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TITLE

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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 2007. The level of random breath testing (RBT) in South Australia in 2007 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 increased in 2007 to the highest level on record, while the detection rate for screening tests decreased. Detection rates in South Australia were comparable with those in other states. Just over 12,000 drug tests were conducted during 2007, the first full year of random drug testing. Relative to other Australian jurisdictions supplying comparative data, South Australia had the highest testing rate per head of population. Around 24 drivers per 1,000 tested were confirmed positive for at least one of the three prescribed drugs with methylamphetamine the most commonly detected drug. Of the fatally injured drivers who were drug tested in 2007, 25 per cent tested positive for illicit drugs. There was a slight decrease in the number of hours spent on speed detection in 2007. Nevertheless, the total number of speed detections increased, with increases observed for speed camera and red light/speed cameras, the latter most likely due to the expansion of the program. The detection rate (per hour of enforcement and per 1,000 vehicles passing speed cameras) increased by around 30 per cent. Data from systematic speed surveys, introduced in 2007, indicated that travelling speeds on South Australian roads were increasing. The number of restraint offences in 2007 decreased by 14 per cent. Males were charged with more restraint offences and were more likely to be unrestrained in fatal and serious injury crashes than females, indicating that males remain an important target for restraint enforcement. The 2007 publicity campaign focused on the consequences of not using restraints rather than increasing the perceived risk of detection.

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 2007 and is the first report in which information on drug testing has been included.

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 consequently further reduce road trauma on South Australian roads. This annual report provides a consistent framework for the evaluation of enforced driver behaviours.

The main findings from the performance indicators for enforced behaviours in 2007 are summarised below.

DRINK DRIVING

In 2007, 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 set target and was greater than the recommended level of one in two licensed drivers. 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, increased in 2007 to the highest level on record. An increase was observed in both metropolitan and rural areas. Contrary to this, the overall detection rate for screening tests decreased in 2007. 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 static testing in rural areas. The contrasting findings for evidentiary and screening detection rates are difficult to explain.

Despite an increase in mobile testing, South Australia had one of the lowest proportions of testing conducted by mobile methods compared to other Australian jurisdictions. Nevertheless, South Australia had a much higher mobile detection rate per 1000 drivers tested than all jurisdictions providing comparative data. Overall, South Australian 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. Both static and mobile RBT were predominantly conducted at highly visible times (i.e. 6pm to midnight) to enhance the deterrent effect of RBT, and on days when drink driving rates were highest (i.e. Fridays and Saturdays). The proportion of mobile testing after midnight could be increased to increase detections when drink driving rates are highest.

There was a decrease in the involvement of alcohol in fatal crashes in 2007 (30% of drivers had an illegal BAC) while data for serious injury crashes showed a similar level of alcohol involvement as the previous year. However, the BAC of drivers was unknown for a considerable percentage of serious injury crashes (42%) and fatal injury crashes (15%), as has been the case in previous years. The high level of unknown BAC levels makes it difficult to draw conclusions about the level of alcohol involvement in crashes in South Australia. Improving the BAC information in the TARS database would create a more complete and reliable database, and make it simpler to determine whether current enforcement methods are having the desired effect on drink driving behaviour.

In 2007, spending on anti-drink driving publicity increased by 11 per cent. The increase in spending was likely a result of higher production costs associated with the development of a new campaign. During the first half of the year, an existing campaign was used that focused on decision making after drinking. The new campaign in the second half of the year concentrated on increasing the perceived risk of detection and planning appropriate travel methods when considering drinking.

DRUG DRIVING

Legislation allowing random drug testing in South Australia was introduced in July 2006. Consequently, drug testing and detection data are available for only one full year, making it difficult to draw any definitive conclusions about the effectiveness of operations. Nevertheless, examination of this data can inform future drug driving enforcement operations.

In 2007, 12,328 random drug tests were conducted, equating to just over one per cent of licensed drivers in South Australia. The majority of these tests were conducted in the metropolitan area. The level of drug testing is expected to increase with an expansion of drug enforcement operations and resources in 2008. In comparison to other Australian jurisdictions with drug testing data for the entire year, South Australia had the highest testing rate per head of population.

Drug testing was conducted at times (i.e. 10am-10pm) when many drivers would see it. Increased testing after midnight and into the early hours of the morning would assist in deterring and detecting drug drivers likely to be on the roads at these times.

Around 24 drivers per 1,000 tested were confirmed positive (by evidentiary laboratory analysis) for at least one of the three prescribed drugs. Methylamphetamine was the most commonly detected drug followed by THC and MDMA. Note that evidentiary testing can only be conducted on samples positive at the screening test stage so it is not possible to determine whether the higher rate of methylamphetamine 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 2.8 times higher than random alcohol breath testing detection rates in 2007. Detection rates were similar in metropolitan and rural regions.

Drug test results for drivers fatally injured in a road crash were available for eight years. Similar to data for previous years, of the fatally injured drivers who were drug tested in 2007, 25 per cent tested positive for the prescribed drugs. A more accurate estimate of the prevalence of drugs in fatally injured drivers could be obtained if all drivers were drug tested (15% were not tested in 2007).

There were no new publicity campaigns specifically targeting drug driving behaviour in 2007. However, material from a 2006 campaign highlighting the consequences of drug driving, such as the increased risk of crashing and a high likelihood of detection by police, continued to be distributed at the beginning of 2007. Analysis of drug tests results of drivers fatally injured in a crash suggest that publicity campaigns should continue to target male drivers. Future drug driving campaigns should also consider coordinating enforcement and publicity efforts.

SPEEDING

The number of hours spent on speed enforcement in South Australia decreased slightly in 2007. This number does not include hours of operation of dual purpose red light/speed cameras because this information was unavailable. Consequently, the reported number of speed detection hours is an underestimate. Slight decreases in speed detection hours were evident in both the metropolitan area and rural regions and for speed cameras and non-camera devices. Contrary to these major trends, there were some small increases in speed camera hours in rural areas and non-camera hours in the metropolitan area.

Speed detection hours were concentrated during the daytime (6am-8pm) and were relatively evenly spread across the week. This provided a good balance between operation during high traffic periods (weekdays and daytime), to increase general deterrence, and high speeding days (weekends). However, enforcement operations should also be altered to prevent the drop in speed camera detection hours during the lunch period (12-2pm).

The total number of speed detections increased in 2007 with around 30 per cent of licensed drivers in South Australia detected for speeding (including red light/speed cameras). Increases in detections were recorded for speed cameras and red light/speed cameras, the latter most likely due to further expansion of the program.

Detection rates (excluding red light/speed camera detections) per hour of enforcement and per 1,000 vehicles passing speed cameras, increased by approximately 30 per cent in 2007. Speed camera detection rates increased in both the metropolitan area and rural regions while for non-camera devices, detection rates remained at a similar level to the previous year.

Consistent with previous years, 'excessive speed' was seriously underestimated as an apparent driver error in the crash database. Consequently, meaningful analysis of serious injury and fatal crashes was limited due to under-reporting bias.

Systematic on-road surveys for measuring vehicle speeds throughout South Australia were introduced in 2007. Data from 132 sites indicates that travelling speeds on 50km/h zoned roads increased from 2005 to 2007. Data for a subset of different types of rural roads showed little change (slight upward trend) in vehicle speeds from 2006 to 2007. Future speed survey data could be analysed to determine the times and days when speeding rates are highest.

The development of a new anti-speeding media campaign in 2007 resulted in a significant increase in publicity expenditure. While the timing of the publicity campaign coincided with speed enforcement operations, with a message focused on changing the perception that driving a small amount (i.e. 5km/h) over the speed limit is not dangerous.

RESTRAINT USE

Determining the effectiveness of restraint use enforcement was problematic because of the lack of information on specific hours of restraint enforcement undertaken in 2007. The number of restraint offences provides some indication of the level of enforcement. Restraint offences in 2007 decreased by 14 per cent.

Observational surveys provide data that could assist in determining the effectiveness of restraint use enforcement but no surveys have been undertaken since 2002. 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). Furthermore, better records of restraint use for all vehicle occupants in serious and fatal crashes need to be kept to improve database reliability and accuracy.

Although overall restraint usage rates in 2007 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 amount of money invested in restraint use publicity in 2007 increased by 69 per cent, predominantly due to an increase in media spending on television, radio and billboard publicity. The campaign conveyed the message that not wearing a seatbelt is dangerous, even when travelling a short distance, and it is an offence that will incur penalties.

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 2007. 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. Additionally, 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 the two other major enforceable behaviours, speeding and restraint use (see Wundersitz & McLean, 2004; Wundersitz, Baldock, Woolley & McLean, 2007; Baldock, Woolley, Wundersitz & McLean, 2007; Wundersitz & Baldock, 2008a, Wundersitz & Baldock, 2008b). In 2007 drug driving enforcement commenced in South Australia. Consequently, drug driving data has been included in this series of reports for the first time.

In this report RBT data are presented from 1997 to 2007, speeding and restraint use data are included for the years 2000 to 2007 and drug data are available for 2007.

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 2007 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 form all Australian states and territories are provided. In addition, anti-drink driving publicity campaigns operating during 2007 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' (it was the only Australian jurisdiction to restrict mobile testing). The 'prescribed periods' included long weekends, school holidays and four other periods during the year that did not exceed 48 hours. 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, 2007 is the second 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 (925 alco-testers were available in 2007). 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 2007), 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. There were 99 evidentiary breath testing instruments available for use in South Australia in 2007.

The coordination of RBT activities was decentralised in 2000. Drink drive enforcement is now the responsibility of the 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 of ensuring drink driving enforcement targets are met and that the operations are efficient and effective. SAPOL previously had highway patrol officers that worked on a statewide basis, travelling out to LSAs and assisting in additional RBT activities. In late 2006 this group was disbanded.

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. 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 incurs an expiation fee, is required to make a court appearance and incurs a licence suspension. The amount of the fine and length of licence disqualification is dependent on the actual BAC level and previous offences. In December 2005, heavier penalties for drink driving were introduced: immediate loss of licence for six months for a BAC level of 0.08 – 0.149g/ml and immediate loss of licence for 12 months for a BAC level of 0.150g/ml or above.

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 give 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 from 1997 to 2007 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, 1997-2007

Year	Metro	Rural	Total	% difference from previous year
1997	431,784	185,721	617,505	91.1
1998	369,882	211,044	580,933[a]	-5.9
1999	357,556	204,490	562,046	-3.3
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

[a] The total for 1998 does not equal the sum of metro and rural random breath tests as there were some unknown locations which contribute to the total but can not be identified as metro or rural.

In 1997, a testing target of 500,000 breath tests per year in South Australia was set by SAPOL. As a result, the number of tests in 1997 increased substantially from the previous year and exceeded the target level. The testing target was increased to 600,000 tests per year 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 total number of tests (678,282) conducted in 2007 exceeded the target of 612,000. This level of testing was slightly less than the previous year but still at a relatively high level. RBT testing levels decreased in the metropolitan area by 3 per cent and remained relatively stable (0.7% decrease) in rural areas.

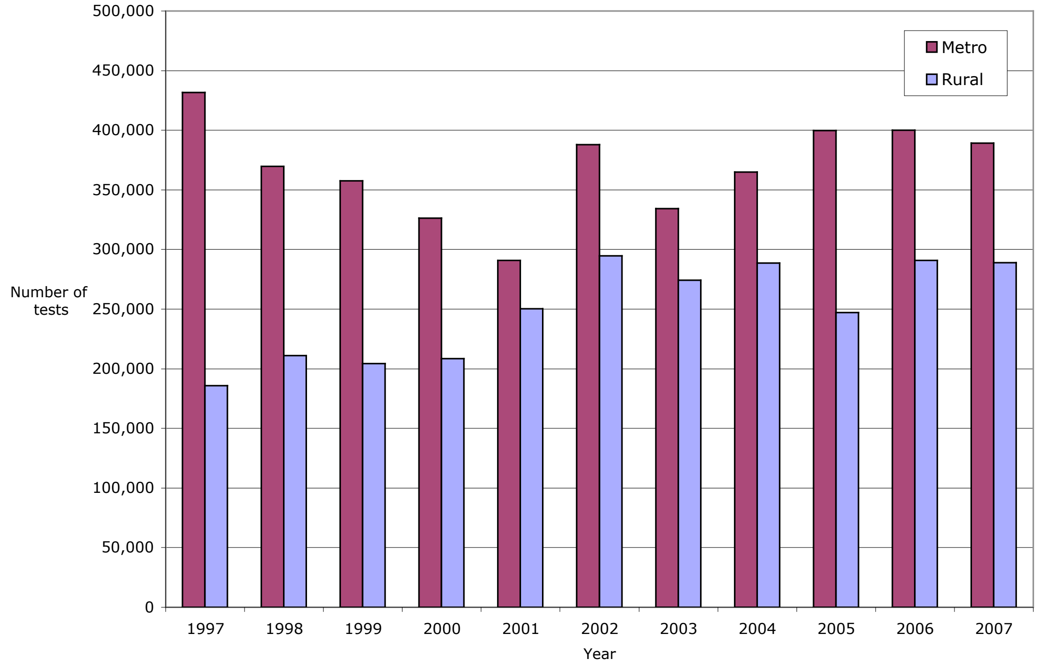

Figure 2.1
Number of random breath tests in South Australia, 1997-2007

The number of random breath tests conducted by static and mobile testing methods from 2003 to 2007 is summarised in Table 2.2. The proportion of mobile RBT testing in 2003 was low because mobile RBT operations commenced in September of that year. In 2004, mobile RBT was operating for the full 12 months but only during prescribed periods. The proportion of mobile testing increased in 2005, most likely due to the extension of mobile RBT to full time in June 2005. Since the introduction of full time mobile RBT operations, the proportion of mobile testing has increased each year to almost 22 per cent in 2007.

Table 2.2
Number of random breath tests conducted in South Australia by testing method, 2003-2007

Year	Static	Mobile	Total	% Mobile
2003	595,458	13,191	608,649	2.2
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

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

DAY OF WEEK

Table 2.3 shows the number of random breath tests performed on each day of the week, as a percentage of all tests in a year, for the years 1997 to 2007. Consistent with previous years, the greatest proportion of testing in 2007 was performed on Friday and Saturday.

Table 2.3
Random breath tests performed by day of week, 1997-2007
(expressed as a percentage of total tests each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1997	8.9	8.4	11.1	8.9	28.4	19.1	15.2
1998	9.8	6.8	8.8	17.0	27.1	15.9	14.5
1999	12.8	8.9	8.3	11.4	26.0	16.6	16.0
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

Table 2.4 shows that the distribution of testing by day of week for static and mobile RBT in 2007 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 2004-2007
(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

TIME OF DAY

The percentage of tests performed from 1997 to 2007 by time of day is presented in Table 2.5. In 2007, RBT was conducted most commonly between 6pm and midnight. There were relatively low levels of testing between midnight and 6am although the proportion of tests conducted from midnight to 4am increased. These patterns are broadly consistent with previous years.

Table 2.5
Random breath tests performed by time of day, 1997-2007
(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
1997	19.9	3.0	9.8	5.9	2.7	11.7	9.8	28.2	9.0
1998	9.1	2.5	5.8	9.4	4.9	10.5	12.5	33.4	11.9
1999	4.8	3.8	3.4	16.6	9.2	14.7	12.5	24.9	10.1
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

Table 2.6 shows time of day testing data for 2004 to 2007, separately for static and mobile RBT. In 2007, police conducted static RBT most frequently during the hours from 6pm to midnight although the proportion of tests from midnight to 4am increased. For mobile testing, the level of RBT was relatively high throughout the afternoon and into the night (2pm - 2am) but highest from 6pm to midnight.

Table 2.6
Random breath tests performed by time of day in 2004-2007
(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

The percentage of RBT tests per month for static and mobile testing in 2007 is shown in Table 2.7. While there is no discernable pattern by month for static testing, mobile testing increased as the year progressed. The data for static RBT by month shows higher levels in April, September and December and lower levels of testing during the winter months, probably due to the effects of wet weather.

Table 2.7
Random breath tests by month in 2007 (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	7.2	8.3	7.6	5.1	8.2	6.8
Feb	7.2	6.4	6.8	4.5	6.1	5.4
Mar	7.3	6.2	6.9	4.0	6.1	5.1
Apr	9.8	14.1	11.5	5.8	7.9	7.0
May	5.1	6.0	5.5	5.8	6.3	6.1
Jun	7.4	6.5	7.0	5.8	8.1	7.0
Jul	5.4	3.7	4.8	6.1	8.1	7.2
Aug	11.4	7.9	10.0	8.5	8.8	8.7
Sep	12.0	12.9	12.4	14.2	11.6	12.8
Oct	7.5	7.0	7.3	13.8	8.8	11.1
Nov	8.5	9.0	8.7	14.3	9.2	11.4
Dec	11.2	12.0	11.5	12.1	10.8	11.4
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 1997 to 2007 is presented in Table 2.8 and in Figure 2.2. The testing target level of 1 in 2 drivers has been exceeded since its inception in 1997 (Baldock and White, 1997). Just over 63 per cent of licensed drivers were tested in 2007, a slight decrease from the previous year.

Table 2.8
Number and percentage of licensed drivers tested in South Australia, 1997-2007

Year	Number of tests	Number of licensed drivers [a]	% of licensed drivers tested
1997	617,505	994,719	62.1
1998	580,933	992,459	58.5
1999	562,046	1,043,581	53.9
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

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.

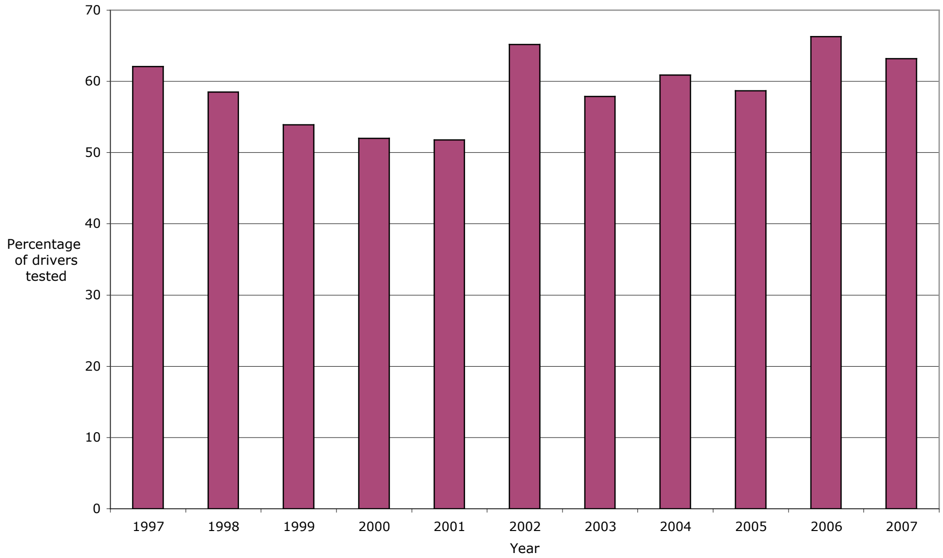

Figure 2.2
Percentage of licensed drivers tested, 1997-2007

2.1.3 Interstate comparisons

To establish standards against which South Australian practices may be assessed, information on the levels of RBT conducted in other Australian jurisdictions was collected. 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. In 2007 the highest levels of RBT were conducted in New South Wales and Victoria followed by Queensland, a trend similar to the previous year (see Wundersitz & Baldock, 2008). Note that RBT was prioritised in the Northern Territory and, consequently, the level of testing more than doubled from the previous year (41,950 in 2006). The proportion of RBT that was conducted using mobile testing methods was much higher in all other jurisdictions than in South Australia, with the exception of New South Wales.

Table 2.9
Number of random breath tests conducted in Australian jurisdictions in 2007, by testing method

Jurisdiction	Static	Mobile	Total	% Mobile
South Australia	530,939	147,343	678,282	21.7
New South Wales	2,682,437[a]	740,411	3,422,848	21.6
Queensland	1,949,359[b]	951,836	2,901,195	32.8
Tasmania	229,254	447,686	676,940	66.1
Victoria	2,455,802 [c]	835,802	3,291,604	25.4
Western Australia	249,472	499,868	749,340[d]	66.7
Northern Territory	UK	UK	100,989	UK
Australian Capital Territory	UK	UK	91,433	UK

[a] Total includes tests conducted by RBT buses.
[b] Total includes 188,105 tests conducted using RBT 'booze buses'.
[c] Total includes 1,238,708 tests conducted using RBT 'booze buses'.
[cd]Total includes 249,472 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. Similar to previous years, 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 Queensland and Victoria. South Australia's level of RBT was similar to the level reported in 2006 (44%), and higher than levels in the Australian Capital Territory and Western Australia. The pattern of results in 2007 are similar to those reported for 2006 (see Wundersitz & Baldock, 2007) with the exception of the Northern Territory where the proportion tested increased significantly from 20 to 46 per cent.

Table 2.10
Number of random breath tests conducted in Australian jurisdictions in 2007, as a percentage of population

Jurisdiction	Total	Pop 2007 [a]	% of Pop
South Australia	678,282	1,591,900	42.6
New South Wales	3,422,848	6,927,000	49.4
Queensland	2,901,195	4,228,300	68.6
Tasmania	676,940	495,800	136.5
Victoria	3,291,604	5,246,100	62.7
Western Australia	749,340	2,130,800	35.2
Northern Territory	100,989	217,600	46.4
Australian Capital Territory	91,433	340,800	26.8

[a] Source: Estimated resident population data from Australian Bureau of Statistics (2008) *Australian Demographic Statistics, December 2007.* 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 2007 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 has risen each year since 2000. In 2007, the number of detections increased by 24 per cent to the highest level recorded, 5,835 detections.

Table 2.11
Number of RBT detections in South Australia, 2000-2007

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

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 some estimate of the effectiveness of RBT. A lower detection rate may indicate greater effectiveness of RBT and other drink driving countermeasures, although it is very important to remember 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 the metropolitan and rural areas for the years 1997 to 2007 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 2007 increased to a level that was the highest recorded since 1997. An increase in the detection rate was evident in both metropolitan and rural areas with the rural rate reaching the highest level recorded in the table.

Table 2.12
RBT detection rates, 1997-2007
(number of drivers detected with an Illegal BAC per 1,000 tested)

Year	Metro	Rural	Total
1997	9.5	5.2	8.2
1998	6.8	3.7	5.7
1999	4.5	2.8	3.9
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

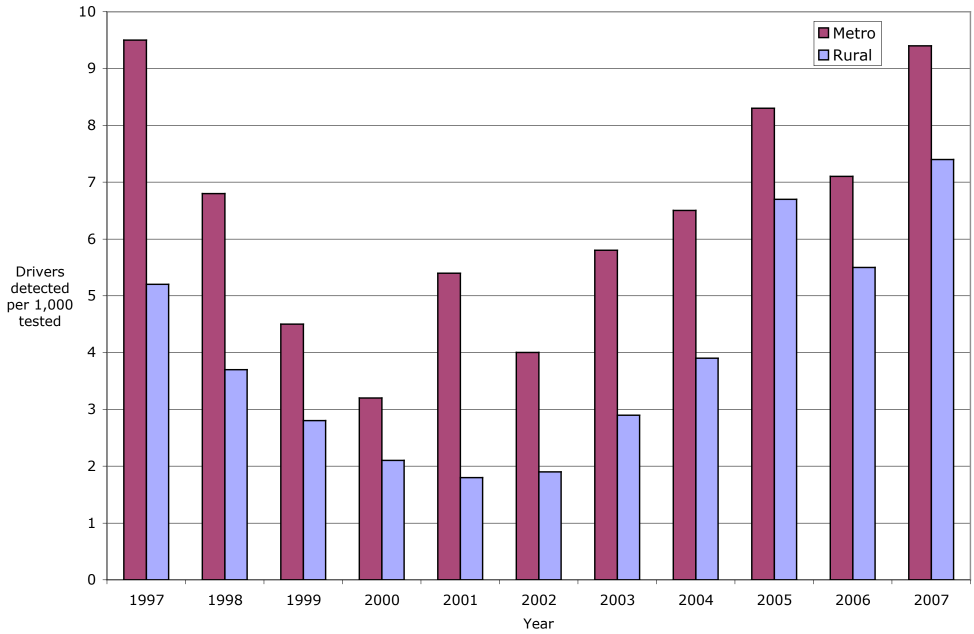

Figure 2.3
RBT detection rates per 1,000 tests, 1997-2007

The detection rates associated with static and mobile RBT in metropolitan and rural areas from 2003 to 2007 are presented in Table 2.13. 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).

Table 2.13 clearly shows that mobile RBT continues to detect a greater percentage of drink drivers than static RBT. Contrary to the detection rate based on evidentiary testing, the overall detection rate based on screening tests decreased from 14.3 per cent in 2006 to 10.6 per cent in 2007. Consistent with previous years, static and mobile detection rates were highest in metropolitan areas.

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), 2003-2007
(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
2003			
Metro	5.2	51.7	9.9
Rural	1.8	34.5	19.2
Total	3.7	40.0	10.8
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

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 2007, 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, 2000-2007
(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
2000									
Metro	18.77	13.35	19.76	1.58	3.11	0.26	0.28	0.75	2.05
Rural	6.37	13.41	2.71	0.69	0.87	0.48	0.55	0.36	1.05
Total	13.71	13.36	15.19	1.23	1.87	0.38	0.36	0.53	1.39
2001									
Metro	32.49	9.14	60.47	3.62	4.61	1.64	0.48	0.73	2.16
Rural	8.34	15.98	0.00	0.70	2.03	0.21	0.55	0.28	1.23
Total	21.65	9.56	45.24	2.11	3.11	0.45	0.51	0.45	1.50
2002									
Metro	22.41	15.05	16.75	1.82	3.62	0.73	0.27	0.46	2.41
Rural	7.48	17.03	0.43	0.57	1.23	0.73	0.18	0.46	1.06
Total	16.87	15.28	14.18	1.31	2.60	0.73	0.23	0.46	1.52
2003									
Metro	23.57	20.20	24.30	2.28	1.10	2.56	2.59	4.60	4.64
Rural	13.13	48.09	13.77	0.81	0.50	1.62	3.17	2.81	7.93
Total	20.46	24.39	22.37	1.56	0.71	1.94	2.84	3.95	5.51
2004									
Metro	37.72	28.97	36.67	2.95	0.85	4.06	2.41	3.52	4.87
Rural	21.19	71.65	16.72	0.71	0.89	1.65	2.89	3.88	10.85
Total	31.07	35.46	29.99	1.87	0.87	2.32	2.65	3.64	6.13
2005									
Metro	Data not available								
Rural	Data not available								
Total	Data not available								
2006									
Metro	38.45	27.12	31.80	14.16	1.50	3.80	2.38	5.74	5.03
Rural	34.26	92.48	23.32	8.41	0.97	2.10	4.20	5.72	8.60
Total	36.79	35.64	29.57	11.68	1.16	2.70	2.95	5.73	5.99
2007									
Metro	30.97	16.43	33.51	3.57	1.46	4.97	7.42	8.05	6.76
Rural	40.36	46.17	51.33	2.34	1.24	3.46	3.00	6.76	9.07
Total	34.21	22.03	35.90	3.12	1.33	4.06	4.56	7.60	7.58

Table 2.15 shows detection rates by time of day for mobile and static RBT. 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 be higher than those in Table 2.14. Similar to evidentiary testing data, in 2007 higher RBT detection rates were observed at night from 10pm to 6am in both the metropolitan area and rural regions. Detection rates were also high from 6 to 8pm in the metropolitan area. Mobile detection rates were highest from 10pm to 6am while static detection rates were also generally highest from 10pm to 6am but also from 6 to 8pm.

Table 2.15
RBT detection rates (screening test only) in 2007
(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	12.9	8.8	12.7	1.6	2.1	5.6	16.6	4.1	6.6
Rural	8.5	1.2	11.0	3.3	2.0	2.4	2.5	2.8	3.2
Total	11.8	7.5	12.5	2.1	2.1	3.7	7.3	3.7	5.6
Mobile									
Metro	60.6	69.0	61.0	19.2	32.8	23.1	39.0	34.6	74.1
Rural	43.9	74.4	61.9	12.5	11.6	16.0	24.3	20.2	33.5
Total	52.4	70.6	61.1	15.3	20.0	18.8	30.1	27.1	50.6
Both									
Metro	25.7	13.5	20.0	4.7	9.6	10.2	22.3	7.9	14.5
Rural	26.0	11.6	24.3	7.3	4.4	5.8	7.2	7.2	11.9
Total	25.8	13.2	20.6	5.7	6.5	7.5	12.5	7.7	13.6

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, shown in Table 2.16, indicate that mobile RBT is more effective in detecting drink drivers in metropolitan areas during the day from 6am to 4pm while in rural areas mobile RBT is most advantageous from 2 to 4am and 10pm to midnight.

Table 2.16
The ratio of mobile to static RBT detection rates in 2007, 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	4.7	7.8	4.8	11.7	15.3	4.1	2.3	8.4	11.2
Rural	5.2	60.0	5.6	3.8	5.8	6.6	9.9	7.2	10.4
Total	4.5	9.5	4.9	7.2	9.7	5.1	4.1	7.3	9.0

DAY OF WEEK

Detection rates by day of week for static and mobile RBT, presented separately for metropolitan and rural testing, are displayed in Table 2.17. Detections here are for drivers testing positive on the screening test rather than on the evidentiary test. For both static and mobile testing, 2007 detection rates were higher from Friday to 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 2007
(number of drivers detected per 1,000 tested) by day of week and location

Method	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Static							
Metro	3.9	2.8	3.9	4.0	8.0	8.0	8.5
Rural	3.3	2.0	2.3	2.3	3.4	2.7	3.2
Total	3.7	2.6	3.3	3.2	6.0	6.0	6.6
Mobile							
Metro	24.3	26.2	32.2	35.2	47.0	60.6	41.9
Rural	13.3	20.6	19.9	21.5	27.1	24.5	21.0
Total	18.6	23.6	26.1	27.9	34.9	37.9	30.8
Both							
Metro	7.0	8.4	8.9	11.6	14.7	14.8	13.7
Rural	5.7	9.1	7.0	7.7	10.2	9.1	8.1
Total	6.5	8.7	8.1	9.6	12.6	12.4	11.5

RBT DETECTION RATES BY MONTH

Table 2.18 shows static and mobile RBT detection rates by month for both metropolitan and rural areas for 2007. Note, again, that these detection rates refer to the results of screening tests, not evidentiary tests. For static testing, detection rates were higher during the first two months of the year. In contrast, mobile testing rates were lowest in January then relatively consistent during the remainder of the year.

Table 2.18
RBT detection rates by month in 2007
(number of drivers detected with an Illegal BAC per 1,000 tested), by location

Month	Static			Mobile		
	Metro	Rural	Total	Metro	Rural	Total
Jan	9.4	3.0	6.7	39.5	15.4	23.4
Feb	8.2	6.4	7.5	38.7	24.9	29.9
Mar	6.7	3.0	5.4	27.2	26.2	26.6
Apr	4.4	2.0	3.2	32.4	24.7	27.5
May	5.7	2.8	4.5	42.2	28.6	34.3
Jun	4.8	2.2	3.9	33.7	29.8	31.2
Jul	5.1	3.8	4.7	49.5	22.9	32.8
Aug	6.9	2.9	5.6	42.5	25.2	32.7
Sep	7.8	2.6	5.7	51.5	17.3	34.1
Oct	3.2	1.7	2.7	38.3	17.6	29.0
Nov	6.0	3.6	5.0	43.4	22.2	33.9
Dec	7.5	2.5	5.5	34.5	20.5	27.1
Total	6.4	2.9	5.0	40.8	22.4	30.5

RBT DETECTION RATES BY SEX

Table 2.19 shows the detection rates for males and females from 1997 to 2007, 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 5715 cases for which sex was unknown. However, the difference does not affect the pattern of drink driving activities evident in the data.

Similar to the previous year, the ratio of male to female drink drive detection rates in 2007 indicates that, on average, males are 3.5 times more likely to be detected than females. This 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, 1997-2007

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
1997	543,017	3,254	5.99	467,155	1,051	2.25	2.66
1998	553,878	2,121	3.83	475,667	603	1.27	3.02
1999	556,399	1,740	3.13	482,038	464	0.96	3.26
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

Note. The number of licence holders was obtained from the DRIVERS database from 1996-2005. 2006 & 2007 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 provided 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, 18 per cent recorded a high BAC level, that is, a BAC of 0.150mg/L and above, and rural regions recorded a greater proportion of drivers with a high BAC level (23%) than the metropolitan area (16%).

Table 2.20
Number of drivers detected by RBT by BAC category and region, 2000-2007

	RBT BAC readings (mg/L)								
Year	Zero	0.001-0.049	0.050-0.079	0.080-0.099	0.100-0.199	0.200-0.299	.300+	Refused	Total
2000									
Metro	0	46	422	217	345	16	1	0	1,047
Rural	0	26	155	83	167	17	0	0	448
2001									
Metro	2	83	596	328	522	29	0	0	1,560
Rural	2	34	139	85	166	16	0	0	442
2002									
Metro	8	115	624	306	472	16	4	8	1,553
Rural	7	50	176	112	187	17	1	6	555
2003									
Metro	11	182	817	339	521	34	0	28	1,932
Rural	8	57	218	154	296	33	3	24	793
2004									
Metro	13	216	946	550	786	40	1	30	2,582
Rural	15	91	294	210	542	58	1	27	1,238
2005									
Metro	Data not available								
Rural	Data not available								

Year	Zero	0.001-0.049	0.050-0.079	0.080-0.149	0.150+	Refused	Total
2006							
Metro	0	285	827	1,321	388	0	2,821
Rural	0	145	360	742	351	0	1,598
2007							
Metro	0	429	981	1,691	577	23	3,701
Rural	0	219	418	1,031	489	17	2,174

2.2.3 Interstate comparisons

Data concerned with RBT detections 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 enable meaningful comparisons. South Australian RBT detections are given for both screening and evidentiary testing. Note that this is the first year that detection data were available for the Australian Capital Territory and the Northern Territory.

The screening test data show that two of the eastern states, for which data are available, had the highest number of RBT detections in 2007. When adjusted for population, the Northern Territory and Queensland had the highest detection rates. All states had a higher detection rate than South Australia. Concerning evidentiary testing, the detection rate for South Australia was higher than the Australian Capital Territory and New South Wales but lower than Tasmania.

Table 2.21
RBT detections in 2007 in Australian jurisdictions

	Jurisdiction	RBT Detections	% of Population
Screening	South Australia	7,170	0.45
	Queensland [a]	30,296	0.72
	Western Australia [b]	14,391	0.68
	Victoria [c]	24,782	0.47
	Northern Territory	2,786	1.28
Evidentiary	South Australia	5,835	0.37
	New South Wales	19,715	0.28
	Tasmania	4,713	0.95
	Australian Capital Territory	652	0.19

Source: Estimated resident population data from Australian Bureau of Statistics (2008) *Australian Demographic Statistics, December 2007.* Catalogue No 3101.0.

[a] Includes 1,310 detections conducted at a booze bus (evidentiary testing).

[b] Includes 3,459 detections conducted at a booze bus.

[c] Includes 4,934 detections conducted at a booze bus (evidentiary testing).

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, including South Australia. 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 Western Australia and Northern Territory and similar to Queensland. South Australia recorded the highest mobile (31%) detection rate for screening test data of these jurisdictions. With respect to evidentiary testing, South Australia's detection rate was higher than all other comparative jurisdictions.

Table 2.22
RBT detection rates, 2007, (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	5.0	30.5	10.6
	Queensland	7.6	16.3	10.4
	Western Australia	13.9	21.9	19.2
	Victoria [a]	3.0	21.0	7.5
	Northern Territory	UK	UK	27.6
Evidentiary	South Australia	3.1	28.4	8.6
	New South Wales	1.9	19.9	5.8
	Tasmania	3.0	9.0	7.0
	Australian Capital Territory	UK	UK	7.1

[a] Includes 4.934 detections conducted at a booze bus (evidentiary testing).

Overall, compared to other Australian jurisdictions, in 2007 South Australia had a low rate of testing per head of population, the (equal) lowest proportion of tests conducted using mobile methods, but comparable drink driving detection rates per capita and 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 can also be used to measure 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 blood samples with the Traffic Accident Reporting System (TARS) database, maintained by the Department for Transport, Energy and Infrastructure, and the infrequency with which police record data for drivers who do not go to hospital (Kloeden, McLean & Holubowycz, 1993).

The BAC distributions of drivers who were fatally injured in a road crash and for whom a BAC was recorded are presented in Table 2.23 and Figure 2.4. The results for 2007 are indicative of lower levels of alcohol involvement in fatal crashes than in the previous year. The percentage of fatally injured drivers with a BAC above 0.05 was 30 per cent in 2007, a decrease from the 2006 level of 40 per cent which was the highest recorded since 1997. The percentage of drivers with a BAC level above 0.100 decreased from 34 per cent in 2006 to 25 per cent in 2007. 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 and Figure 2.5 for the results for serious injuries). The proportion of known BAC levels decreased in 2007 to around 84 per cent, a level that is relatively low compared to the years prior to 2005. The low proportion of known cases is of considerable concern because BAC data for deceased drivers should be routinely recorded in autopsy toxicology reports.

Table 2.23
Percentage of drivers and motorcycle riders fatally injured in road crashes by known BAC category, 1997-2007

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
1997	61.84	6.58	0.00	0.00	18.42	11.84	1.32	31.58	76	95.00	80
1998	73.17	4.88	2.44	3.66	8.54	7.32	0.00	21.96	82	96.47	85
1999	67.95	5.13	2.56	1.28	12.82	10.26	0.00	26.92	78	88.64	88
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

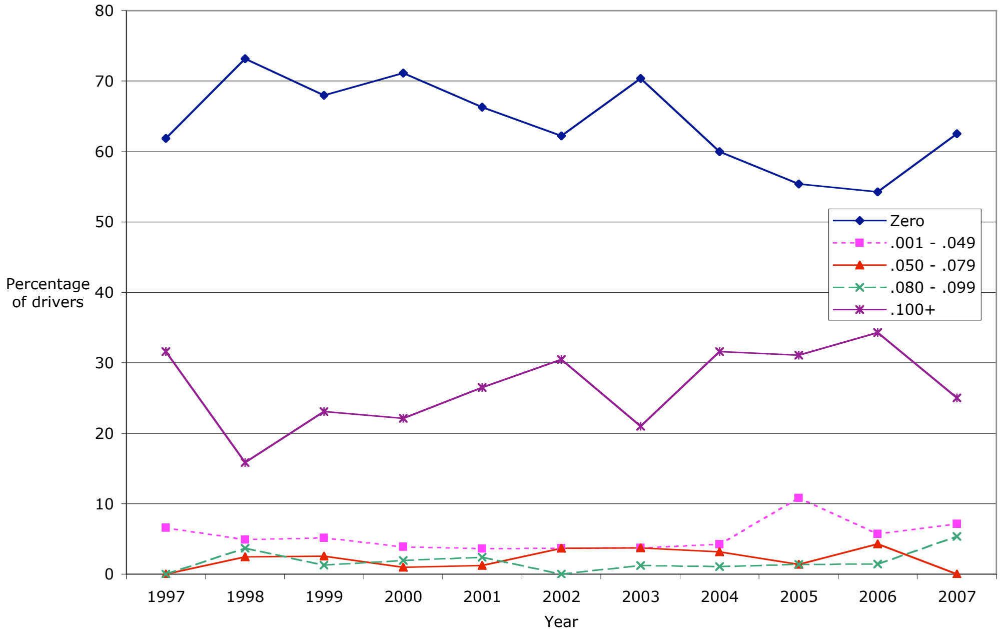

Figure 2.4
Percentage of drivers and motorcycle riders fatally injured by known BAC category, 1997-2007

Table 2.24 and Figure 2.5 show 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 2006, just under 22 per cent of drivers seriously injured in a crash had a BAC of .050 or greater, which was similar to the previous year. The percentage of drivers with a BAC above 0.100 in 2007 was 19 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 (30%, refer to Table 2.23). The percentage of known BAC levels for seriously injured drivers in 2007 decreased to the lowest level recorded in the table, 58 per cent.

In summary, these results are indicative of a slightly lower level of alcohol involvement in fatal injury crashes and similar levels of alcohol involvement for serious injury crashes during 2007 compared to previous years.

Table 2.24
Percentage of drivers and motorcycle riders seriously injured in road crashes by known BAC category, 1997-2007

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
1997	80.20	2.15	1.32	0.99	10.07	4.95	0.33	17.66	606	70.79	856
1998	79.55	3.55	1.70	1.14	8.52	4.83	0.71	16.90	704	75.21	936
1999	77.74	2.51	2.51	1.08	12.21	3.59	0.36	19.75	557	63.73	874
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

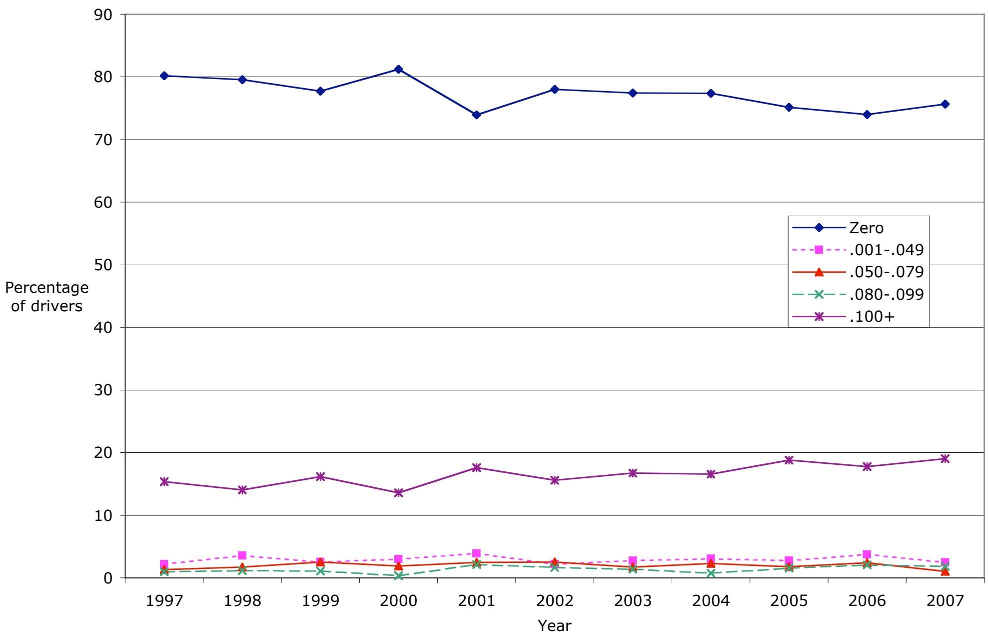

Figure 2.5
Percentage of drivers and motorcycle riders seriously injured by known BAC category, 1997-2007

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. However, roadside 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

In 2007, two anti-drink driving publicity campaigns were implemented that highlighted the effects of drink driving and supported random breath testing operations. The first publicity campaign, "0.05. The Point of No Return", developed in 2005, was used in the Adelaide metropolitan area and rural regions from 2005 to 2007. The campaign was developed to provide drivers with an incentive to comply with drink driving laws by highlighting the potential risks and consequences of drink driving, such as causing death/injury, even when only slightly over the legal limit. The campaign also reinforced the inability of drivers to assess risks when impaired and the importance and responsibility of designated drivers. The target audience was all road users above the age of 16 in metropolitan and regional areas, with an emphasis on male drivers aged 16 to 40 years in regional areas.

Television, radio, outdoor billboards and online media were used to reinforce this message. Two versions of the television commercial were featured, one with a central male character, "Twin Guys", and the other with a central female character, "Twin Girls." The commercials depicted the same person in the same scenario making different choices about having another drink and the consequences of their decisions to drive under the influence of alcohol. They were broadcast in metro and regional areas in March to coincide with various festivals and sporting events held at this time.

Two slogans, "You Don't Know Where. You Don't Know When" and "Catch You Later" were used in the second campaign that focused on educating drivers about the likelihood of being caught by a mobile breath-testing unit anywhere at any time. The new campaign was also designed to increase public awareness about drivers being randomly breath tested by police anywhere at anytime, even if they are only travelling a short distance. The risk of licence loss and the impact this would have on lifestyle, work and family life was emphasised. The importance of responsible drinking by planning appropriate travel methods after drinking was also highlighted. The primary target audience included male drivers aged 16 to 39 years, and the secondary audience included all drivers above the age of 50.

Mobile random breath testing buses displayed the slogan "You Don't Know Where. You Don't Know When". A television commercial from interstate was adapted for South Australia and focused on building a sense of paranoia around drink driving. The commercial centred around a driver being conscious that he could be breath tested anywhere at any time. Radio adverts reinforcing the campaign slogan were broadcast in both the metropolitan and rural areas. Pictures from the television commercial were used on buses in the metropolitan area. Bathroom advertising and urinal stickers promoting the television advert were distributed through pubs, clubs, and sporting venues in metropolitan and rural areas. An online advertisement appeared on AFL.com websites and hotmail.com.

The campaign was implemented in two phases. The first began in September and the second occurred in December. The timing of the campaign coincided with increased levels of static RBT testing during these months.

In 2007, the estimated costs for anti drink driving advertising totalled $605,911, an increase of 11 per cent from the last reported campaign costs in 2006 ($548,290, see Wundersitz & Baldock, 2008). The 2007 production costs were higher ($261,413) than the previous year ($72,863) due to the development of a new campaign. A total of $344,498 was spent on media and planning.

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.

Random drug testing is combined with breath testing for alcohol. The drug testing procedure begins if a driver has provided a negative result on the breath test. The procedure for drug testing itself occurs in three stages. Firstly, drivers are required to complete a saliva screening test. The saliva test involves placing an absorbent swab in the driver's mouth 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. Secondly, if the first test is positive, the driver is required to leave their vehicle to accompany police for further testing in the drug bus. At this stage, the driver will be required to undertake a second oral fluid test using the Cozart Rapiscan device. 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). If the driver is alone, police will assist in arranging alternative transport. Individuals who attempt to drive away 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 penalties based on whether the offence is a first, second, third or subsequent offence. In 2007, drivers were fined $300 with three demerit points, or a maximum of $700 court fine and three demerit points if it was their first offence. Second offence penalties included a $700 fine, three demerit points and a licence disqualification of not less than six months. Drivers committing a third offence were handed a $700 court fine, three demerit points and licence disqualification of not less than 12 months. All subsequent offending drivers were handed a $700 court fine, three demerit points and a licence disqualification for at least 12 months. All fines increased slightly on 1 July 2007 in line with the consumer price index.

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 2007, if it was the driver's first offence and he/she failed to undertake the test, a fine of $700, three demerit points and a court imposed licence disqualification of not less than six months were applied. Subsequent offences involved the same charges and licence disqualification for not less than 12 months to 2 years.

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 drug bus was dedicated to drug testing throughout South Australia. Some drug testing sites were random while others where more targeted, selected on the basis of crash data or the area being known to have a drug problem. Note that drug testing can occur anywhere and at anytime where breath alcohol testing is permitted.

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 during 2007, the first calendar year for which 12 months of data were available. A greater number of tests were undertaken in the metropolitan area (79%) than in rural regions. Just over one per cent of licensed drivers were drug tested.

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

Year	Metro	Rural	Total	No. of licensed drivers	% of licensed drivers tested
2007	9753	2575	12,328	1,073,103	1.15

DAY OF WEEK

The number of drug tests performed on each day of the week as a percentage of all tests in 2007 is presented in Table 3.3. 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, 2007 (expressed as a percentage of total tests each year)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Metro	15.5	12.7	12.8	13.2	12.9	18.3	14.7
Rural	7.4	2.4	0.7	13.0	15.5	31.3	29.7
Total	13.8	10.5	10.3	13.1	13.4	21.0	17.8

TIME OF DAY

The distribution of drug tests by time of day, as shown in Table 3.4, indicates that drug testing in 2007 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 8am).

Table 3.4
Drug tests performed by time of day, 2007 (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	5.4	0.0	0.4	0.5	8.5	15.6	12.7	12.2	12.8	14.7	14.7	2.5
Rural	0.0	0.0	0.0	0.0	0.2	24.2	21.3	23.6	19.0	5.0	6.6	<0.1
Total	4.3	0.0	0.3	0.4	6.8	17.4	14.5	14.6	14.0	12.7	13.0	2.0

TESTING BY MONTH

Table 3.5 shows that there was no discernable pattern in the percentage of drug tests performed per month in 2007. Drug testing was highest during August and December but also high in rural areas during May.

Table 3.5
Drug tests performed by month of year, 2007 (expressed as a percentage of total tests each year)

Month	Metro	Rural	Total
Jan	9.6	5.6	8.7
Feb	5.9	5.0	5.7
Mar	6.1	6.5	6.2
Apr	9.3	5.8	8.5
May	5.8	17.3	8.2
Jun	5.5	8.8	6.2
Jul	8.9	0.9	7.2
Aug	10.1	16.6	11.5
Sep	10.2	7.8	9.7
Oct	8.4	7.7	8.2
Nov	9.7	7.6	9.2
Dec	10.6	10.4	10.5
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, not all jurisdictions have testing data for the entire calendar year in 2007. Queensland commenced testing in December 2007 and Western Australia legislation came into effect in October

2007. Consequently, the figures for each jurisdiction provided in Table 3.6 are not directly comparable.

When drug test levels are expressed as tests per head of population, South Australia had the highest rate (0.77%), followed by Victoria (0.42%).

Table 3.6
Number of random drug tests conducted in Australian jurisdictions in 2007, as a percentage of population

Jurisdiction	Total	Pop 2007 [a]	% of Pop
South Australia	12,328	1,591,900	0.77
New South Wales	7,271	6,927,000	0.10
Queensland [b]	809	4,228,300	0.02
Tasmania	445	495,800	0.09
Victoria	21,887	5,246,100	0.42
Western Australia [b]	1,266	2,130,800	0.06

[a] Source: Estimated resident population data from Australian Bureau of Statistics (2008) *Australian Demographic Statistics, December 2007.* Catalogue No 3101.0.
[b] Testing data were not available for the full year.

3.2 Levels of drug driving

3.2.1 Confirmed positive drug detections

As mentioned in Section 3.1, random roadside drug testing in South Australia currently 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 2007 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.

A total of 92 drivers tested positive for a combination of two of the three prescribed drugs and 11 tested positive to all three drugs. Note that the total number of detections in Table 3.7 (295) is the sum of the three individual drug types and 'all prescribed drugs' minus the 92 detections for a combination of two drugs. Results for 2007 indicate that methylamphetamine was the drug type detected most frequently.

Table 3.7
Confirmed positive drug detections by drug type, 2007

Drug	Detections
Methylamphetamine	209
THC	143
MDMA	24
All prescribed drugs	11
Combination	-92
Total	295

DETECTIONS BY SEX

Table 3.8 shows the number of confirmed positive detections for males and females in 2007. Around 83 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, 2007

Sex	Metro	Rural	Total
Female	41	8	49
Male	195	51	246
Total	236	59	295

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. 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, 2007

Age Group (yrs)	Metro	Rural	Total
0-15	0	0	0
16-19	5	2	7
20-24	52	9	61
25-29	42	10	52
30-39	93	24	117
40-49	40	11	51
50-59	4	3	7
60 +	0	0	0
Total	236	59	295

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 for 2007. Approximately 24 drivers per 1000 tested were confirmed positive for the illicit drugs tested. 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

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

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 Sundays. While drug detection rates in the metropolitan area were spread evenly throughout the week, rural detection rates fluctuated, most likely due to the small number of tests conducted in rural areas (a result of limited resources).

Table 3.11
Confirmed positive drug detections per 1,000 tests by day of week, 2007

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Metro	23.87	21.79	23.24	28.79	27.89	21.28	23.74
Rural	10.53	49.18	176.47	5.95	10.03	21.09	36.55
Total	22.38	23.08	25.30	24.06	23.58	21.22	28.21

DETECTION RATES BY MONTH

The distribution of drug detection rates by month is displayed in Table 3.12. Generally, detection rates were higher at the beginning of the year from January to April and also in December. Detection rates by month for rural areas are highly variable due to the small number of tests and detections.

Table 3.12
Confirmed positive drug detections per 1,000 detections by month of year, 2007

Month	Metro	Rural	Total
Jan	32.09	48.95	34.32
Feb	20.69	54.69	26.84
Mar	45.53	11.98	38.16
Apr	33.19	33.33	33.21
May	33.39	11.21	23.65
Jun	29.85	17.70	26.25
Jul	24.19	41.67	24.66
Aug	17.26	9.37	14.87
Sep	21.15	0.00	17.59
Oct	12.22	20.10	13.77
Nov	14.86	5.10	13.18
Dec	18.45	70.90	29.28
Total	24.20	22.91	23.93

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 2007 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. However, Table 3.13 shows that around 15 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, 25 per cent returned a positive result in 2007. This proportion was broadly consistent with previous years.

Table 3.13
Drug test results of fatally injured drivers and riders by location, 2000-2007

Year	Number of positives			% of tested positive	Number tested	Total fatalities
	Metro	Rural	Total			
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

Table 3.14 shows that for the eight-year period recorded, the majority of fatally injured drivers who tested positive for drugs were male. In 2006 and 2007, all fatally injured drivers testing positive for drugs were male.

Table 3.14
Drug test results of fatally injured drivers and riders by sex, 2000-2007

Year	Males		Females		Number tested	Total fatalities
	N	% of no. tested	N	% of no. tested		
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

3.3 Anti-drug driving publicity

In 2007, while there were no formal publicity campaigns targeting drug driving behaviour, targeted, event based marketing took place at events including the Big Day Out and in hotel bathrooms, street based publications and websites. For this marketing, material was used from the second of two campaigns developed during the previous year. The first drug driving campaign in 2006 was implemented to raise awareness of new drug driving legislation that came into effect from 1 July 2006. This campaign predominantly used radio and press media in metropolitan and rural areas.

The second drug driving campaign involved television, street press and outdoor advertising to communicate the message "Drive high, people die". This campaign aimed to educate drivers of the consequences of drug driving, specifically increased crash risk, detection by police and penalties, in an effort to change driver attitudes and behaviour. The target audience for the communication activities were drivers aged 16 to 40 years from metropolitan and rural areas, particularly males. The campaign was launched in December 2006 with a television advertisement "She's not there" and outdoor advertising at prime locations within a 5km radius of the Adelaide city centre. Brochures explaining the new drug driving legislation and testing procedure were also widely distributed. During January 2007, postcards communicating the campaign message were distributed among 80 venues around South Australia including colleges, cafes, bars, cinemas etc. Two advertisements were also run in street magazines specifically targeting young people. Finally, posters were erected in toilets in bars, clubs and roadhouses during April and May 2007. A total of $396,364 was spent on the two drug driving campaigns in 2006.

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, a description of anti-speeding campaigns operating in 2007 is provided.

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).

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 Police Security Services Branch, a semi-independent body, currently operates the speed cameras. There were 17 speed cameras available for use in 2007 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 in an effort 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. SAPOL (Traffic Camera Unit) records indicate that in 2007 there were 57 dual purpose red light/speed cameras: 50 in the metropolitan area and 7 in rural regions. There were 44 digital cameras fixed at specific sites and 13 wet film cameras that were rotated between 23 sites. The number of cameras has increased substantially from 2006 (31 cameras).

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 2007 are summarised in Table 4.1. Laser gun devices, and to a lesser extent, mobile radars, are the most common form of non-camera speed detection in South Australia.

Table 4.1
Non-camera detection devices used in South Australia, 2007

Non-camera detection devices	Metro	Rural	Total
Lasers	64	83	147
Mobile Radars	0	127	127
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. This equates to approximately 310 hours per month. 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 spends 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 2007, 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 2007, the total number of speed detection hours for South Australia decreased by approximately 4 per cent but remained at a relatively high level. The small decrease in speed detection hours was observed in rural (4.6%) and metropolitan areas (2.1%). 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.

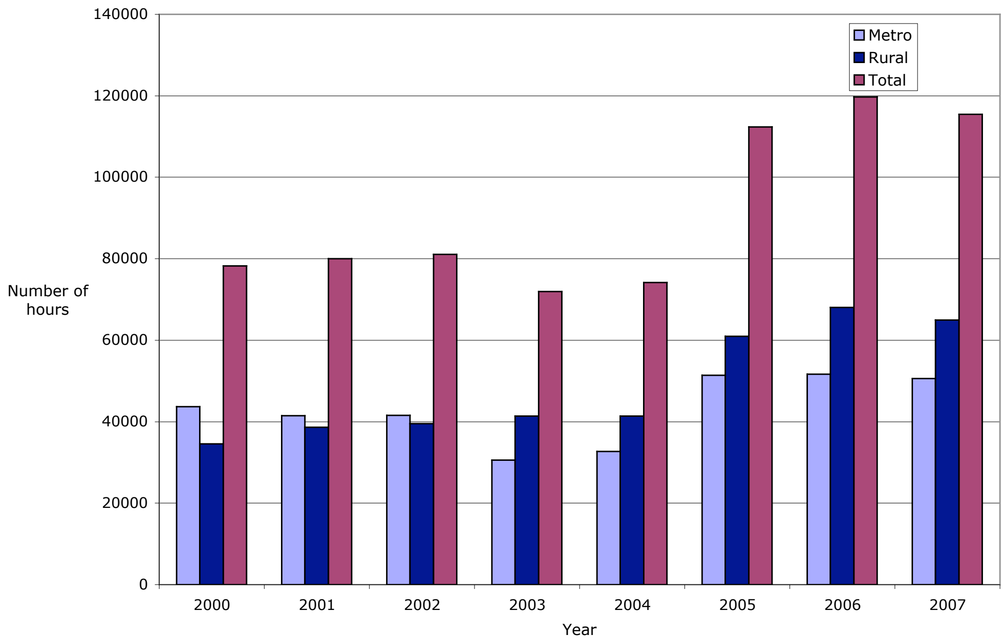

Figure 4.1
Number of speed detection hours in South Australia, 2000-2007

Table 4.2 summarises the hours spent on speed detection by speed cameras only, from 2000 to 2007 for metropolitan and rural areas. Speed cameras were used predominantly in the metropolitan area. The numbers of hours for speed camera operation have steadily increased in recent years. In 2007, the number of hours decreased slightly (by 3%) but remained at a relatively high level. The total exceeds the target number of speed camera detection hours (36,720). While a decrease was recorded in the metropolitan area (7%) the number of hours in rural regions increased (11%).

Table 4.2
Number of hours for speed detections by speed cameras in South Australia, 2000-2007

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

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. Similar to the previous year, the total number of non-camera hours decreased slightly (4%) in 2007, but remained at a relatively high level. In contrast to the previous year, a decrease in hours was reported in the rural regions (7%) while an increase was reported in the metropolitan area (5%).

Table 4.3
Number of hours for speed detections by non-camera devices in South Australia, 2000-2007

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

DAY OF WEEK

The number of hours spent on speed detection from 2000 to 2007 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 spent 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, 2000-2007
(expressed as a percentage of total hours each year)

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

Table 4.5
Number of speed detection hours for non-camera devices by day of week, 2000-2007
(expressed as a percentage of total hours each year)

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

TIME OF DAY

The speed detection hours (expressed as a percentage of the total hours each year) for all speed detection devices by the time of day, from 2000 to 2007 are depicted in Figure 4.2. 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. Compared to other times of the day; there is a noticeable dip in the distribution of detection hours around lunchtime (12 – 2pm). During 2006 and 2007, there were a lower proportion of detection hours at night from 8pm to midnight.

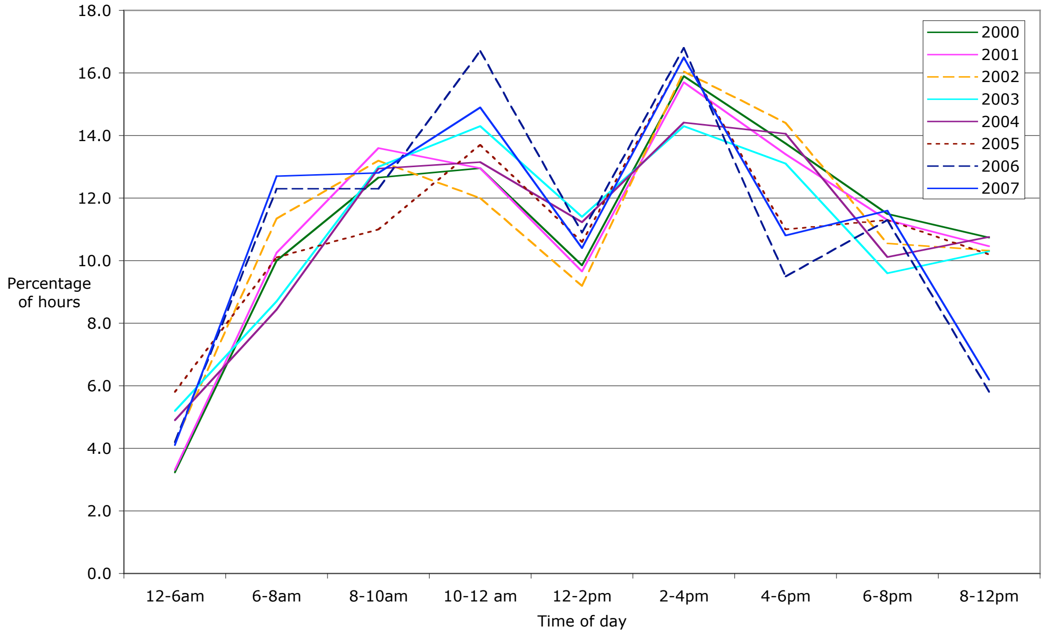

Figure 4.2
Hours spent on speed detection in South Australia by time of day, 2000-2007

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 2007, 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, 2000-2007
(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

Non-camera devices were operated predominantly from 8am to 6pm. The pattern of non-camera speed detection hours resembled that of the previous year. Compared 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 evident 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, 2000-2007
(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

DETECTION HOURS BY MONTH

Table 4.8 shows the distribution of speed detection hours by month for speed camera and non-camera devices in 2006 and 2007. Both speed camera and non-camera devices were operated relatively evenly throughout 2007, increasing slightly in the last few months of the year. Although speeding was the SAPOL focus of the month in March and April 2007, speed detection hours in these months did not differ considerably from hours in other months. Note that the target of 3,060 hours of detection per month for speed cameras was exceeded each month with the exceptions of June, July and August.

Table 4.8
Number of speed detection hours by month for speed cameras and non-camera devices in 2006 and 2007 (expressed as a percentage of total hours each year)

Month	2006			2007		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	8.4	9.6	9.2	8.6	7.5	7.9
Feb	7.0	8.9	8.3	8.1	6.6	7.1
Mar	8.0	11.4	10.3	9.6	8.2	8.7
Apr	8.2	10.8	10.0	9.0	7.8	8.2
May	8.2	8.3	8.3	8.6	7.4	7.8
Jun	8.8	6.9	7.5	7.6	6.7	7.0
Jul	7.7	6.1	6.6	6.3	8.3	7.6
Aug	7.3	8.3	8.0	6.0	9.3	8.2
Sep	7.3	8.0	7.7	8.2	8.8	8.6
Oct	9.7	7.0	7.9	10.1	8.8	9.2
Nov	10.1	7.0	8.0	9.0	9.5	9.3
Dec	9.4	7.8	8.3	8.9	11.1	10.4
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

The number of speed detections, by speed cameras and non-cameras, in South Australia for the years 2000 to 2007 is presented in Table 4.9. Inspection of the number of speed detections divided by the number of licensed drivers in South Australia indicates that approximately 30 per cent of licensed drivers were detected for a speeding offence in 2007. Note that a new database was used to extract the number of licensed drivers in 2006. Consequently, the percentage of detected licensed drivers in 2006 and 2007 is not directly comparable with previous years.

The total number of detections increased by 30 per cent in 2007. Similar to the previous year, speed camera detections increased (32%) while non-camera detections decreased slightly (5%). 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 almost 50 per cent from 2004 to 2007. There were 100,563 detections in 2007. The increase in dual camera detections during this period is likely to be due to an increase in the number of dual purpose cameras.

As noted in Section 3.1.1, 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 half 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, which are characterised by lower levels of traffic density.

Table 4.9
Number and percentage of licensed drivers detected speeding in South Australia, 2000-2007

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

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.

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 2007. If the speeding detection rate is interpreted as the level of speeding behaviour, the results suggest that speeding has decreased (by 41%) since the year 2000, to an average level of 2 detections per hour in 2007. However, the detection rate has increased by approximately 27 per cent from the previous year.

The increase in the detection rate from 2007 is attributable to an increase in speed camera detections, by 36 per cent. Both metropolitan and rural areas experienced an increase in the speed camera detection rate (38% and 35%, respectively). 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 3.2.3. 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, 2000-2007 (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

DAY OF WEEK

The following tables display detection rates per hour and have been separated by detection method because of the differences in detection rates noted above. Table 4.11 indicates that in most previous years, detection rates were at their highest on weekends, with the exception of 2006. During 2007, speed camera detection rates were at their highest on Friday and Saturday and their lowest from Monday to Wednesday. Rates per day were higher in 2007 compared to 2006, reflecting the overall increase noted in Table 4.10.

Table 4.11
Speeding detection rates per hour for speed cameras by day of week, 2000-2007

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

Detection rates for non-camera devices by day of the week from 2000 to 2007 are shown in Table 4.12. Similar to previous years, 2007 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, 2000-2007

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

Table 4.13 shows the total detections for dual purpose red light/speed cameras by day of week from 2004 to 2007 (detections per hour could not be calculated). In recent years, 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 there were more red light camera speed detections on weekends than weekdays, similar to 2004. 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, 2004-2007

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

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

TIME OF DAY

The speeding detection rates for speed cameras by the time of day from 2000 to 2007 are presented in Table 4.14. Speed camera detection rates during 2007 were relatively consistent across the day and lower at night time between 6pm and midnight. The detection rate was highest in the afternoon from 2pm to 4pm and at midnight to 6am. 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, 2000-2007

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

Table 4.15 shows the speeding detection rates for non-camera devices by time of day for the years 2000 to 2007. In 2007, as in previous years, detection rates with non-camera devices were generally lower from midnight to 6am but this is likely to be due to lower

traffic volumes rather than lower rates of speeding. Detection rates were highest between 4 and 6pm, most likely due to higher traffic volumes at this time.

Table 4.15
Speeding detection rates per hour for non-camera devices by time of day, 2000-2007

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

The numbers of speeding detections for red light cameras by time of day from 2004 to 2007 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, 2004-2007

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

DETECTION RATES BY MONTH

The speeding detection rates by month for speed cameras and non-camera devices for 2006 and 2007 are shown in Table 4.17. Overall, detection rates were relatively consistent during the year but slightly higher from October to December in 2007. This is a reflection of the higher detection rates at the end of the year for speed cameras. Detection rates for non-camera devices were reasonably constant throughout the year during 2007.

Table 4.17
Speeding detection rates per hour by month
for speed cameras and non-camera devices, 2006 and 2007

Month	2006			2007		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	2.28	0.56	1.08	3.55	0.54	1.63
Feb	3.69	0.61	1.47	4.06	0.59	1.91
Mar	3.63	0.63	1.40	3.99	0.55	1.82
Apr	2.78	0.60	1.19	3.48	0.57	1.64
May	3.07	0.55	1.38	3.62	0.55	1.68
Jun	3.74	0.58	1.80	3.65	0.56	1.69
Jul	3.49	0.62	1.74	3.57	0.61	1.43
Aug	3.26	0.58	1.40	3.95	0.61	1.43
Sep	3.46	0.58	1.48	3.68	0.62	1.60
Oct	3.39	0.57	1.73	6.51	0.63	2.77
Nov	4.02	0.61	2.03	7.69	0.57	2.87
Dec	4.41	0.57	2.01	7.41	0.57	2.52
Total	3.45	0.59	1.54	4.69	0.58	1.95

DETECTION RATES BY SEX

Accurate sex and age data are not available for speed camera offences because the infringement notice is sent to the vehicle owner who may not have been the driver at the time of the offence. Table 4.18 shows the detection rates for males and females from 2000 to 2005 for non-camera devices. Data were not available in 2006 and 2007. In previous years, the ratio of male to female speeding detection rates has consistently shown that males are around 2.6 times more likely to be detected than females. Clearly, speeding is a greater problem among male drivers.

Table 4.18
Number and sex of licence holders, detected speeding by non-camera devices, 2000-2007

Year	Male			Female			Ratio of male to female detection rate
	Licence holders	Detected	Detection rate (per hundred licensed)	Licence holders	Detected	Detection rate (per hundred licensed)	
2000	542,811	39,783	7.33	480,120	13,123	2.73	2.68
2001	553,141	36,977	6.68	486,509	11,867	2.44	2.74
2002	552,451	41,118	7.44	488,723	14,000	2.86	2.60
2003	553,702	52,305	9.45	492,448	17,962	3.65	2.59
2004	563,389	44,498	7.90	502,828	15,084	3.00	2.63
2005	574,093	45,822	7.98	512,926	15,489	3.02	2.64
2006	Data not available						
2007	Data not available						

NB: Refer to Table 3.9 for the overall rate per licensed driver of speeding detections.

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 2007 are shown in Table 4.19. Consistent with detection rates per hour of speed enforcement, detection rates per vehicle passing also increased in 2007 by 30 per cent to the highest level recorded in the table. Together, these findings suggest that the level of speeding increased in 2007 and has been increasing since 2005.

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 the lower traffic volumes in rural areas allowing for a greater opportunity for drivers to freely choose their own travelling speed. The substantial increase in the detection rate per vehicles passing was experienced in both metropolitan (29% increase) and rural (25% increase) areas.

Table 4.19
Number of vehicles passing speed cameras and speeding detection rates (per 1,000 vehicles passing), 2000-2007

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

Speeding detection rates per 1,000 vehicles passing by day of week and time of day for speed cameras in the years 2001 to 2007 are shown in Table 4.20 and Table 4.21, respectively. In 2007, 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 previous years, detection rates were unusually high from midnight to 6am. Note that in these early hours of the morning, speed cameras operated for a short period of time in rural areas only.

Table 4.20
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by day of week, 2001-2007

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

*Data unavailable but rates calculated using data for other variables

Table 4.21
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by time of day, 2001-2007

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

*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 2003 to 2007. There is no consistent pattern across the four years. During 2007, the detection rate was relatively consistent across the year but increased considerably in October and remained high for the rest of the year. This trend is relatively consistent with that for detection rates per hour.

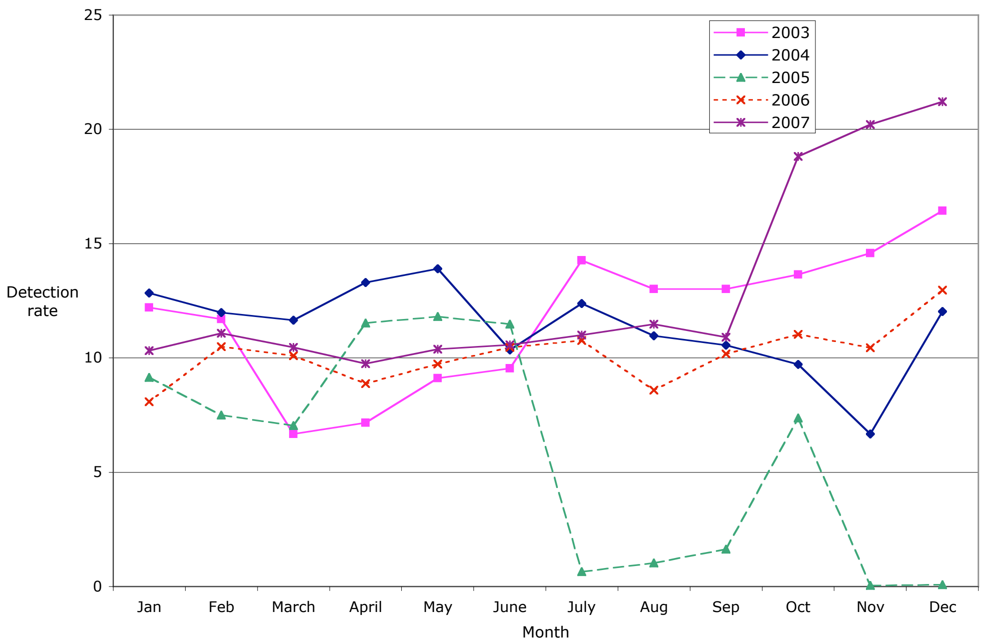

Figure 4.3
Speed camera detection rate (per 1,000 vehicles passing) in South Australia by month, 2003–2007

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 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. Only one driver in a multiple vehicle crash is assigned an apparent error. One of these possible apparent errors is 'excessive speed'. Obviously, drivers will not 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 tyre marks or vehicle damage. Therefore, the apparent error of 'excessive speed' is an underestimate of speeding and probably represents only cases of very high speeding rather than speeding in general. Fatal crashes involving more than one vehicle are usually investigated by police to a greater extent than less severe crashes but illegal speed is 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 13 per cent of fatal crashes and 2.5 per cent of serious injury crashes in 2007. The small number of fatal crashes and the issues mentioned above make it hard to draw any substantial conclusions about the involvement of speed in these crashes. In any case, these are certainly underestimates of the percentage of speed related crashes. Given that the involvement of speeding in crashes can not be determined directly from police crash records, the NSW Roads and Traffic Authority developed a 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 37 per cent of fatal crashes in 2007 could be considered as involving speed as a contributing factor.

Serious and fatal crashes are combined in Table 4.22 to show the distribution of crashes in which the apparent error was listed as 'excessive speed' in metropolitan and rural regions. The percentage of 'excessive speed' crashes in the metropolitan area in 2007 decreased notably from previous years. In rural regions, the proportion of 'excessive speed' crashes has been highly variable in recent years. In 2007, the level increased from 1.5 per cent to 4.3 per cent. Interestingly, the proportion of 'excessive speed' crashes in rural areas was 1.5 times greater than the metropolitan area, a trend contradictory to previous years.

Table 4.22
'Excessive speed' as the apparent error in serious and fatal crashes by location of crash, 2000-2007

Year	Metro 'Excessive Speed'		Total metro crashes (N)	Rural 'Excessive Speed'		Total rural crashes (N)
	(N)	(%)		(N)	(%)	
2000	30	4.03	744	22	3.46	636
2001	32	4.48	715	23	3.44	668
2002	31	4.62	671	32	4.80	666
2003	32	5.03	636	22	3.40	647
2004	29	4.54	639	19	3.41	558
2005	26	4.66	558	28	5.00	560
2006	28	4.19	669	8	1.52	527
2007	18	2.77	650	23	4.25	541

The majority of serious and fatal crashes with an apparent error of 'excessive speed' typically involve male drivers. In 2007, the proportion of male drivers deemed to have been responsible for speed-related crashes was around 93 per cent.

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 initial collection of speed data at 132 sites (includes sites with historical measurements and new sites) is described by Kloeden and Woolley (2008) in the CASR report "Vehicle speeds in South Australia 2007". Speed data were collected for one week at each of the selected sites and summary volume, speed statistics and speed distributions were analysed for each of the road types surveyed.

To summarise the Kloeden and Woolley (2008) report, limited historical surveys on a set of roads in built up areas indicated that travelling speeds on those roads decreased in 2003 (after the introduction of the default urban 50 km/h speed limit in March 2003) compared to 2002 and decreased again in 2005. However, travelling speeds on those roads increased in 2007 by a statistically significant amount, at least on Adelaide local roads affected by the 50

[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.

km/h limit. On 60 km/h roads, small non-statistically significant increases in speeds were observed. Analysis of previously collected data for a limited subset of rural roads indicated no statistically significant change in vehicle speeds on those roads between 2006 to 2007 although there was a general upward trend in speeds on most road types. For further details, see the full report.

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).

The "Speeding, What's Your Excuse?" anti-speeding campaign, developed in 2005, focused on the dangers and consequences of speeding to positively influence motorcyclists' and drivers' speeding behaviours and attitudes. The dangers of speeding while riding a motorcycle, peer pressure and speeding, and the penalties that apply were outlined in the campaign. However, the slogan was revised to "Speeding. There's no excuse" as it was discovered that the open-ended question was encouraging vandalism on outdoor advertising. This decision was made prior to the March-April campaign period.

The campaign was designed to increase the public's knowledge of the consequences of speeding at any level and encouraged compliance with speeding laws. The message of the campaign was that there is no excuse for speeding, and informed the community about the strong relationship between speeding and crash risk. Consequences of speeding such as death or injury were highlighted. The campaign also reinforced the reason for speed limits and the penalties if caught speeding, such as loss of licence.

The primary target audience for this campaign was male drivers aged 16 to 40 years in metropolitan and rural areas, and motorcyclists aged 20 to 40. The television commercial used the concept of "excuses." It featured a voiceover of excuses for speeding partnered with visuals of a young girl chasing her dog onto the road and then being hit by a speeding car. Radio advertisements emphasised the existing slogan, "Speeding. What's your excuse?", along with six new ads across metro and regional areas targeting motorists whilst in transit. Radio broadcasting was aired during the Clipsal 500 in March 2007, and Australian Traffic Network radio reports were customised to include anti-speed messages. For the first time, cinemas were used in the campaign. They featured a short film produced by TAC. "Anything" focused on the consequences for a youth who caused the death of his best friend by speeding. Outdoor publicity such as regional banners, bus shelters and speed variable message signs were used to support the radio campaign.

The media strategies occurred in five phases in 2007. In January the focus was on cinema and regional banners. In March, cinemas, bus shelters, the Australian Traffic Network and radio advertisements were broadcasted. Television, bus shelters, radio, regional banner work, and the Australian Traffic Network were used during the third phase in April. During May and June, the campaign focused on cinema and regional banner network again. The second and third phases of the campaign coincided with police enforcement operations that focused on speeding.

A new campaign titled "Speeding, Think About the Impact" was developed in the second half of 2007. Generally, the campaign focused on reducing road trauma attributable to speeding on South Australian roads but it also aimed to educate drivers and increase awareness that speeding, even slightly above the speed limit (by 5km/h), can significantly increase the risk of crashing and the severity of injury. The campaign explained to road users that the time saved by speeding 5 to 10 km/h over the limit is marginal and reinforced the statement that the choice to speed is up to the road user. Another objective of the campaign was to refocus the perceived consequences of speeding from the risk of being caught by the police to serious injury outcomes.

The campaign was primarily targeted towards younger male drivers, motorcyclists and all drivers. The slogan, "Speeding, Think About the Impact" was used for television, radio and billboard advertisements. The campaign was used in rural and metropolitan areas. Bus shelters and buses used images from the television commercial. Online media modified banner advertisements on MSN messenger and Windows Live Mail, and advertisements appeared in regional press papers.

The speeding campaign in 2007 was organised in two phases. The first phase occurred in October, and the second in December-January. In total, $695,248 was invested in anti-speeding advertising in 2007. This was a 76 per cent increase in expenditure from 2006 ($395,791, Wundersitz & Baldock, 2008). The increase in costs can be attributed to the development of a new media campaign and increased media costs. Of the total advertising costs in 2007, $516.964 was spent on media planning and $178.284 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

The use of vehicle occupant restraints or seat belts 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. In South Australia, drivers are legally responsible for ensuring that passengers aged under 16 years are restrained. It is the responsibility of the driver to ensure that seat belts are available and fit for use.

Similar to previous years, no information was available on the hours spent by police specifically targeting restraint use in 2007. 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 seven types of restraint-related offences. Table 5.1 displays the frequencies of these offences from 2001 to 2007. The last two offences listed are the driver's responsibility by law. There was a 14 per cent decrease in 2007 for the total number of restraint offences detected, resulting in a similar low level to that recorded in 2004. The decrease in 2007 might be due to higher seatbelt wearing rates or to decreased police enforcement activity.

The most common restraint offence involving the driver from 2001 to 2007 has been failure to wear a seat belt adjusted and fastened properly. Over four per cent of offences involved failing 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, 2001-2007

Year	Fail to wear seatbelt properly adjusted & fastened (driver)	Fail to wear seatbelt properly adjusted & fastened (passenger)	Fail to occupy seat fitted with a seatbelt	Sit in front row of seat when not permitted	Fail to ensure front row passenger properly restrained	Fail to ensure child under 1 year restrained	Fail to ensure child under 16 wears seatbelt	Vehicle not equipped with prescribed seatbelts and anchorages	Total
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(N)
2001	85.8	10.3	0.3	<0.1	0.8	0.3	2.6	-	10,273
2002	85.6	10.3	0.1	<0.1	0.8	0.3	2.8	-	10,127
2003	83.5	11.0	0.1	<0.1	1.6	0.4	3.3	-	10,963
2004	85.7	10.0	0.2	<0.1	0.2	0.5	3.4	-	9,237
2005	85.4	9.7	0.1	0.0	0.8	0.6	3.4	-	9,555
2006	85.6	9.8	0.1	<0.1	0.5	0.5	3.5	-	10,758
2007	84.3	9.9	0.3	<0.1	0.6	0.7	3.9	0.1	9,346

Table 5.2 shows restraint offences detected in metropolitan and rural areas from 2000 to 2007. Note that there is 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 2007 is almost double that of the previous years. Consequently, the large number of unknowns makes it difficult to meaningfully compare 2007 data to those of previous years.

Table 5.2
Restraint offences detected by region, 2000-2007

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	1937	10,758
2007	3,675	39.3	1,838	19.7	3833	9,346

DAY OF WEEK

The distribution of restraint-related offences detected from 2000 to 2007 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 restraint offences detected on weekdays in 2007, similar to previous years.

Table 5.3
Number of restraint offences detected by day of week, 2000-2007
(expressed as a percentage of total offences detected each year)

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

TIME OF DAY

Table 5.4 displays restraint offences detected by time of day from 2000 to 2007. In 2007, the distribution of restraint offence detections by time of day was similar to that in previous years. Restraint offences were detected most frequently during the day between the hours of 8am and 6pm. Restraint offence detections were much less common from midnight until 6am.

Table 5.4
Number of restraint offences detected by time of day, 2000-2007 (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
2000	1.9	2.6	11.1	18.1	17.3	15.3	17.0	8.9	7.8
2001	1.7	2.2	11.7	18.9	17.1	14.6	17.9	9.1	6.7
2002	1.7	2.3	11.2	17.4	17.6	15.7	20.0	7.7	6.4
2003	1.8	2.6	12.8	18.4	16.7	15.2	18.2	8.2	6.0
2004	1.6	2.5	11.5	19.4	18.5	15.1	16.9	8.0	6.3
2005	Data not available								
2006	1.3	2.4	12.5	20.6	19.3	15.4	17.0	6.8	4.7
2007	1.6	2.4	13.4	21.3	18.0	14.2	16.6	7.3	5.1

RESTRAINT OFFENCES BY MONTH

Table 5.5 shows the restraint offences for both metropolitan and rural areas, in terms of the percentage of total offences detected each year. If offence rates reflect levels of enforcement, overall, restraint enforcement was greater in November and December in both metropolitan and rural areas.

Table 5.5
Number of restraint offences detected by month in 2007
(expressed as a percentage of total offences detected in the year)

Month	Metro	Rural	Unknown	Total
January	8.2	9.2	6.0	7.5
February	8.6	9.1	9.7	9.1
March	8.1	6.6	6.3	7.1
April	5.8	6.4	5.8	5.9
May	4.6	4.9	7.2	5.7
June	5.1	6.6	6.1	5.8
July	9.9	7.5	9.4	9.2
August	9.1	9.8	10.8	9.9
September	8.0	8.6	9.4	8.7
October	9.7	8.6	8.4	8.9
November	11.5	12.4	11.5	11.6
December	11.4	10.1	9.4	10.3

SEX AND AGE

Table 5.6 displays the detected restraint offences by sex and age for 2006 and 2007. The greatest proportion of restraint offences of all age groups during 2006 and 2007 was recorded for vehicle occupants aged 20 to 29 years. In both years, males were approximately 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, 2006-2007

	2006						2007					
	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	2	<0.1	1	<0.1	3	<0.1
16-19 yrs	643	8.0	266	10.2	909	8.4	535	7.8	235	9.8	784	8.4
20-29 yrs	2307	28.7	826	31.8	3133	29.1	1895	27.7	739	31.0	2668	28.5
30-39 yrs	1748	21.7	548	21.1	2296	21.3	1431	21.0	504	21.0	1964	21.0
40-49 yrs	1521	18.9	486	18.7	2007	18.7	1336	19.6	484	20.0	1838	20.0
50-59 yrs	1059	13.2	293	11.3	1352	12.6	927	13.6	255	10.6	1190	12.7
60+ yrs	764	9.5	177	6.8	941	8.7	700	10.3	187	7.5	890	9.5
Unknown age	0	0.0	1	<0.1	1	<0.1	-	-	-	-	9	<0.1
Unknown sex	-	-	-	-	116	1.1	-	-	-	-	113	1.2
Total	8044	100.0	2598	100.0	10758	100.0	6826	100.0	2407	100.0	9346	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, if there is no physical evidence (i.e. injuries, scuff marks on seatbelt), police 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 2007. In 2007, 75 per cent of vehicle occupants in fatal crashes were wearing restraints. Restraint status was known for 73 per cent of all fatally injured vehicle occupants in 2007.

Table 5.7
Restraint usage of fatally injured vehicle occupants, 2000-2007

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

* 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 2007 is presented in Table 5.8. A serious injury is defined as an injury requiring the person to be admitted to hospital but which does not cause the person to die within 30 days of the crash. In 2007, the percentage known to be wearing restraints was 88 per cent but restraint status was reported for only 64 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, 2000-2007

Year	Restraint worn		Number of known cases	Total occupants injured
	(N)	(%)		
2000	633	89.2	710	1230
2001	582	85.1	684	1232
2002	612	85.2	718	1188
2003	567	88.1	643	1126
2004	571	89.6	637	998
2005*	544	86.5	629	986
2006	548	89.3	614	973
2007	580	87.7	661	1034

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

Restraint usage for fatally and seriously injured vehicle occupants is presented in Table 5.9 and Figure 5.1 according to the region where the crash occurred. Overall restraint use decreased slightly to 86 per cent in 2007. Injured vehicle occupant restraint wearing rates remained higher for crashes in the Adelaide metropolitan area (89%) than for crashes in rural regions (84%).

Table 5.9
Restraint usage of fatally and seriously injured vehicle occupants by region, 2000-2007

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

* Percentage of known

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

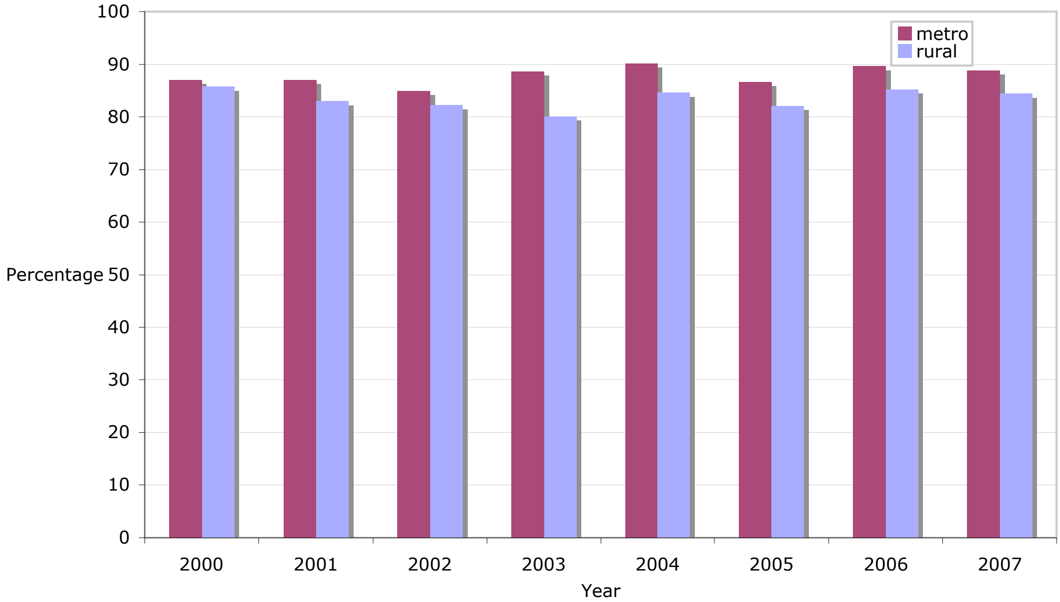

Figure 5.1
Restraint usage of fatally and seriously injured vehicle occupants, by location, 2000-2007

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 2007, male restraint use was similar to previous years at approximately 82 per cent. Female restraint use was also consistent with previous years at a level of 92 per cent.

Table 5.10
Restraint usage of fatally and seriously injured vehicle occupants by sex, 2000-2007

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

* Percentage of known

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

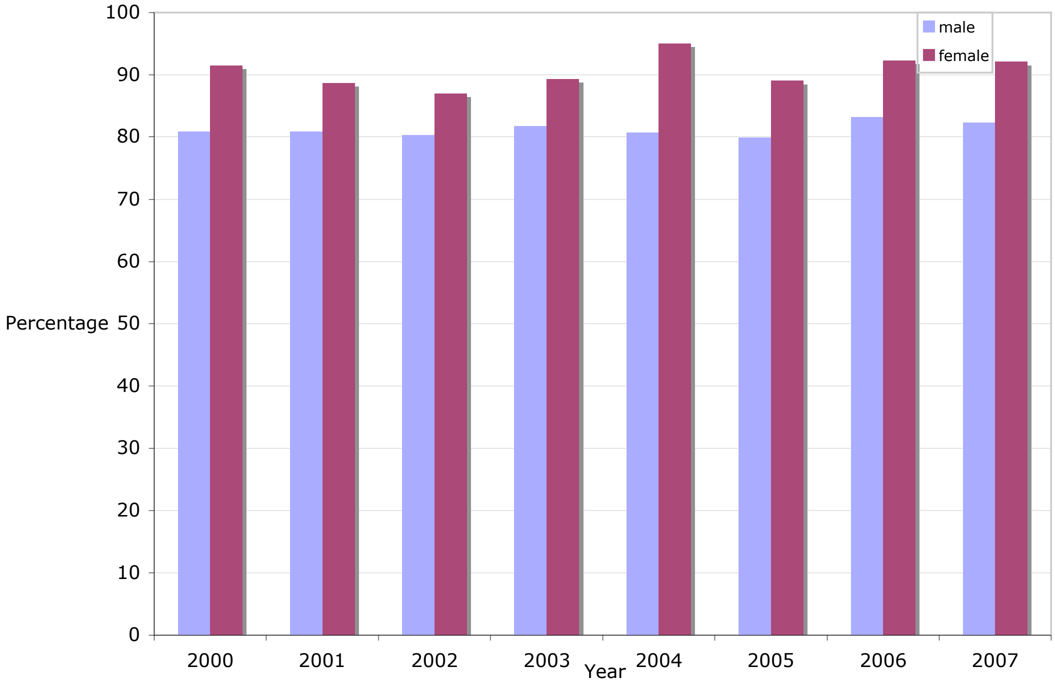

Figure 5.2
Restraint usage of fatally and seriously injured vehicle occupants, by sex, 2000-2007

5.2.3 On-road observational restraint use surveys

On-road observational surveys provide another means to measure the effectiveness of restraint enforcement. No observational studies of restraint use were conducted in 2007. Results from previous surveys are described in the 2002 report on annual performance indicators of enforced driver behaviours (Wundersitz & McLean, 2004).

5.3 Restraint publicity

In 2007, restraint publicity was based on the “No trip’s too short for a seatbelt” campaign developed and implemented in 2005 for metropolitan and rural areas. The primary target audience included drivers and passengers in regional and metropolitan areas. The campaign focused on reinforcing the potential consequences of not wearing a seatbelt. It was structured to send the message that not wearing a seatbelt is dangerous, even when travelling a short distance, and it is an offence that will incur penalties. The campaign also served to portray not wearing a seat belt as an anti-social behaviour and aimed to keep restraint use as a “top of mind” issue in the South Australian community.

The campaign encouraged restraint use through several methods of advertising in the media. The slogan was delivered to the public through television, radio, outdoor billboards, and placing message signs on service stations, boom gates and petrol pumps. Television and radio commercials were aired in January 2007.

In 2007, the total amount of money invested in restraint-related advertising was $286,175, an increase in spending from the last reported campaign costs in 2006 of $232,384. Media costs increased ($260,991 compared with $144,876 in 2006) while production/creative costs remained relatively similar to the previous year because an existing campaign was used ($25,184 compared with $24,348 in 2006).

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 success of RBT essentially depends on the method of its enforcement. In particular, he found that only the 'boots and all' model of RBT had been unambiguously successful. This 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.

An important change to drink driving enforcement in South Australia occurred in June 2005. Legislation enabled mobile RBT to be conducted on a full time basis rather than only during 'prescribed periods'. Consequently, 2007 was the second 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 in South Australia decreased slightly in 2007, it remained at a relatively high level exceeding the target of 612,000 tests per year. The decrease in testing was predominantly in the metropolitan area; testing remained relatively stable in rural areas. Approximately 63 per cent of licensed drivers were breath tested in 2007, an overall level of testing that was greater than the recommendation that one in two licensed drivers be tested.

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 2007, the proportion of mobile testing increased to 22 per cent (17% in 2006). Even though the level of mobile testing increased in South Australia, comparisons with other states showed that mobile testing made up a smaller proportion of total tests in South Australia. New South Wales reported a similar level of mobile testing while Western Australia and Tasmania recorded the highest levels at around 66 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 (1990) 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. The last late night surveys conducted in metropolitan Adelaide indicated that drink driving rates were highest on Wednesday and Thursday nights, and after midnight although these surveys were undertaken over ten years ago (Kloeden & McLean, 1997). Slightly more recent roadside breath testing surveys conducted in Perth (Friday to Sunday, 10pm-3am), found that drink driving rates were highest after midnight and on Friday nights (Ryan, 2000). In terms of the time of day, time series analysis of Tasmanian RBT data indicated that tests conducted before midnight were more important as a general deterrent than late night or day time testing. However, low numbers of crashes and tests after midnight precluded definitive conclusions (Henstridge, Homel & Mackay, 1997). 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 2007, 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. With respect to time of day, both static and mobile testing was undertaken predominantly from 6pm to midnight. Thus, highly visible static testing was conducted in the early part of the evening when potential drink drivers would see it on their way to drinking venues, consequently increasing their perceived risk of detection and general deterrence. The proportion of static testing after midnight increased, but it might be more beneficial to devote any extra testing resources available after midnight to mobile testing, the form of RBT most likely to detect drink drivers at this time when drink driving rates are highest. (i.e. 10pm to 2am). Experimentation is needed to establish a balance between deterrence and detection.

EFFECTIVENESS

For specific deterrence, it is important to apprehend a large proportion of drink drivers. In 2007, the total number of RBT detections (evidentiary) in South Australia increased by 24 per cent to the highest level on record. Generally, a high number of detections is 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 that of the ACT and New South Wales but lower than Tasmania.

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 increased in 2007 to the highest level recorded since 1997. An increase was experienced in both metropolitan and rural areas. The overall detection rate in South Australia for evidentiary tests was higher than the three comparison states, New South Wales, Tasmania and the ACT.

Contrary to the findings based on evidentiary testing, the overall detection rate for screening tests decreased in 2007. 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 static testing in rural areas. The overall detection rate was higher than that in Victoria and Queensland but lower than Western Australia and the Northern Territory. The contrasting findings for evidentiary and screening detection rates are difficult to explain.

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). Despite the increase in mobile testing in 2007, South Australia had one of the lowest proportions of testing conducted by mobile methods in comparison to other Australian jurisdictions. Nevertheless, South Australia had a much higher mobile RBT detection rate per 1000 drivers tested than all jurisdictions providing comparative detection rates. These results could be interpreted as suggesting that in comparison to other jurisdictions, South Australia had a relatively high level of drink driving in the community. 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.

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. 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) was recorded.

RBT detection rate data indicate that static and mobile detection rates were highest from 10pm to 6am but static detection rates were also high from 6 to 8pm. Consequently, even though static RBT was conducted at highly visible times (i.e. 6-8pm) to act as a deterrent, it was also effective in detecting many drink drivers. With respect to day of week, detection rates were highest from Friday to Sunday, days when drink drive rates are highest.

The percentage of drivers fatally injured in a crash with an illegal BAC (i.e. 0.050mg/L and above) decreased to 30 per cent in 2007. Similarly, the proportion of fatally injured drivers with a high BAC level (i.e. 0.100mg/L and above) also decreased. Taken together these results are indicative of slightly lower levels of alcohol involvement in fatal crashes than in the previous year. However, the small number of fatalities means that there is much more variation from year to year. Data for serious injury crashes suggested that the proportion of drivers with an illegal BAC in 2007 (22% at 0.050mg/L and above) was similar to the previous year. 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 was very low in 2007, for both fatal (85%) and particularly, serious injury crashes (58%). Improvement in the matching process of blood samples with the TARS database is needed for a more complete and reliable database, and to provide a more accurate indicator of the level of drink driving.

PUBLICITY

In 2007, expenditure on anti-drink driving publicity increased by 11 per cent from that in 2006. The increase in spending is most likely due to the development of a new campaign (increased production costs).

Homel (1990) emphasised that publicity accompanying RBT activities should not simply be educational but have a deterrent value. The campaign used in the first half of 2007 highlighted the consequences facing a driver when they are caught over the BAC legal limit and the effect of impairment on decision making skills. However, the campaign was designed to coincide with festivals and sporting events rather than police enforcement. The new 2007 anti-drink driving campaign appeared to accompany police drink driving operations and focused of deterrence by reinforcing the message that drivers can be caught anywhere at any time.

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). The 2007 campaigns focused on decision making and planning appropriate travel methods when drinking.

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 first in this series to examine drug driving enforcement operations and its effectiveness. Consequently, only one year of data is available and results should be considered preliminary.

LEVELS OF TESTING

In 2007, the first full year of random drug testing, 12,328 drivers or just over one per cent of the licensed drivers in South Australia were tested. Almost 80 per cent of these tests were performed in the metropolitan area. While the number of tests might appear low, particularly in comparison to RBT, there was only one drug bus dedicated to drug testing in South Australia, operated by a small team of specially trained traffic police. To increase the level of testing, more drug testing equipment and resources are needed. It is understood that the drug testing enforcement program was expanded in 2008. Nevertheless, 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. 12-8am) when levels of drug driving might be expected to be high.

EFFECTIVENESS

As drug detection data are available for only one year, it is difficult to draw any conclusions about the effectiveness of drug testing operations. However, drug detection rates can 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 once it has been taken while methylamphetamines can be detected 24 hours after consumption. 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. Around 24 drivers per 1,000 tested were confirmed positive for at least one of the prescribed drugs. Both metropolitan and rural areas had similar detection rates. While detection rates cannot be compared to previous years, comparisons with evidentiary RBT detection rates show that drug detection rates were 2.8 times higher.

Drug detection rates were highest on Sundays and in warmer months of the year. This could reflect times of highest 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 (85%), 25 per cent were positive for the prescribed drugs in 2007. This level was similar to previous years. A more accurate estimate of the prevalence of drugs in fatally injured drivers could be obtained if all drivers were drug tested.

Crash data from 2000 to 2007 indicate that, of the fatally injured drivers testing positive for drugs, the majority have been male. Future publicity campaigns and enforcement activities should target males.

PUBLICITY

While there were no publicity campaigns specifically targeting drug driving behaviour during 2007, promotional material from one of the two campaigns developed in 2006 continued to be distributed at the beginning of 2007. The two 2006 drug driving campaigns focused on raising awareness of the new random drug testing legislation and emphasising the consequences of drug driving such as increased crash risk, increased likelihood of detection by police and penalties. Future drug driving campaigns should consider coordinating enforcement and publicity efforts.

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

In 2007, the number of hours spent on speed enforcement in South Australia decreased by approximately 4 per cent but remained at a relatively high level. This total does not include hours of operation of dual purpose red light/speed cameras. Therefore, the true number of hours of speed detection is greater than is stated within this report.

While the number of speed camera hours was slightly lower in 2007, it still exceeded the target number of detection hours. The decrease was primarily due to a decrease in operating hours in the metropolitan area; in rural areas the number of hours increased. Similar to the previous year, the hours of operation for non-camera devices (laser devices, hand-held radars and mobile radars) decreased slightly (by 4%) in 2007 but remained at a relatively high level. Non-camera devices are generally used more frequently in rural areas. In contrast to speed camera hours, a decrease in non-camera hours was recorded in rural regions while a small increase in hours was observed in the metropolitan area.

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 2007.

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, in terms of both detections per hour and detections per 1,000 vehicles passing. 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 (speed camera) for time of day in 2007 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 more accurately determine when speeding rates are highest as these data are not influenced by enforcement operations.

EFFECTIVENESS

In 2007, 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 30 per cent. An increase in the number of detections was observed for speed cameras (32%) and dual purpose red light/speed cameras (50%) but not non-camera devices (5% decrease). The increase in dual purpose speed detections was most likely due to a significant expansion in the number of cameras and sites (84% increase). 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 with non-camera devices. Cameras are also used more frequently in the metropolitan area, which is characterised by a higher level of traffic density than rural areas.

If the speeding detection rate is interpreted as the level of speeding behaviour, the results suggest that speeding has increased in 2007 by approximately 30 per cent to 2.0 detections per hour of enforcement or 13 detections per 1,000 vehicles passing (excluding red light/speed camera detections). Both the metropolitan and rural areas reported increases in speed camera detection rates per hour and per 1,000 vehicles passing speed cameras during 2007. The higher detection rate was accompanied by a slight decrease in speed camera detection hours. In contrast, the detection rate per hour for non-camera devices remained similar to the previous year (with an decrease in the metropolitan area and a increase in rural areas) while the number of non-camera detection hours decreased slightly (4%).

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. 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. In contrast to previous years, the proportion of ‘excessive speed’ crashes (serious and fatal) in rural areas was 1.5 times greater than that in the metropolitan area. Although the under-reporting of speeding in crashes makes it difficult to evaluate the effects of enforcement on speed-related crash occurrence, the consistent finding that most speed-related crashes (in which the driver’s sex was known) involved male drivers affirms the importance of deterring male drivers from speeding to reduce crashes. In previous years, males were also two and a half times as likely as females to have been detected speeding by non-camera devices (data by sex was not available in 2006 and 2007). As an alternative to police records, the RTA developed criteria to determine the involvement of speeding in crashes. According to the RTA definition, 37 per cent of fatal crashes in 2007 could be considered as involving speed as a contributing factor.

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 132 sites (historical and new sites). Travelling speeds on roads rezoned to 50km/h in 2003 (Adelaide local roads) increased statistically significantly from 2005 to 2007. Small non-statistically significant increases in speeds were observed on 60 km/h roads. Analysis of previously collected data for a limited subset of rural roads indicated no statistically significant change in vehicle speeds on those roads from 2006 to 2007 although there was a general upward trend in speeds on most road types. The combination of increases in mean travelling speeds and higher detection rates is consistent with a higher level of speeding in 2007.

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 2007, 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 during the second half of the year. These campaigns were designed to reinforce the value of speed limits and increase public awareness of the consequences of speeding, death and injuries, even when slightly over the speed limit. While some parts of the campaigns accompanied increased police enforcement operations, the campaign did not specifically attempt 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, compared with that on speeding and drink driving laws. On-road observational surveys of restraint use provide the best indication of restraint use levels. However, in 2007, the observational surveys were not undertaken. 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 2007.

LEVELS OF RESTRAINT ENFORCEMENT

The total number of restraint offences detected in South Australia decreased by 14 per cent in 2007. The proportion of offences by location could not be accurately ascertained due to problems with data cleansing. 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. Therefore, as a result, the slight decrease in offences in 2007 may be attributed to either lower levels of enforcement or greater compliance with restraint laws.

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 occurred predominantly during daylight hours (8am-6pm). Restraint enforcement was spread relatively evenly throughout weekdays but was slightly lower on weekends. 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 and, therefore, a greater number of potential offenders, although it must be noted that the location of the offence was unknown in many cases.

In 2007, males were three times as likely as 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, which 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 2007 was 88 per cent, which was slightly lower than the previous year but generally comparable to other years. The level of restraint use of 75 per cent in fatal crashes was higher than the previous year (65%) but the small numbers of fatal crashes makes it difficult to interpret these results. Similar to previous years, in 2007 restraint wearing rates for injured vehicle occupants in serious and fatal crashes were somewhat higher in the metropolitan area than rural regions, 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 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 was 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 (27%) and serious (36%) crashes. Better recording of restraint use status in the TARS database will improve database reliability and accuracy and also improve the evaluation of restraint enforcement practices.

As there were no observational restraint use surveys during 2007, 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 2007 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 females in fatal and serious injury crashes (92%) was similar to the level recorded in previous years. The level of restraint use for males (82%) decreased slightly from the previous year, but remained at a relatively high level for males. Self-reported restraint use has also been found to be lower among males in the literature (Milano, McInturff & Nichols, 2004; Reinfurt, Williams, Wells & Rodgman, 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.

Restraint use data from fatal and serious injury crashes continues to indicate that drivers crashing in rural areas have lower restraint wearing rates than drivers crashing in the metropolitan area. Unfortunately, location data are missing for many restraint offences and so it is not possible to compare metropolitan and rural regions in terms of number of offences.

Many children in Australia are not using an appropriate restraint for their size (Edwards, Anderson, & Hutchinson, 2006; Stewart & Lennon, 2007). A recent study found that more than 30 per cent of children from 4 to 6 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.

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 2007 increased by 69 per cent. The increase in costs in 2007 is mainly due to media costs rising as more publicity such as television, radio and billboards was used. However, production costs were similar to the previous year as an existing campaign was used. The restraint use campaign focused predominantly on the risks and consequences of not using restraints, particularly when driving short distances. 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).

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, Lough, Whelan & Cameron, 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 2007 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).

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