whole rear of a bus were developed to look like a 'creeper' had crashed into the back of the bus. Six videos were placed on Youtube and disseminated through e-mail that used real crash footage on recognisable South Australian roads to demonstrate the real life consequences of 'creeping'.

The campaign officially started in early October 2008. It was implemented in three periods, each lasting for a month. Only the first period occurred in 2008.

In total, $1,074,619 was invested in anti-speeding advertising in 2008. This was a 55 per cent increase in expenditure from 2007 ($695,248, Wundersitz & Baldock, 2009). The increase in costs can be attributed to both increased production and media costs. Of the total advertising costs in 2008, $745,654 was spent on media and $328,965 on production.

5 Restraint use

The following section investigates the operations and effectiveness of restraint enforcement by examining restraint-related offences detected by police, restraint use in fatal and serious casualty crashes, and publicity promoting restraint use.

5.1 Restraint enforcement practices and levels of operation

Vehicle occupant restraint (or seat belt) usage has been shown to be effective in reducing serious and fatal injuries in the event of a crash (ETSC, 1996). Restraint usage is strongly influenced by legal requirements and enforcement practices. South Australia introduced the legislation for the compulsory use of restraints in 1971.

Similar to drink driving and speeding behaviour, the effects of restraint use enforcement can be optimised when combined with information or publicity campaigns (Gundy, 1988). The most effective way of increasing restraint usage is through intensive, highly visible and well-publicised enforcement (ETSC, 1999). Long-term effects were observed when this so-called ‘blitz’ approach incorporated high levels of enforcement over a short period, usually one to four weeks, repeated several times a year.

Restraint enforcement is similar to speeding enforcement as it is regarded as an on-going activity throughout the year in South Australia. The detection of restraint non-wearing relies mainly on traffic patrol observations but the restraint use of vehicle occupants may also be checked when a driver has been detected for any traffic offence or when the vehicle has been involved in a road crash. On 1 March 2008, legislation came into effect making a driver of a vehicle legally responsible for the restraint use of all their passengers, regardless of age. Previously a driver was only legally responsible for the restraint use of passenger aged less than 16 years. The driver is responsible for ensuring that seat belts are available and fit for use. Police conducted a corporate traffic operation that specifically targeted non-restraint use during March in 2008 to coincide with the introduction of the new laws.

Similar to previous years, no specific information was available on the hours spent by police exclusively targeting restraint use in 2008. Consequently, this section will provide details of restraint offences, restraint use among vehicle occupants involved in road crashes, and spending on advertising promoting the use of restraints.

5.2 Levels of restraint use

5.2.1 Restraint non-use offences

There are eight types of restraint-related offences. Table 5.1 displays the frequencies of these offences from 2001 to 2008. The last three offences listed are the driver’s responsibility by law. In 2008, there was a 26 per cent increase for the total number of restraint offences detected, resulting in the highest number of restraint offences detected in the past eight years. Part of this increase may be due to the new offence of the driver failing to ensure passengers over the age of 16 are restrained but there was still an increase in offences after accounting for this new offence. Note that a passenger over 16 years of age can also incur an offence if unrestrained and so multiple offences can be generated from a single event.

Failure to wear a seat belt adjusted and fastened properly has been the most common restraint offence involving the driver from 2001 to 2008. The new offence of ‘failure to ensure passenger over 16 wears seatbelt' contributed 4.6 per cent of the total restraint offences. Over three per cent of offences in 2008 involved a failure to ensure that children under the age of 16 years were wearing seat belts. Some of the other restraint offence types may have included children, so it is likely that the true number of offences involving unrestrained children is higher. All types of restraint offences are aggregated in the subsequent tables.

Table 5.1
Restraint offences and detections, 2001-2008

Offence (%)	2001	2002	2003	2004	2005	2006	2007	2008
Fail to wear seatbelt properly adjusted & fastened (driver)	85.8	85.6	83.5	85.7	85.4	85.6	84.3	77.0
Fail to wear seatbelt properly adjusted & fastened (passenger)	10.3	10.3	11.0	10.0	9.7	9.8	9.9	11.1
Fail to occupy seat fitted with a seatbelt	0.3	0.1	0.1	0.2	0.1	0.1	0.3	0.3
Sit in front row of seat when not permitted	<0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1	<0.1
Fail to ensure front row passenger properly restrained	0.8	0.8	1.6	0.2	0.8	0.5	0.6	1.0
Fail to ensure child under 1 year restrained	0.3	0.3	0.4	0.5	0.6	0.5	0.7	0.6
Fail to ensure child under 16 wears seatbelt	2.6	2.8	3.3	3.4	3.4	3.5	3.9	2.5
Fail to ensure passenger over 16 wears seatbelt	-	-	-	-	-	-	-	4.6
Total (N)	10,273	10,127	10,963	9,237	9,555	10,758	9,346	11,810

Table 5.2 shows restraint offences detected in metropolitan and rural areas from 2000 to 2008. Note that there are an exceptionally large number of unknowns. This is because the data cleansing software is not able to read the suburb and, thus, it is not possible to determine the location of all offences. The number of unknowns in 2008 is less than in 2007 but still much more than in previous years. Consequently, the large number of unknowns makes it difficult to meaningfully compare 2008 data to those of previous years.

Table 5.2
Restraint offences detected by region, 2000-2008

Year	Metro		Rural		Unknown	Total restraint offences detected
	(N)	(%)	(N)	(%)	(N)	
2000	5,079	73.6	1,823	26.4	643	7,545
2001	6,624	70.8	2,739	29.2	910	10,273
2002	6,969	75.8	2,223	24.2	935	10,127
2003	7,660	69.9	3,303	30.1	-	10,963
2004	6,713	72.7	2,524	27.3	-	9,237
2005	5,915	61.9	3,640	38.1	-	9,555
2006	6,514	73.8	2,307	26.2	1,937	10,758
2007	3,675	39.3	1,838	19.7	3,833	9,346
2008	6,777	57.4	2,577	21.8	2,442	11,810

DAY OF WEEK

The distribution of restraint-related offences detected from 2000 to 2008 by day of week, in terms of the percentage of total offences detected each year, is displayed in Table 5.3. The percentage of offences detected on weekends was slightly lower than the percentage of restraint offences detected on weekdays in 2008, consistent with the two previous years.

Table 5.3
Number of restraint offences detected by day of week, 2000-2008
(expressed as a percentage of total offences detected each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total (%)
2000	13.6	12.9	13.4	15.9	15.1	14.8	14.3	100
2001	13.9	13.9	15.3	15.5	14.0	13.9	13.9	100
2002	13.5	14.0	14.4	15.2	15.8	15.9	11.2	100
2003	14.5	14.5	15.2	14.1	13.4	15.3	13.0	100
2004	15.2	14.4	15.5	15.6	14.0	14.0	11.3	100
2005	12.4	15.0	14.8	13.4	15.0	15.1	14.1	100
2006	15.4	15.8	15.5	15.7	13.9	12.9	10.8	100
2007	14.7	14.4	15.7	16.7	15.1	12.2	11.2	100
2008	14.9	14.5	15.3	16.3	15.0	13.4	10.6	100

TIME OF DAY

In 2008, the distribution of restraint offence detections by time of day was similar to that in previous years (see Table 5.4). Restraint offences were detected most frequently during the day between the hours of 8am and 6pm. Restraint offence detections are generally much less common from midnight until 6am although they were more common in 2008 than any previous year recorded.

Table 5.4
Number of restraint offences detected by time of day, 2000-2008 (expressed as a percentage of total offences detected each year)

Year	Midnight –6 AM	6-8 AM	8-10 AM	10 AM-Noon	Noon - 2 PM	2-4 PM	4 –6 PM	6–8 PM	8 PM – Midnight	Total (%)
2000	1.9	2.6	11.1	18.1	17.3	15.3	17.0	8.9	7.8	100
2001	1.7	2.2	11.7	18.9	17.1	14.6	17.9	9.1	6.7	100
2002	1.7	2.3	11.2	17.4	17.6	15.7	20.0	7.7	6.4	100
2003	1.8	2.6	12.8	18.4	16.7	15.2	18.2	8.2	6.0	100
2004	1.6	2.5	11.5	19.4	18.5	15.1	16.9	8.0	6.3	100
2005	Data not available									
2006	1.3	2.4	12.5	20.6	19.3	15.4	17.0	6.8	4.7	100
2007	1.6	2.4	13.4	21.3	18.0	14.2	16.6	7.3	5.1	100
2008	2.6	2.1	12.0	19.3	17.1	15.3	18.2	7.7	5.7	100

RESTRAINT OFFENCES BY MONTH

Table 5.5 shows restraint offences for both metropolitan and rural areas in terms of the percentage of total offences detected in 2008. The effect of the enforcement operation in March that specifically targeted restraint no-use can be clearly seen in Table 5.5: the number of restraint offences in March was approximately double the monthly average. September and October also had a greater proportion of offences than other months, which may suggest a higher level of enforcement in those months.

Table 5.5
Number of restraint offences detected by month in 2008
(expressed as a percentage of total offences detected in the year)

Month	Metro	Rural	Unknown	Total
January	8.1	9.2	8.2	8.4
February	6.9	7.8	5.8	6.9
March	17.1	16.8	17.5	17.1
April	7.5	7.3	7.8	7.5
May	6.0	4.2	7.3	5.9
June	6.1	3.4	5.0	5.3
July	5.5	4.2	4.1	4.9
August	6.3	7.2	5.3	6.3
September	9.7	10.1	10.3	9.9
October	11.5	13.1	11.7	11.9
November	8.0	8.7	7.7	8.1
December	7.3	8.0	9.2	7.9

SEX AND AGE

Table 5.6 displays the detected restraint offences by sex and age for 2007 and 2008. The greatest proportion of restraint offences of all age groups during 2007 and 2008 was recorded for vehicle occupants aged 20 to 29 years. In both years males were almost three times more likely to have been detected for a restraint offence than females. Few data were available for children aged less than 16 years, as the driver of the vehicle is legally responsible for these restraint offences.

Table 5.6
Number and percentage of restraint offences detected by year, sex and age, 2007-2008

	2007						2008					
	Male		Female		Total		Male		Female		Total	
Age	N	%	N	%	N	%	N	%	N	%	N	%
0-15 yrs	2	<0.1	1	<0.1	3	<0.1	1	<0.1	1	<0.1	2	<0.1
16-19 yrs	535	7.8	235	9.8	784	8.4	646	7.6	313	9.9	959	8.1
20-29 yrs	1895	27.7	739	31.0	2668	28.5	2271	26.6	984	31.1	3255	27.6
30-39 yrs	1431	21.0	504	21.0	1964	21.0	1808	21.2	648	20.4	2456	20.8
40-49 yrs	1336	19.6	484	20.0	1838	20.0	1647	19.3	606	19.1	2253	19.1
50-59 yrs	927	13.6	255	10.6	1190	12.7	1226	14.4	370	11.7	1596	13.5
60+ yrs	700	10.3	187	7.5	890	9.5	940	11.0	249	7.8	1189	10.1
Unknown age		-		-	9	<0.1	1	<0.1	2	0.1	3	<0.1
Unknown sex		-		-	113	1.2	-	-	-	-	97	0.8
Total	6826	100.0	2407	100.0	9346	100.0	8540	100.0	3173	100.0	11810	100.0

Unknown age: Date of birth was not recorded or data entry error.

Unknown sex: Age and sex was not recorded or data entry error.

5.2.2 Restraint use by vehicle occupants in serious and fatal crashes

Restraint use by vehicle occupants involved in crashes is often difficult to determine conclusively. In some cases there is no physical evidence such as injuries or scuff marks on seatbelts so police must rely on self-report. The TARS database records restraint use if a vehicle occupant is injured. Restraint use is categorised into seven different groups in the database but they have been condensed into three groups for this report: restraint worn (includes child restraints), restraint not worn (includes child restraints and restraint not fitted) and unknown (restraint is fitted but unknown if worn). The following tables give the number and percentage of restraint use for car occupants seriously or fatally injured in a crash. When calculating these percentages, only car occupants with known restraint use status were considered. In some of the tables in this section, the figures for previous years differ from past reports due to the ongoing updating of data in the database.

Table 5.7 shows the restraint usage for fatally injured vehicle occupants from 2000 to 2008. In 2008, 60 per cent of vehicle occupants in fatal crashes were wearing restraints. This is a considerable drop from 2007 and is the lowest level of restraint use for fatally injured occupants since 2003. Restraint status was known for 87 per cent of all fatally injured vehicle occupants in 2008.

Table 5.7
Restraint usage of fatally injured vehicle occupants, 2000-2008

Year	Restraint worn		Number of known cases	Total occupant fatalities
	(N)	(%)		
2000	52	62.7	83	128
2001*	59	80.8	73	108
2002	49	65.3	75	111
2003	53	55.7	95	121
2004	58	68.2	85	103
2005	58	65.9	88	113
2006	39	65.0	60	78
2007	52	75.4	69	95
2008	36	60.0	60	69

* Data for 2001 differs from the previous report due to the continuous updating of data.

Restraint use for seriously injured vehicle occupants from 2000 to 2008 is presented in Table 5.8. A serious injury is defined as an injury that requires the person to be admitted to hospital but which does not cause the person to die within 30 days of the crash. In 2008, the percentage known to be wearing restraints was 88 per cent but restraint status was reported for only 66 per cent of seriously injured vehicle occupants. Each year, restraint use is higher for seriously injured occupants than for fatally injured occupants.

Table 5.8
Restraint usage of seriously injured vehicle occupants, 2000-2008

Year	Restraint worn		Number of known cases	Total occupants injured
	(N)	(%)		
2000	633	89.2	710	1,230
2001	582	85.1	684	1,232
2002	612	85.2	718	1,188
2003	567	88.1	643	1,126
2004	571	89.6	637	998
2005*	544	86.5	629	986
2006	548	89.3	614	973
2007	580	87.7	661	1,034
2008	496	88.4	561	848

* Data for 2005 differs from the previous report due to the continuous updating of data.

Restraint usage according to the region where the crash occurred for fatally and seriously injured vehicle occupants is presented in Table 5.9 and Figure 5.1. Overall restraint use decreased slightly to 86 per cent in 2008. Injured vehicle occupant restraint wearing rates remained higher for crashes in the Adelaide metropolitan area (91%) than for crashes in rural regions (81%). The discrepancy between the metropolitan and rural restraint usage in 2008 was larger than for any other year presented in Table 5.9.

Table 5.9
Restraint usage of fatally and seriously injured vehicle occupants by region, 2000-2008

Year	Metro Worn		Rural Worn		Total Worn		Total Killed/ Injured
	(N)	(%)*	(N)	(%)*	(N)	(%)*	
2000	303	87.0	382	85.7	685	86.4	1,360
2001	280	87.0	361	83.0	641	84.7	1,340
2002	287	84.9	374	82.2	661	83.4	1,300
2003	297	88.7	323	80.1	620	84.0	1,249
2004	293	90.2	336	84.6	629	87.1	1,101
2005	252	86.6	348	82.1	602	83.9	1,102
2006	287	89.7	300	85.2	587	87.4	1,051
2007	307	88.9	325	84.4	632	86.6	1,129
2008	255	91.4	277	81.0	532	85.7	917

* Percentage of known

Note: Data differs from the previous report due to the continuous updating of data

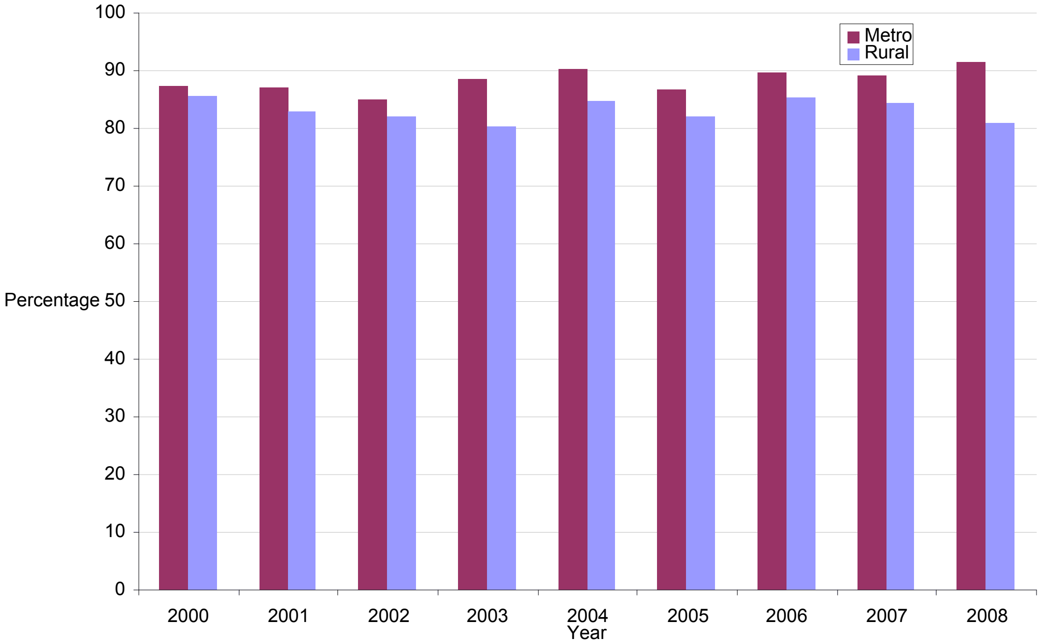

Figure 5.1
Restraint usage of fatally and seriously injured vehicle occupants, by location, 2000-2008

Table 5.10 and Figure 5.2 show the number and percentage of fatally and seriously injured vehicle occupants wearing restraints, by sex. Overall, injured males had lower restraint usage rates than injured females. In 2008, male restraint use was similar to previous years at approximately 81 per cent. Female restraint use was also consistent with previous years at a level of around 91 per cent.

Table 5.10
Restraint usage of fatally and seriously injured vehicle occupants by sex, 2000-2008

Year	Male Worn		Female Worn		Total Killed/ Injured
	(N)	(%)*	(N)	(%)*	
2000	311	80.8	368	91.5	1,360
2001	317	80.9	321	88.7	1,340
2002	351	80.3	309	87.0	1,300
2003	319	81.8	300	89.3	1,249
2004	322	80.7	307	95.0	1,101
2005	318	79.9	284	89.0	1,102
2006	301	83.2	286	92.3	1,051
2007	339	82.3	293	92.1	1,129
2008	263	81.2	269	90.6	917

* Percentage of known

Note: Data differs from the previous report due to the continuos updating of data

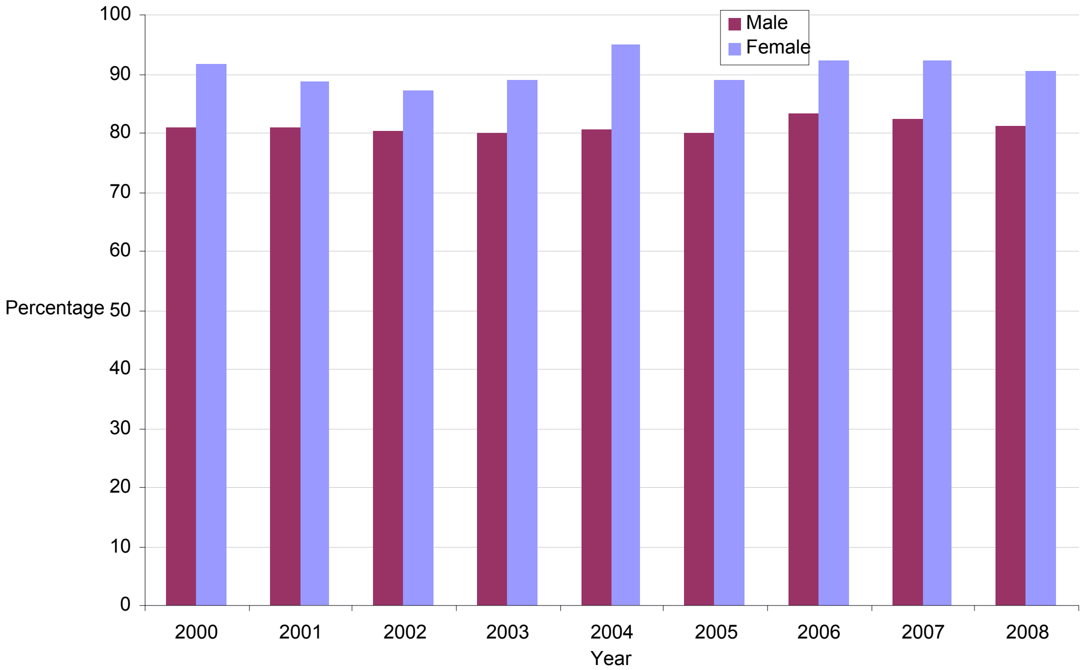

Figure 5.2
Restraint usage of fatally and seriously injured vehicle occupants, by sex, 2000-2008

5.2.3 On-road observational restraint use surveys

On-road observational surveys of restraint use provide another means to measure the effectiveness of restraint enforcement. No observational studies of restraint use were conducted in 2008. Results from previous surveys are described in the 2002 report on annual performance indicators of enforced driver behaviours (Wundersitz & McLean, 2004). A new observational survey was undertaken in 2009, the results of which will be reported in the 2009 annual performance indicators report.

5.3 Restraint publicity

Restraint publicity in 2008 included two phases of the ‘Belt up or you’ll kill someone’ campaign. The campaign aimed to demonstrate the risk of seriously injuring or killing other car occupants when unrestrained and reinforce the penalties that apply to both drivers and passengers if they fail to wear a restraint.

The first phase of advertising was undertaken in January and June. A television commercial originating in the United Kingdom was aired in metropolitan and rural areas. The commercial depicts the injury to other occupants that can be caused by not wearing a seatbelt and was quite graphic in nature. Radio advertisements were played on stations with a youth-oriented audience during the breakfast and drive time slots. Online banner ads were placed on the Whereis website to capture the attention of people who might be planning to travel. Advertising on car park boom gates and elevators were used to capture the attention of drivers prior to entering the roadway. Campaign messages were displayed on the back of buses and bus shelters in the metropolitan area and on billboards in rural areas.

The new seat belt legislation that was introduced in March 2008 prompted the re-running of the ‘Belt up or you’ll kill someone’ campaign to reinforce the objectives of the campaign and the new penalties associated with failing to wear a restraint. A reduced media strategy included the same television commercial, radio advertisements on rural FM stations only and bus shelter advertisements. This additional media phase occurred in August and November.

The total amount of money invested in restraint related publicity in 2008 was $745,052, which is a 160 per cent increase in spending from the 2007 amount of $286,175 (Wundersitz and Baldock, 2009). This large increase is mostly due to four months of advertising taking place in 2008 as opposed to only a single month in 2007. Production cost also increased as a new campaign was used ($84,126 compared with $25,184 in 2007).

6 Discussion

Performance indicators of enforced driver behaviours are important for understanding the relationship between driver behaviour, enforcement activity and crash-related information. The European Transport Safety Council (ETSC, 2001) recommends the systematic monitoring of driver behaviour by independent institutions to create road safety performance indicators. Following these recommendations, this annual report quantifies the effects of the enforcement of drink driving, drug driving, speeding and non-wearing of restraints in South Australia.

6.1 Drink-driving and random breath testing

In a review of the impact of random breath testing across Australia, Homel (1990) concluded that the most successful model includes highly visible RBT stations in locations that are difficult to predict and evade, rigorous enforcement and extensive publicity. Both enforcement and publicity must be sustained in operation. Combined, these factors influence drink driving behaviour through general deterrence, that is, by increasing the perceived likelihood of detection and emphasising the consequences of legal sanctions.

In June 2005, legislation enabled mobile RBT to be conducted on a full time basis rather than only during 'prescribed periods' in South Australia. Consequently, 2008 was the third calendar year in which full time mobile RBT data was available for the entire 12-month period.

LEVELS OF TESTING

While the level of random breath testing decreased slightly in 2008, it remained at a relatively high level exceeding the target of 660,000 tests per year. This equated to approximately 61 per cent of licensed drivers in South Australia. The decrease in testing was predominantly in the metropolitan area; testing remained relatively stable in rural areas.

Comparisons with other Australian jurisdictions revealed that South Australia tested a greater proportion of the population than the ACT and Western Australia but a smaller proportion than the remaining states and territories. This trend is consistent with previous years. In Tasmania, RBT levels were well over one test for every person in the state per year, compared to less than one in every two people in South Australia.

While static testing decreased in 2008, the proportion of mobile testing increased to 28 per cent (22% in 2007). Compared to other jurisdictions, the proportion of mobile testing in South Australia was higher than in New South Wales and Victoria but lower than three other jurisdictions (Qld, WA, Tas). Tasmania recorded the highest level at around 69 per cent.

VISIBILITY OF RBT

To increase the perceived probability of detection, Homel (1990) suggests that random breath testing should be conducted on days and at times when it is more likely to be seen by potential drink drivers. Alternatively, to detect drink drivers, random breath testing needs to be at times when most drink driving occurs. Homel maintains that experimentation is required to determine the balance of testing at times and places of high traffic volume when the incidence of drinking and driving is low, and when the incidence of drink driving rates is high but the traffic volume is low.

Night time surveys of drink driving provide information about times when the incidence of drink driving is greatest but such surveys have not been conducted in South Australia since 1997. The most recent roadside breath testing surveys conducted in Australia (Friday to Sunday, 10pm-3am), found that drink driving rates were highest after midnight and on Friday nights in Perth (Ryan, 2000). Consequently, to *detect* drink drivers, RBT is needed later in the evening (after midnight) and on days when the highest drink driving rates occur.

To *deter* drink drivers, Harrison (2001) suggests that enforcement taking place early in the decision making process leading to drink driving may be more effective than enforcement targeting decisions later on, particularly in rural areas. Consequently, highly visible RBT methods should operate in the early part of the evening (i.e. 6pm to 10pm) so that potential drink drivers see enforcement on their way to drinking venues, thus influencing subsequent alcohol consumption or the decision to drive.

During 2008, the greatest percentage of static and mobile breath tests continued to be performed on Fridays and Saturdays, days when drink driving rates are typically higher. For time of day, highly visible static testing was undertaken predominantly from 4pm to 10pm, an earlier part of the evening when potential drink drivers would see RBT activities on their way to drinking venues. This might increase perceived risk of detection and general deterrence. The level of mobile testing was highest from 6pm to midnight and was much higher than static testing from midnight to 2am. Therefore, mobile testing, the form of RBT most likely to detect drink drivers, was undertaken at times when drink driving rates are highest, consistent with best practice in the literature.

EFFECTIVENESS

For specific deterrence, it is important to apprehend a large proportion of drink drivers. In 2008, the total number of RBT detections (evidentiary) in South Australia decreased by nine per cent but remained at a relatively high level. Generally, a high number of detections are interpreted as indicating a higher level of drink driving activity, or, reflecting enforcement practices that concentrate largely on detection rather than deterrence. In comparison to other states providing evidentiary RBT detection data, the number of detections per head of population in South Australia was higher than New South Wales but lower than the other four jurisdictions.

Detection rates (drink drivers detected per 1,000 drivers tested) provide a measure for estimating the effectiveness of RBT. Based on evidentiary testing, detection rates in South Australia decreased slightly in 2008 but remained at a relatively high level. A decrease was experienced in rural areas while the metropolitan detection rate remained stable at the highest level recorded since 2000. The overall detection rate in South Australia for evidentiary tests was similar to those in the five comparison jurisdictions (i.e. mid range).

Consistent with evidentiary testing results, the overall detection rate for screening tests decreased in 2008. Lower detection rates were recorded for both static and mobile testing and in metropolitan and rural areas. The most notable decrease in the detection rate was observed for mobile testing in the metropolitan area. The overall detection rate was higher than that in Victoria but lower than Queensland and Western Australia.

Consistent with previous years, mobile RBT was more efficient in detecting drink drivers than static RBT. It has been argued that mobile RBT provides a better means of detecting drink drivers, particularly those trying to avoid static RBT sites (Harrison et al., 2003). Note that few studies have formally evaluated mobile RBT methods and, in most studies, mobile RBT data have been confounded with those of stationary RBT (Harrison et al, 2003). The ratio of mobile to static RBT detection rates was higher in rural regions, suggesting that mobile RBT was of particular benefit in rural regions. In particular, mobile RBT was most effective in detecting rural drink drivers from 2pm to 10pm. Mobile RBT requires fewer police personnel, a limited resource in rural regions, and offers a solution for the 'grapevine' or 'word-of-mouth' effect known to undermine highly visible static operations. Effective drink driving enforcement is particularly important in rural regions because this is where a greater proportion of high BAC levels (0.150mg/L and above) were recorded by RBT operations.

RBT detection rate data indicate that static and mobile detection rates were highest from 10pm to 6am, a period typically associated with high alcohol consumption. Consequently, even though fewer RBT activities were conducted after midnight, they were effective in detecting drink drivers. With respect to day of week, detection rates were highest from Friday to Sunday, days when drink drive rates are highest.

The BAC distribution of drivers who were fatally injured in a crash in 2008 is indicative of a higher level of alcohol involvement than in the previous year. The percentage of fatally injured drivers with an illegal BAC (i.e. 0.050mg/L and above) increased to 38 per cent and the proportion with a high BAC level (i.e. 0.100mg/L and above) increased to 34 per cent. However, the small number of fatalities means that there is much more variation from year to year. Data for serious injury crashes also showed an increase in the proportion of drivers with an illegal BAC (25% at 0.050mg/L and above). The greater number of serious injury crashes means that they are a more reliable indicator of alcohol involvement in crashes. The percentage of cases in which BACs for drivers were known increased in 2008 for both serious injury (61%) and particularly, fatal crashes (92%). However, there is still scope for improvement in obtaining more BAC data so that the database can provide an even better indication of the level of drink driving.

The best indicator of the level of drink driving and, consequently, of the effectiveness of RBT as a deterrent, is a roadside survey. No such surveys have been conducted in South Australia since 1997.

PUBLICITY

In 2008, expenditure on anti-drink driving publicity rose slightly (by 17%) due to increased spending on media. Two separate campaigns were conducted in 2008.

Homel (1990) emphasised that publicity accompanying RBT activities should not simply be educational but have a deterrent value. The first campaign conducted in 2008 followed these recommendations: the campaign accompanied police drink driving operations and focused on deterrence by reinforcing the message that drivers can be caught anywhere at any time. The second campaign also had a deterrent value but used a different approach that concentrated on social norms, essentially society's disapproval and rejection of drink drivers. Both campaigns used a variety of media to convey this message.

Harrison (2001) suggested that publicity focusing on the early decisions in the chain of decision making relating to drink driving (i.e. how people get to drinking venues) may be more beneficial than targeting decisions later on (i.e. how to get home). Future campaigns should consider this approach.

6.2 Drug driving

Introduced in July 2006, random roadside drug testing is a relatively new enforcement activity in South Australia. This present report is the second in this series to examine drug driving enforcement operations and its effectiveness. As a result, this report is limited to only two years of data and results should be considered preliminary.

LEVELS OF TESTING

In 2008, the second full year of random drug testing, 25,889 drivers or 2.4 per cent of the licensed drivers in South Australia were tested. This level of testing was about double that of the previous year with the majority of tests performed in the metropolitan area (80%). The large increase in testing was a direct result of the expansion of the drug testing enforcement program that commenced on 1 July 2008. The program expanded from a single drug truck and 13 specially trained traffic police to a decentralised model involving 260 trained traffic police and extra equipment. Relative to other Australian jurisdictions supplying comparative drug testing data, testing rates per head of population were highest in South Australia, followed by Victoria.

Random drug testing was conducted predominantly on weekends, when drug driving rates are likely to be higher, and from 10am to 10pm, times when drug testing would be highly visible. Very little drug testing was conducted late at night or in the early morning hours (i.e. 12-6am) when levels of drug driving might be expected to be high.

EFFECTIVENESS

As drug detection data are available for only two years, limited conclusions can be drawn about the effectiveness of drug testing operations. Drug detection rates provide a guide as to the times and days when drug driving is more prevalent and give an indication of the profile of drivers detected drug driving. This information can be used to refine future enforcement activities.

Examination of confirmed positive detections (detections confirmed by evidentiary laboratory analysis) revealed that methylamphetamine was the most commonly found illicit drug of the three tested. As evidentiary testing can only be conducted on samples positive at the screening test stage, it is not possible to determine whether the higher rate of methylamphetamine reflects higher use of this drug than of cannabis, or whether this is due to the screening tests detecting methylamphetamine more reliably than cannabis. There is evidence that roadside screening tests often fail to detect cannabis when it is present (Verstraete & Raes, 2006). Note also that cannabis can only be detected for 5 hours after consumption while methylamphetamines can be detected 24 hours afterwards. Detection data also indicated that drivers aged 30-39 years were detected for the greatest number of drug offences. However, testing data were not available to clarify whether this finding was due to more drug driving among this age group or to more drivers in this age group being tested.

Detection rates (drug drivers detected per 1,000 tested) provide an indication of the effectiveness of random drug testing. Just over 21 drivers per 1,000 tested were confirmed positive for at least one of the prescribed drugs, a level slightly lower than the previous year. Both metropolitan and rural areas had similar detection rates. In comparison to evidentiary RBT detection rates, drug detection rates (per 1,000 tested) were 2.7 times higher.

Drug detection rates were higher on Thursdays and in months associated with summer festivals in the Adelaide metropolitan area (February, March). This might reflect times of higher recreational drug use.

The number of crash involved drivers testing positive for drugs can provide an indication of the level of drug driving. Of the drivers fatally injured in a crash who were drug tested (92%), 20 per cent were positive for at least one of the prescribed drugs in 2008. This proportion was slightly lower than previous years. Together, the decrease in detection rates and lower proportion of fatally injured drivers with positive drug results suggest a lower level of drug driving in South Australia. The lower level of drug driving might be partly due to increased random drug testing but there is insufficient evidence to make any definitive conclusions.

PUBLICITY

Following a year without any anti-drug driving mass media campaigns, a new campaign was developed in 2008 that supported enforcement activities. The new campaign aimed to increase the perceived risk of detection by creating awareness of the ability of technology to detect drugs and emphasising that police are actively targeting drug drivers. Various media were used to convey the campaign message and males aged 20 to 40 years were targeted. Given that fatal crash data and drug driving offence data indicate that the majority of drug drivers are male and aged 30 to 40 years, publicity campaigns and enforcement activities should continue to target this group.

6.3 Speeding

The success of speed enforcement depends on balanced methods of police enforcement to deter motorists, both specifically and generally. This enforcement needs to be supported by regular anti-speeding publicity that emphasises the high levels of speed enforcement taking place and the certainty of detection.

LEVEL OF OPERATIONS

The number of hours spent on speed enforcement in South Australia in 2008 increased by approximately seven per cent to the highest level recorded since records commenced in 2000. The hours of operation of dual purpose red light/speed cameras are not included in this total. Therefore, the true number of hours of speed detection is greater than is stated within this report.

The number of speed camera hours in 2008 was similar to the previous year, yet still exceeded the target number of detection hours. In rural areas, the number of hours decreased while in the metropolitan area, the number of hours increased slightly. In contrast to the two previous years, the hours of operation for non-camera devices (laser devices, hand-held radars and mobile radars) increased moderately (by 10%) in 2008. An increase was recorded in both rural and metropolitan areas. Non-camera devices were used more frequently in rural areas.

VISIBILITY OF OPERATIONS

To increase general deterrence, the perceived likelihood of detection must be increased. Drivers' perceptions of the likelihood of detection are influenced by knowledge of the levels of enforcement conducted, and by direct observation of enforcement activities (Swadling, 1997). Consequently, to increase the perceived probability of detection, speed detection devices should be operated on days and at times when they are most likely to be seen by potential speeders (Homel, 1990). In addition, a mixture of covert and overt speed enforcement is necessary to optimise both general and specific deterrence (perceived high levels of apprehension and punishment).

Speed detection operations in South Australia have been organised to produce a high level of general deterrence by operating at times when the majority of drivers are on the road. For speed cameras and non-camera devices, speed detection hours were spread evenly throughout the week with the majority operating during daylight hours from 6am to 8pm (although in comparison to speed cameras, non-camera devices were more frequently operated at night). This pattern of speed detection operations has varied little from 2000 to 2008.

For specific deterrence, it is important to conduct speed enforcement during times when rates of speeding are higher. Speed camera data suggest higher speeding rates on weekends. As speed enforcement was conducted evenly across all days of the week, it appears that a good balance between operations during high traffic periods (weekdays) and high speeding days (weekends) was achieved. Detection data from speed cameras for time of day in 2008 indicated higher rates of speeding from midnight to 6am although low hours of operation at this time are likely to have exaggerated the rates. Data from on-road speed surveys could be analysed by time of day and day of week to determine more accurately when speeding rates are highest, as these data are not influenced by enforcement operations.

EFFECTIVENESS

In 2008, the proportion of licensed drivers in South Australia detected for speeding offences, including the number detected with dual purpose red light/speed cameras, increased to almost 40 per cent. An increase in the number of detections was observed for all forms of speed detection with speed camera detections increasing by 42 per cent and non-camera detections increasing by 9 per cent. Dual purpose red light speed detections increased moderately (19%).

The large increase in speed camera detections was most likely due to the lowering of the speed tolerance for speed cameras at the beginning of October 2007 rather than a dramatic increase in the level of speeding. The effect of the change in the tolerance level can be clearly seen by the sharp jump in speed camera detection rates in October 2007 from just over 10 detections per 1,000 vehicles passing to around 20. This high detection rate has been maintained throughout 2008. Over half of all detections were made with conventional speed cameras, most likely due to the greater efficiency of speed cameras. Speed cameras check the speeds of all vehicles, not just those that the police officer selects and no time is lost to write a ticket. Cameras are also used more frequently in the metropolitan area, which is characterised by a higher level of traffic density than rural areas.

Detection rates accounting for traffic volumes were much higher in rural areas, suggesting a greater prevalence of speeding in rural areas. This is probably due, in part, to a greater opportunity to freely choose travelling speeds in rural areas. There may also be a lesser perceived risk of being detected in rural areas. Consequently, to reduce speeding in rural areas, higher levels of speed enforcement are needed.

The incidence of speed-related crashes and the measurement of on-road vehicle speeds can arguably provide a better indication of speed distributions and changes in speeding behaviour than detection rates because they are not as heavily influenced by enforcement operations. However, the role of speeding in crashes in South Australia is likely to be an underestimate due to the under-reporting of speeding as an apparent error in the crash database. The incidence of speed related serious and fatal crashes decreased in both the metropolitan area and rural areas in 2008. As an alternative to police records, the RTA developed criteria to determine the involvement of speeding in crashes. According to the RTA definition, 36 per cent of fatal crashes in 2008 could be considered as involving speed as a contributing factor. Of these crashes 58% occurred in the metropolitan area while the remaining 42% occurred in rural areas. This is most likely due to greater traffic volumes in metropolitan areas and hence a greater number of vehicles speeding even though the proportion of vehicles speeding is less than in rural areas, as discussed above. Of the drivers at fault in these crashes, 87% were male, and so males remain an important target for speed enforcement.

A systematic method of measuring vehicle speeds was introduced in South Australia in 2007 to assess the effects of speed reduction countermeasures and to monitor the speed behaviour of South Australian motorists over time. Speed data were collected at 130 sites (historical and new sites). In 2008 all road types showed reductions in speed with the exception of 80km/hr metropolitan arterial roads. This further supports the suggestion that the increased detection levels observed in 2008 were due to the reduction in the speed camera tolerance level rather than an increase in the prevalence of speeding.

PUBLICITY

Information and publicity campaigns developed to educate motorists about speed limits have had little success (Sivak et al., 2007). Instead, publicity can be useful in raising the perceived risk of detection and assisting in the process of changing behaviour by providing public acceptance of enforcement (Elliot, 1993; Zaal, 1994). This is important because the certainty of detection is more important as a deterrent than severity or immediacy of sanctions. An evaluation of anti-speeding television advertising in the Adelaide metropolitan areas reported slight but statistically significant decreases in mean free speeds (Woolley et al., 2001).

In 2008, the spending on publicity increased significantly, covering the continued airing of an existing campaign during the first half of the year, and the development of a new campaign featuring late in 2008. Both of these campaigns sought to increase public awareness of the consequences of speeding, death and injuries, even when slightly over the speed limit. Given that between about 20 and 45 per cent of drivers broke the speed limit by less than 10km/hr (depending on the road type) on both metropolitan and rural roads in 2007, low level speeding appears to be a suitable focus for a campaign (Kloeden and Woolley, 2009). Neither campaign specifically attempted to raise drivers' perceived risk of detection.

6.4 Restraint use

It was very difficult to assess the effectiveness of restraint use enforcement operations, as there was a lack of information on this type of enforcement. On-road observational surveys of restraint use provide the best indication of restraint use levels but no surveys were undertaken in 2008. In the absence of this information, the number of restraint offence detections (an indicator of enforcement activities), the level of restraint use for injured occupants in crashes, and publicity were examined to monitor trends in 2008.

LEVELS OF RESTRAINT ENFORCEMENT

The total number of restraint offences detected in South Australia increased by 26 per cent in 2008. The number of restraint offences provides only a rough estimate of the prevalence of restraint non-usage, and is heavily dependent on police enforcement strategies. In 2008 police specifically focused on restraint use enforcement in March to coincide with a new restraint non-use offence that came into effect on 1 March 2008. This new rule made it an offence for the driver to fail to ensure passengers over the age of 16 are restrained. This offence allows the offending passenger to be fined as well as the driver and so two offences can be generated from the one event.

Restraint usage can be increased through high levels of enforcement over short periods, when applied repeatedly (ETSC, 1999). If the number of detected offences is used as an approximate guide to enforcement activities, it appears that restraint enforcement was spread relatively evenly throughout weekdays but was slightly lower on weekends. Restraint enforcement occurred predominantly during daylight hours (8am-6pm) when restraint use is most easily observed. These results were consistent with previous years. The majority of offences were detected in the metropolitan region. This could be attributed to an increase in enforcement in the metropolitan area or to greater traffic volumes, although it must be noted that the location of the offence was unknown in many cases.

In 2008, males were 2.7 times more likely than females to be detected for a restraint offence, and vehicle occupants aged 20 to 29 years were detected for more offences than any other age group. This was consistent with previous years.

LEVELS OF RESTRAINT USE AND EFFECTIVENESS

The percentage of injured vehicle occupants wearing restraints in serious injury crashes in South Australia in 2008 was 88 per cent, which was slightly higher than the previous year but generally comparable to other years. The level of restraint use of 60 per cent in fatal crashes was lower than the previous year (75%) but the small numbers of fatal crashes makes it difficult to interpret these results. Similar to previous years, restraint wearing rates for injured vehicle occupants in serious and fatal crashes in 2008 were much higher in the metropolitan area (91%) than rural regions (81%), as is historically the case, suggesting that attention still needs to be given specifically to restraint use in rural areas.

Injured vehicle occupant restraint wearing rates were much lower in fatal crashes than in serious casualty crashes (and are usually reported to be lower for crashes than the general driving population observed during on-road surveys, see Wundersitz & McLean, 2004). Restraint wearing rates might be lower in fatal crashes, compared to serious injury crashes, due to police not specifically trained in crash investigation overestimating seat belt usage in less severe crashes. More likely is that restraint wearing rates were lower in fatal crashes because the higher severity of the injuries sustained were directly related to the vehicle occupant being unrestrained. The status of restraint use is only reported for injured vehicle occupants. Thus, the confounding nature of the relationship between crash injury and restraint use may compromise crash data as an indicator of the actual level of restraint use.

Restraint use status was unknown for a considerable proportion of injured vehicle occupants in fatal (13%) and serious (34%) crashes although the proportion of unknowns for fatal crashes is about half of what it has been in previous years. Continuing improvement in the recording of restraint use status will improve database reliability and accuracy and also improve the evaluation of restraint enforcement practices.

As there were no observational restraint use surveys during 2008, no information was available on restraint use by seating position in the vehicle. In 2002, seat belt usage in South Australia was at a high level (above 95%) but was observed to be lower for rear seat passengers than for drivers and front seat passengers. Males were also found to have slightly lower restraint use rates than females (Wundersitz & McLean, 2004). This is consistent with the finding in 2008 of males being more likely to be charged with restraint offences and to be unrestrained in fatal and serious injury crashes. The level of restraint use for males (81%) and females (91%) in fatal and serious injury crashes was similar to the level recorded in previous years. Self-reported restraint use has also been found to be lower among males in the literature (Milano et al., 2004; Reinfurt et al., 1996). Data from the United States have also shown that male drivers restrain their child passengers less than female drivers (Glassbrenner, 2003). Therefore, males remain an important target for restraint enforcement.

Many children in Australia are not using an appropriate restraint for their size (Edwards et al., 2006; Stewart & Lennon, 2007). A recent study found that more than 30 per cent of children from four to six years of age were too small for the restraints they were using. Therefore, in order to improve children's safety in the car as passengers, parents should be informed of when to move children into larger restraints (Stewart & Lennon, 2007). It must be noted that failure to ensure that a child is *appropriately* restrained is not an offence in South Australia currently but an amendment to the Australian Road Rules is expected to come in to effect in July 2010 which will mandate the use of age appropriate restraint systems for children up to the age of seven.

PUBLICITY

Restraint enforcement is by nature more covert than other forms of enforcement such as random breath testing or overt speed detection. In order to increase the perceived risk of apprehension and general deterrence of the behaviour, a high level of enforcement publicity is recommended (Zaal, 1994).

The amount of money invested in restraint use publicity in South Australia in 2008 increased by 160 per cent. The increase in expenditure in 2008 is mainly due to media costs associated with running a lengthier campaign and using a variety of media including television, radio and billboards. Production costs also increased as a new campaign was developed. The restraint use campaign focused predominantly on the risks and consequences of not using restraints, particularly the risk of injuring other occupants. The advertisements were aimed towards drivers and passengers, incorporating both the rural and metropolitan areas. Future restraint enforcement operations in South Australia would benefit from accompanying publicity concentrating on deterrence, particularly one or two weeks prior to, and during, the enforcement period (see Stefani, 2002). Media strategies might also specifically target rural areas where restraint use appears to be lower.

The use of unintentional or unpaid publicity (that is, publicity not supported by the organisation(s) that disseminated the mass media campaign) is important for the outcome of a publicity campaign (Delaney et al., 2004; Elliot, 1993). Citing a national campaign to increase restraint use in the United States, Milano et al. (2004) reported that unpaid advertising was highly effective when used in conjunction with paid advertising and enforcement. However, it was also noted that unpaid media was not effective by itself to reach high-risk groups (i.e. young males). The amount of unpaid restraint use publicity received in 2008 is unknown but it should be encouraged to enhance future restraint use publicity campaigns and enforcement. Restraint offence and crash data suggest that publicity and restraint use enforcement should be targeted towards young males as they are a high-risk group.

Restraint use legislation seems to be most effective when it is accompanied by strict enforcement and publicity. Restraint use of drivers in Korea rose from 23 per cent to 98 per cent in less than a year as a result of increased publicity from the national police enforcement campaign and doubling the fines for not using a restraint. Increased publicity and enforcement also increased restraint use in provinces in France and Canada by 10 to 15 per cent within one year (World Health Organization, 2004). The new restraint legislation that was introduced in 2008 was accompanied by relevant publicity campaigns

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