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Annual performance indicators of enforced driver behaviours in South Australia, 2005

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ABSTRACT

This report was produced to quantify performance indicators for selected enforced driver behaviours (drink driving, speeding and restraint use) in South Australia for the calendar year 2005. Note that there were considerable problems with data on police enforcement operations and detections in 2005. Consequently, some 2005 data were not available for this report. The level of random breath testing (RBT) in South Australia in 2005 was slightly lower than in 2004. The abolition of the requirement for mobile RBT to be conducted only during 'prescribed periods' in mid 2005 was responsible for an increase in the proportion of tests conducted using mobile RBT. The increase in mobile testing led to an increase in the overall detection rate. However, interstate comparisons suggest the level of testing and the proportion of testing using mobile RBT should be increased further in South Australia. The proportion of mobile testing is expected to be more comparable with other states in 2006, when mobile methods would have operated on an unrestricted basis for 12 months. There was a marked increase (34%) in number of hours spent on speed detection in 2005, despite three months of speed camera inactivity. The detection rate (per hour of enforcement and per 1,000 vehicles passing speed cameras) continued to decrease in 2005 to the lowest of all years since records began in 2000. The finding of a low detection rate combined with an increase in the hours of speed detection in 2005 suggests the possibility of the positive effects of increased levels of speed enforcement. Urban and rural speed surveys were conducted in 2005. They revealed that reductions in speeds on 50 km/h urban roads in 2003 were maintained in 2005 but speeds on 60, 100 and 110km/h rural roads increased. The number of restraint offences in 2005 was slightly lower than the number in 2004. The amount of publicity supporting restraint use increased by 27 per cent in 2005 and involved a new mass media campaign in both metropolitan and rural areas.

KEYWORDS

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

Summary

The Centre for Automotive Safety Research at the University of Adelaide was commissioned by the Department for Transport, Energy and Infrastructure to produce a report quantifying the performance indicators for selected enforced driver behaviours (drink driving, speeding and restraint use) in South Australia for the calendar year 2005.

For each of the driver behaviours, information was collected on: the current levels and outcomes of police enforcement operations, 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 examined. Note that there were considerable problems with data on police enforcement operations and detections in 2005. Consequently, some 2005 data were not available for this report.

The establishment of consistent performance indicators for drink driving, speeding and restraint use enforcement practices will assist in optimising enforcement operations and related publicity, and may consequently further reduce road trauma on South Australian roads. Providing a consistent framework to collect and evaluate this information will help in achieving these aims.

The main findings from the performance indicators for enforced behaviours in 2005 are summarised below.

DRINK DRIVING

In 2005, the level of random breath testing in South Australia decreased very slightly. While a decrease in testing was observed in rural areas, testing increased in the metropolitan area. Despite the overall decrease, the level of testing was greater than the recommended level of one in two licensed drivers.

Mobile RBT comprised 12 per cent of total tests in 2005, compared to 7 per cent in 2004. The increase in mobile testing was most likely due to the abolition of the requirement that mobile testing only be conducted during 'prescribed periods'. In June 2005, this restriction was lifted and mobile RBT was conducted on a full time basis. Detection rates with mobile RBT were much higher than those associated with static RBT, thus causing an increase in the overall detection rate to a level higher than those in all years since 1997. Note that a detailed analysis of the effectiveness of RBT, particularly the introduction of unrestricted mobile RBT, could *not* be completed because a full data set on RBT testing and detections by the day of week, time of day and month was not available in 2005.

Interstate comparisons revealed that detection rates per capita were higher in states with a high number of overall tests and a high proportion of all tests conducted using mobile testing. South Australia, comparatively speaking, had a low number of tests (per capita) and a low proportion of tests conducted with mobile testing (due to it being the only state in which mobile RBT was conducted only during prescribed periods for six months), and, thus, a low detection rate per capita. To be on par with other jurisdictions in Australia, South Australia would need to increase its level of testing and increase the proportion of tests conducted using mobile RBT. The proportion of mobile testing in South Australia is expected to be more comparable with other states in 2006, when mobile methods would have operated on an unrestricted basis for 12 months.

There was a slight increase in the involvement of alcohol in serious injury crashes in 2005 but the BAC of drivers was unknown for a considerable percentage (34%) of these crashes, 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 matching process of blood samples with 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 2005, expenditure on anti-drink driving publicity increased by 6 per cent. The campaigns encompassed both metropolitan and rural regions and used a variety of media. While the 2005 campaigns focused on decision making, they tended to examine the decision to drive after drinking rather than earlier decisions such as how to get to the drinking venue.

SPEEDING

The number of hours spent on speed enforcement in South Australia in 2005 increased by 34 per cent to the highest recorded level since 2000. This total does not include hours of operation of dual purpose red light/speed cameras because this information was unavailable in 2005. Thus, the actual number of speed detection hours is an underestimate. Increases in speed detection hours were evident for cameras and non-camera devices in both the metropolitan area and rural regions.

Speed detection hours were concentrated during the daytime and were relatively evenly spread across the week. This provided a good balance between operation during high traffic periods (weekdays) 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).

In 2005, only 12 per cent of licensed drivers in South Australia were detected for speeding but this number omits red light/speed camera detections. When an analysis of speed camera detections only was conducted, it revealed that these decreased in number in 2005 despite an increase in speed camera hours of operation.

Given the limitations of the detection data (speed cameras were mostly inactive for three months and no data were available for dual purpose red light/speed cameras), detection rates provide a more accurate picture of the actual level of detection. The overall detection rates, detections per hour of enforcement and per 1,000 vehicles passing speed cameras, continued to decrease in 2005 to the lowest of all years since records began in 2000. The decrease in speed detection rates was experienced in both the metropolitan area and rural regions. The combination of a low detection rate and an increase in the hours of speed detection in 2005 suggests that the low detection rate may reflect the positive effects of increased levels of speed enforcement.

As was the case for previous years, ‘excessive speed’ was seriously underestimated as an apparent driver error in the TARS database. Consequently, meaningful analysis of serious injury and fatal crashes was limited due to under-reporting bias.

On-road travel speed surveys are not conducted in a systematic manner in urban areas. However, a survey was conducted in 2005 to assess the effects of change in the urban default speed limit in 2003. Travel speeds on 50 km/h roads reduced between 2003 and 2005, and there were also speed reductions on arterial roads, where the speed limit was unchanged. While travel speeds on 50km/h zoned roads in rural areas decreased, travel speeds on rural roads with 60, 100 and 110km/h speed limits increased in 2005.

During 2005, publicity continued to support speed enforcement. Expenditure on speed-related publicity continued to remain at a high level, similar to that recorded in 2004.

RESTRAINT USE

Determining the effectiveness of restraint use enforcement was difficult because of the lack of information on specific hours of restraint enforcement undertaken in 2005. The number of restraint offences provides some indication of the level of enforcement. Restraint offences in 2005 increased very slightly from the number in 2004.

Unfortunately, no observational surveys were undertaken in 2005 to provide data that could assist in determining the effectiveness of restraint use enforcement. 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 2005 are unknown, the higher likelihood of males being detected for restraint offences and of being unrestrained in fatal and serious injury crashes indicates that males remain an important target for restraint enforcement.

The amount of money spent on restraint use publicity in 2005 increased substantially, by around 27 per cent, to support a new campaign incorporating metropolitan and rural areas. Although the publicity campaign accompanied police enforcement operations, the campaign focused on the consequences of not using restraints rather than increasing the perceived risk of detection.

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 commissioned 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, speeding and restraint use in South Australia for the calendar year 2005. The findings from this report are important for the evaluation and planning of future enforcement operations concerned with drink driving, speeding and restraint use.

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 analysed.

Note that there were considerable problems with data on police enforcement operations and detections in 2005 resulting in the unavailability of some 2005 data. Consequently, the full assessment of some enforced behaviours was not possible. To the best of our knowledge, the 2005 data reported here were accurate at the time of writing this report.

The first section of the report examining drink driving continues on from other regular annual reports discussing the operations and effectiveness of RBT (White & Baldock, 1997; Baldock & Bailey, 1998; Hubbard, 1999; Wundersitz & McLean, 2002; Wundersitz & McLean, 2004; Wundersitz, Baldock, Woolley & McLean, 2007; Baldock, Woolley, Wundersitz & McLean, 2007). In this report, data are presented from 1995 to 2005. For the two other major enforceable behaviours covered in this report, speeding and restraint use, data are included for the years 2000 to 2005 to analyse short-term trends.

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 2005 in terms of the number of tests, the percentage of licensed drivers tested, detection rates, and alcohol involvement in serious and fatal road crashes. RBT statistics from a number of other Australian states are also provided, enabling a comparison between South Australian practices and those of the police in other Australian jurisdictions. In addition, anti-drink driving publicity during 2005 is 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.

Information about RBT police operations was provided by the Traffic Intelligence Section of the South Australian Police (SAPOL). 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, regardless of RBT method, 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'. The 'prescribed periods' included long weekends, school holidays and four other periods during the year that did not exceed 48 hours. The additional 48 hour periods were determined by the Minister for Police and had to be advertised to the public at least two days prior to the commencement of each period. The intention of this amendment was to widen the powers of police to require drivers to submit to a breath test during holiday periods when there was increased traffic and a potential increase in the risk of crashes. South Australia was the only Australian jurisdiction to restrict mobile testing to 'prescribed periods'. Legislation passed through State parliament in June 2005 enabling mobile random breath testing to be conducted on a full-time basis rather than only during prescribed periods. Consequently, half of the period covered by the present report (2005) involved the operation of mobile RBT during prescribed periods only.

All general patrol and traffic vehicles are equipped with a preliminary breath testing device. 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 to be used in prosecution. This must be completed within two hours of the last known time of driving. Those found to be over the prescribed limit in the evidentiary test are officially recorded as having exceeded the prescribed concentration of alcohol.

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 of which six are located in the Adelaide metropolitan area and eight are 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. Police from a centrally controlled RBT unit also travel out to LSAs and assists in RBT operations.

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. Note that some of the tables could not be completed because 2005 data were not available. There were problems with data migration and extraction from a new SAPOL data warehouse. Consequently, a detailed analysis of the effectiveness of RBT, particularly the introduction of unrestricted mobile RBT in mid 2005, was not possible.

The following data represent a combination of both static and mobile testing to give a complete picture of the operation and effectiveness of RBT in South Australia. Table 2.1 and Figure 2.1 summarise the changes in the number of random breath tests conducted from 1995 to 2005 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, 1995-2005

Year	Metro	Rural	Total	% difference from previous year
1995	176,038	43,993	220,031	-9.0
1996	241,732	81,484	323,216	46.9
1997	431,784	185,721	617,505	91.1
1998	369,882	211,044	580,933*	-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	395,609	246,225	641,834	-1.8

*NB: 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.

A consultancy report in 1996 recommended that the South Australian 1995 RBT numbers be doubled (Vulcan, Cameron, Mullan & Dyte, 1996). Funding was then increased to enable the police to purchase more equipment and increase police overtime hours to operate additional RBT activities. 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 by 91 per cent over the previous year and exceeded the target level. The testing target was increased to 600,000 tests per year in 1999 and remains unchanged. This current testing target is intended to test an average of one in every two licensed drivers in South Australia.

The total number of tests (641,834) performed in 2005 exceeded the target of 600,000. This level of testing was only marginally lower than the previous year. RBT testing levels increased by 8.4 per cent in metropolitan areas but decreased by 14.6 per cent in rural areas.

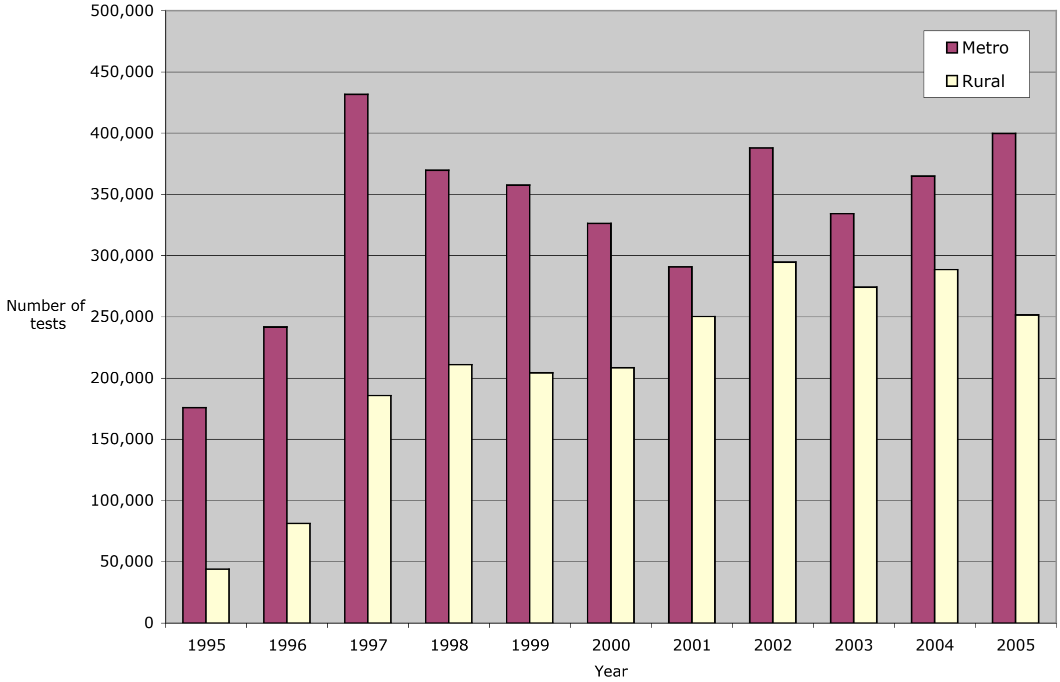

Figure 2.1
Number of random breath tests in South Australia, 1995-2005

Table 2.2 shows the number of random breath tests conducted from 2003 to 2005 by static and mobile testing methods. The low proportion of mobile RBT testing in 2003 would be due to mobile RBT commencing operation only 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.

Table 2.2
Number of random breath tests conducted in South Australia by testing method, 2003-2005

Year	Static	Mobile	Total	% Mobile
2003	595,458	13,191	608,649	2.2
2004	607,303	46,030	653,333	7.0
2005	562,686	79,148	641,834	12.3

DAY OF WEEK

The number of random breath tests performed on each day of the week, as a percentage of all tests in a year, for the years 1995 to 2004 are presented in Table 2.3. Data were not available for 2005.

Table 2.3
Random breath tests performed by day of week, 1995-2005 (expressed as a percentage of total tests each year)

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1995	13.9	13.3	13.3	12.8	20.4	15.6	10.7
1996	11.8	11.9	10.4	9.9	33.9	13.4	8.7
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	Data not available						

Table 2.4 shows the day of week mobile RBT data for 2004 and 2005. Data for static RBT from 2005 were not available. The day of week of testing indicates that mobile RBT was conducted predominantly from Friday to Sunday. This would have been the result of 'prescribed periods' for mobile RBT being more likely to include weekends. Interestingly, even though mobile RBT was on a full time basis for six months in 2005, the spread of hours over by day of week was very similar to the previous year.

Table 2.4
Random breath tests performed by day of week in 2004 and 2005 (expressed as a percentage of total tests each year) for mobile RBT

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2004	11.9	6.1	5.8	9.6	20.2	26.7	19.6
2005	11.0	8.8	7.6	9.1	18.7	26.4	18.5

TIME OF DAY

The percentage of tests performed from 1995 to 2004 by time of day is summarised in Table 2.5. Data for 2005 were not available.

Table 2.5
Random breath tests performed by time of day, 1995-2005 (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
1995	11.4	4.7	2.3	1.2	0.9	13.9	14.3	31.8	19.7
1996	10.7	3.5	1.6	6.7	2.1	12.2	10.6	38.6	13.9
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	Data not available								

Time of day mobile RBT data for 2004 and 2005 are shown in Table 2.6. Data for static RBT by time of day in 2005 were not available. In 2005, mobile RBT testing was conducted most frequently at night during the hours from 6pm to 2am, similar to 2004.

Table 2.6
Random breath tests performed by time of day in 2004 and 2005 (expressed as a percentage of total tests in the year) for 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	10.4	3.4	1.5	18.4	8.1	8.8	14.7	19.9	14.6
2005	11.1	3.6	1.8	18.9	7.8	9.3	13.0	16.4	18.0

The percentage of mobile RBT tests per month, by location for 2005 are shown in Table 2.7. Data for static RBT by month were not available in 2005. The uneven distribution of mobile RBT from January 2004 until May 2005 would be due to the legislative requirement for testing only during 'prescribed periods'. During this period, high levels of testing are associated with Easter, Christmas, and school holidays. The amount of mobile testing increased from June 2005, coinciding with the commencement of full time mobile testing.

Table 2.7
Random breath tests by month in 2004 and 2005 (expressed as a percentage of total tests in the year), by location for mobile RBT

Month		2004			2005	
	Metro	Rural	Total	Metro	Rural	Total
Jan	14.8	15.3	15.2	9.3	10.7	10.9
Feb	0.0	0.0	0.0	0.0	0.1	0.0
Mar	2.1	2.3	2.3	3.4	6.9	5.6
Apr	16.2	18.1	17.6	3.8	7.9	6.3
May	5.6	6.3	6.2	3.4	4.2	3.8
Jun	5.5	5.2	5.3	13.2	10.3	11.3
Jul	16.5	16.5	16.5	6.9	10.1	8.9
Aug	1.0	0.9	0.9	13.0	10.8	11.6
Sep	5.2	5.7	5.6	9.8	9.2	9.4
Oct	4.8	8.8	7.7	9.7	9.4	9.5
Nov	3.0	3.6	3.4	13.0	9.7	10.8
Dec	25.2	17.2	19.4	14.4	10.8	12.0
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 1995 to 2005 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). The percentage of licensed drivers tested in 2005 was slightly lower than the previous year but remained at a relatively moderate to high level (58.7%).

Table 2.8
Number and percentage of licensed drivers tested in South Australia, 1995-2005

Year	Number of tests	Number of licensed drivers	% of licensed drivers tested
1995	220,031	974,756	22.6
1996	323,216	989,718	32.7
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	641,834	1,093,550	58.7

Source: Driver's Database, Registration and Licensing Section, Transport SA
NB: Licence data reported at 30 June 2005.

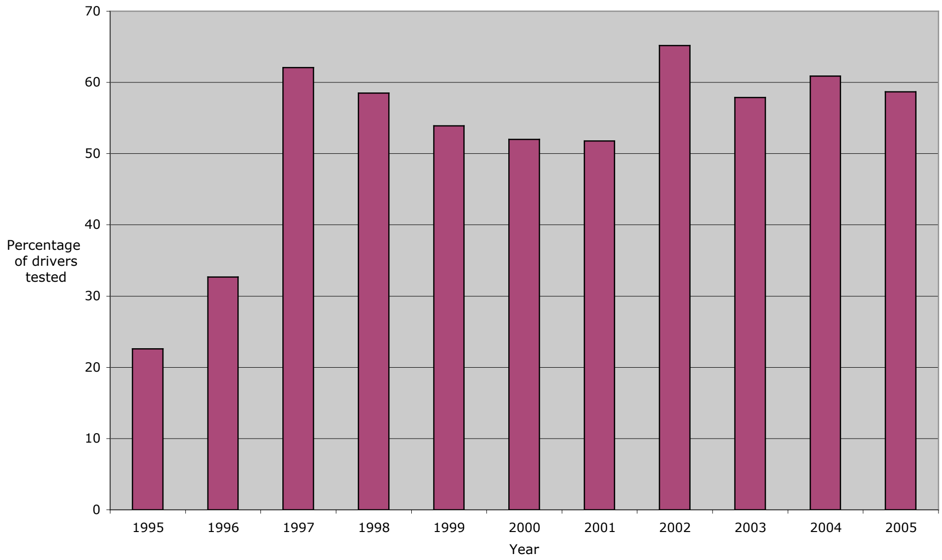

Figure 2.2
Percentage of licensed drivers tested, 1995-2005

2.1.3 Interstate comparisons

To establish standards against which South Australian practices may be compared, it was thought useful to determine the levels of RBT conducted in other Australian jurisdictions. Table 2.9 shows the levels of overall RBT in seven Australian jurisdictions, including South Australia, with total numbers expressed, where possible, in terms of the relative contributions of mobile and static testing methods. In 2005, the highest levels of RBT were conducted in Victoria (even though data for December were missing) and New South Wales, followed by Queensland. Similar to the previous year (see Baldock et al, 2007), the proportion of all RBT that was conducted using mobile testing methods was much higher in all other jurisdictions than in South Australia. However, the proportion of mobile testing in South Australia did increase from 7 per cent in 2004 to 12 per cent in 2005.

Table 2.9
Number of random breath tests conducted in six Australian jurisdictions in 2005, by testing method

Jurisdiction	Static	Mobile	Total	% Mobile
South Australia	562,686	79,148	641,834	12.3
New South Wales	2,731,528[a]	646,092	3,377,620	19.1
Northern Territory	UK	UK	6,047	UK
Queensland	1,949,214	893,374	2,842,588	31.4
Tasmania	168,658	366,144	534,802	68.5
Victoria[b]	2,629,505 [c]	806,028	3,435,533	23.5
Western Australia	UK	UK	711,768 [d]	UK

[a] Total includes 251,053 tests conducted from RBT 'bus units'

[b] Static (other than booze bus RBT) and mobile RBT tests do not include data for December 2005. This was not available at the time of the data request.

[c] Total includes 1,437,122 tests conducted using RBT 'booze buses'.

[d] Total includes 250,701 tests conducted from RBT 'booze bus units'.

NB: UK = unknown

A more appropriate measure of RBT levels in different jurisdictions can be gained by adjusting RBT numbers for the number of drivers in each jurisdiction. To avoid any difficulties associated with differences in licensing conditions across jurisdictions, a simpler measure is breath tests per head of population. As population here refers to total population, and not driving age population, the figures in Table 2.10 will not be of great value beyond the context of the table. That is, they only provide a means by which to compare jurisdictions. When RBT levels are expressed as rates per head of population (Table 2.10), the highest rates of RBT were reported for Tasmania, followed by Queensland and Victoria. South Australia's level of RBT was similar to 2004 (42.6%) but better that Western Australia in 2005.

Table 2.10
Number of random breath tests conducted in six Australian jurisdictions in 2005, as a percentage of population

Jurisdiction	Total	Pop 2005 [a]	% of Pop
South Australia	641,834	1,546,300	41.5
New South Wales	3,377,620	6,803,000	49.7
Northern Territory	6,047	204,500	3.0
Queensland	2,842,588	4,001,000	71.0
Tasmania	534,802	487,200	109.8
Victoria [b]	3,435,533	5,052,400	68.0
Western Australia	711,768	2,028,700	35.1

[a] Source: December 2005 estimated resident population data from Australian Bureau of Statistics (2006) *Australian Demographic Statistics.* Catalogue No 3101.0.

[b] RBT tests (other than booze bus RBT) do not include data for December 2005. This was not available at the time of the data request.

2.2 Levels of drink driving

2.2.1 RBT detections

The number of RBT detections, for the years 2000 to 2005, 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. That is, 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 Table 2.11. It can be seen that the number of RBT detections has risen each year since 2000 with 4,973 detections in 2005 being the highest number recorded during this period. The increase in detections from 2004 to 2005 of 42 per cent was also the largest increase during this period.

Table 2.11
Number of RBT detections in South Australia, 2000-2005

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

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 1995 to 2005 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 RBT detection rate in 2005 was higher than that in 2004 for both metropolitan and rural areas. The overall detection rate was the highest since 1997 and the highest on record for rural regions. It is likely that the higher detection rates are due to the introduction of full time mobile RBT halfway during 2005.

Table 2.12
RBT detection rates, 1995-2005 (number of drivers detected with an Illegal BAC per thousand tested)

Year	Metro	Rural	Total
1995	7.1	6.3	7.0
1996	6.2	4.7	5.8
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

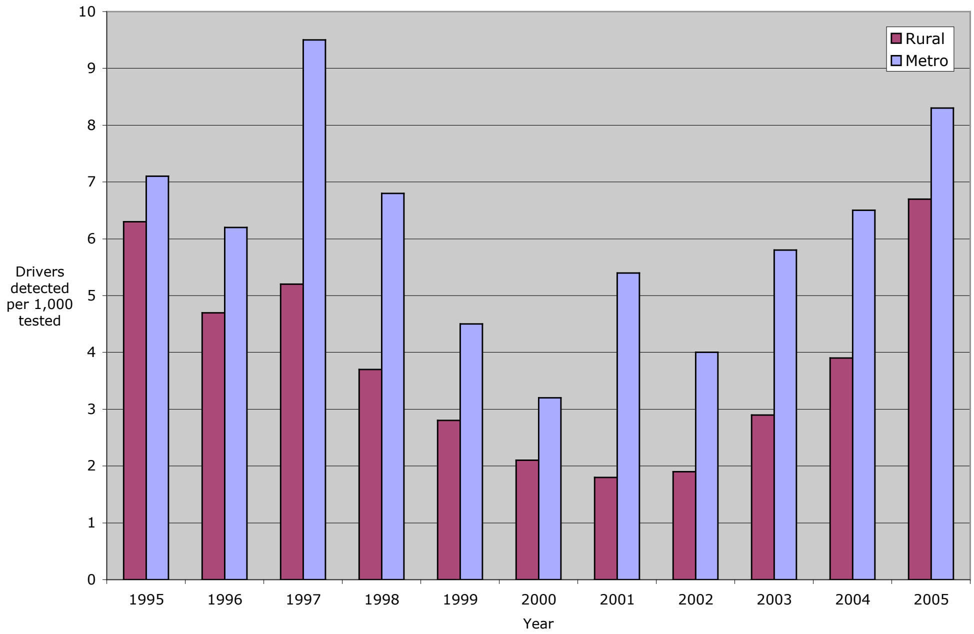

Figure 2.3
RBT detection rates per thousand tests, 1995-2005

The detection rates associated with static and mobile RBT in metropolitan and rural areas from 2003 to 2005 are shown in Table 2.13. Note, however, 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. It also shows a greater rate of detection with mobile RBT in 2003 than in subsequent years. This could be due to drivers in 2003 being less aware that mobile RBT was operational. Mobile detection rates in 2005 were similar to rates in 2004, although there was a slight decrease in mobile rates for the metropolitan area. Interestingly, static RBT detection rates have continued to increase in 2005.

The ratio of mobile to static RBT detection rates shows that mobile RBT has consistently been more effective in rural areas.

Table 2.13
RBT detection rates (screening test only), 2003-2005 (number of drivers detected with an Illegal BAC per thousand 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

TIME OF DAY

Table 2.14 shows RBT detection rates (evidentiary test results) by time of day. Data for 2005 were not available.

Table 2.14
RBT detection rates by time of day, 2000-2005 (number of drivers detected with an Illegal BAC per thousand 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								

Mobile detection rates by time of day for 2004 and 2005 are shown in Table 2.15. Again, note that these detection rates, unlike those in Table 2.14, are *not* for drivers detected with illegal BACs in evidentiary tests but are for drivers detected with illegal BACs in the initial screening test. Therefore, the figures in Table 2.15 will be higher than those in Table 2.14. Static RBT detection rates were not available in 2005 to examine 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.

During 2005, the dispersion of mobile RBT detections over the course of the day was consistent with the previous year, with higher detection rates being evident from midnight to 6am. With regard to location, mobile RBT detection rates fluctuated in both metropolitan and rural areas by time of day but generally followed the overall trend.

Table 2.15
Mobile RBT detection rates (screening test only) in 2004 and 2005 (number of drivers detected with an Illegal BAC per thousand tested) by time of day and location

Year	12-2 AM	2-4 AM	4-6 AM	6 AM-2 PM	2-4 PM	4-6 PM	6-8 PM	8-10 PM	10-12 PM
2004									
Metro	91.10	127.4	74.87	15.23	16.85	18.40	41.55	32.93	43.65
Rural	49.50	75.69	103.1	6.14	12.39	16.97	21.62	19.73	36.71
Total	57.87	92.86	87.90	9.30	13.67	17.26	26.02	23.31	38.51
2005									
Metro	73.00	80.16	93.90	2.80	15.00	9.88	36.34	26.85	40.68
Rural	48.04	91.67	65.53	4.60	13.28	20.99	18.88	27.12	36.94
Total	55.13	85.50	85.81	7.40	13.72	17.04	24.21	27.02	38.44

DAY OF WEEK

Detection rates by day of week for mobile RBT, presented separately for metropolitan and rural testing, are provided in Table 2.16. Note, again, that detections here are for drivers testing positive on the screening test rather than on the evidentiary test. In general, 2005 mobile detection rates were higher later in the week in both locations, similar to the previous year.

Table 2.16
Mobile RBT detection rates (screening tests only) in 2004 and 2005 (number of drivers detected per 1,000 tested) by day of week and location

Year	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2004							
Metro	24.3	30.3	37.4	47.8	44.1	41.0	41.3
Rural	17.0	17.6	22.6	31.2	22.6	30.8	25.4
Total	19.4	22.3	28.4	35.9	27.6	33.2	29.5
2005							
Metro	22.8	18.0	29.4	31.6	31.5	40.6	38.5
Rural	19.9	17.2	21.0	34.6	33.2	27.1	29.7
Total	21.1	17.6	24.3	33.5	32.6	31.9	32.7

RBT DETECTION RATES BY MONTH

Mobile RBT detection rates by month are shown in Table 2.17 for both metropolitan and rural areas for 2004 and 2005. Monthly static RBT detection rates were not available for 2005. Note, again, that these detection rates refer to the results of screening tests, not evidentiary tests. There are no clear patterns of results according to month of the year. Mobile detection rates did not appear to change significantly after the introduction of full time mobile RBT in June 2005. The aberrant mobile detection rates for February are a result of very low hours of operation and, consequently, few detections.

Table 2.17
Mobile RBT detection rates by month in 2004 and 2005 (number of drivers detected with an Illegal BAC per thousand tested), by location

Month	2004			2005		
	Metro	Rural	Total	Metro	Rural	Total
Jan	47.2	32.1	36.1	40.3	28.3	32.5
Feb	0.0	0.0	0.0	0.0	115.4	93.8
Mar	42.3	30.5	33.5	59.6	22.8	31.3
Apr	37.2	17.1	22.1	47.9	18.8	25.4
May	35.8	18.8	23.0	49.9	27.3	34.7
Jun	20.6	26.4	24.8	27.2	24.8	25.8
Jul	46.3	30.0	34.4	47.4	34.9	38.5
Aug	23.6	26.4	25.6	27.8	28.7	28.3
Sep	23.1	33.7	31.1	35.7	27.1	30.5
Oct	53.2	22.8	27.9	22.4	27.7	25.7
Nov	43.2	25.7	29.8	24.2	23.1	23.6
Dec	34.5	23.9	27.6	26.4	33.6	30.4
Total	38.7	25.4	29.0	32.4	27.4	29.3

RBT DETECTION RATES BY SEX

RBT detection rates by sex were not available for 2005. In general, the rate of drink driving detections per license driver for males is more than three times the rate for females (see Wundersitz, Baldock, Woolley & McLean, 2007).

RBT DETECTIONS BY BAC READING

The number of drink drivers detected by RBT in metropolitan and rural regions by BAC category is displayed in Table 2.18. The table includes all drivers detected during evidentiary testing because BAC's are not recorded for the screening test. Thus, BAC readings are not available separately for static and mobile RBT. A number of BAC readings were recorded in the range from zero to 0.049. These low readings may be attributed to drivers recording a higher BAC on the screening test and a lower evidentiary test reading after some time had elapsed. Additionally, some drivers have 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. BAC category data were not available for 2005.

Table 2.18
Number of drivers detected by RBT by BAC category and region, 2000-2005

	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								

2.2.3 Interstate comparisons

Data concerned with RBT detections were obtained from a number of Australian jurisdictions and are shown in Table 2.19. Again, for ease of comparison, these are expressed in terms of detections per head of population. South Australian RBT detections are given for screening test data, not evidentiary testing. None of the other jurisdictions specified whether detections were based on screening or evidentiary testing. In each of the three large eastern states, between 24,000 and 32,000 drink drivers were detected by RBT in 2005. Note that the number of detections for Victoria is likely to be an underestimate because RBT detection data for December 2005 were unavailable (apart from booze bus RBT detections). When adjusted for population, Tasmania had the highest detection rate and South Australia and New South Wales had the lowest. However, the number of detections and, consequently, the detection rate for New South Wales is likely to be an overestimate in comparison to other jurisdictions because detections from crashes are included in this total.

Of interest, a comparison of Tables 2.9. 2.10 and 2.19 reveals a trend for the jurisdictions with the highest testing rate per capita and the greatest proportion of testing using mobile methods to have the highest detection rates, and vice versa. This trend was first observed in 2004 data (see Baldock et al, 2007), with some inconsistencies. One anomaly in 2005 was that South Australia's detection rate was similar to that in New South Wales despite a lower proportion of tests conducted with mobile testing.

Overall, in 2005, South Australia had the third lowest rate of testing per head of population (out of 7 jurisdictions for which data were available), the lowest proportion of tests conducted using mobile methods (out of five), and the lowest drink driving detection rate per capita (out of six – although the South Australian rate may have been higher than that in New South Wales if crash-related drink driving detections were eliminated from NSW data).

Table 2.19
RBT detections in 2005 in six Australian jurisdictions

Jurisdiction	RBT Detections	% of Population
South Australia	6,037	0.39
New South Wales [a]	29,194	0.39
Queensland	32,246	0.73
Tasmania	4,076	0.84
Victoria [b]	24,569	0.49
Western Australia	14,055	0.69

[a] Includes detections following a crash, not RBT detections only

[b] RBT detections (other than booze bus RBT) do not include data for December 2005. This was not available at the time of the data request.

Detection rates taking into account the number of drivers tested, are 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 four Australian jurisdictions, including South Australia. South Australian detection rates (screening test only) are compared to rates in these jurisdictions for static and mobile methods, in 2005, in Table 2.20. South Australia had a relatively high detection rate per thousand tested that was slightly lower than Queensland but higher than Victoria and Tasmania. South Australia recorded the highest mobile detection rate of these jurisdictions (29%).

Table 2.20
RBT detection rates, 2005, (number of drivers detected with an illegal BAC per thousand tested) for selected Australian jurisdictions for static and mobile

Jurisdiction	Static	Mobile	Total
South Australia	6.6	29.3	9.4
Queensland	6.9	17.6	10.3
Tasmania	2.0	10.2	7.6
Victoria [a]	3.0	20.8	7.2

[a] Static (other than booze bus RBT) and mobile detections do not include data for December 2005. This was not available at the time of the data request.

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. Limitations in the matching process for blood samples with the Department for Transport, Energy and Infrastructure Traffic Accident Reporting System (TARS) database, and the infrequency with which police measurements are made and recorded for drivers who do not go to hospital, mean that not all drivers involved in a crash have a known BAC (Kloeden, McLean & Holubowycz, 1993).

Table 2.21 and Figure 2.4 show the BAC distributions of drivers who were fatally injured in a road crash and for whom a BAC was recorded. The results for 2005 are indicative of a comparable level of alcohol involvement in fatal crashes to the previous year. The percentage of fatally injured drivers with a BAC above 0.05g/100ml was around 34 per cent in 2005, a relatively high level for the period recorded in the table. The percentage of drivers with high BAC levels, above 0.200 g/100ml, has increased notably in recent years (i.e. 6.2%

in 2003, 13.7% in 2004, and 20.3% in 2005). 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 2.22 and Figure 2.5 for the results for serious injuries). Moreover, the proportion of known BAC levels decreased significantly in 2005 to 80 per cent, the lowest level for the years recorded in Table 2.21. The low proportion of known cases is of considerable concern because BAC data for deceased drivers should be routinely acquired from autopsy toxicology reports.

Table 2.21
Percentage of drivers and motorcycle riders fatally injured in road crashes by known BAC category, 1995-2005

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
1995	69.57	2.17	2.17	1.09	10.87	13.04	1.09	28.26	92	95.83	96
1996	63.92	4.12	1.03	3.09	13.40	12.37	2.06	31.95	97	90.65	107
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

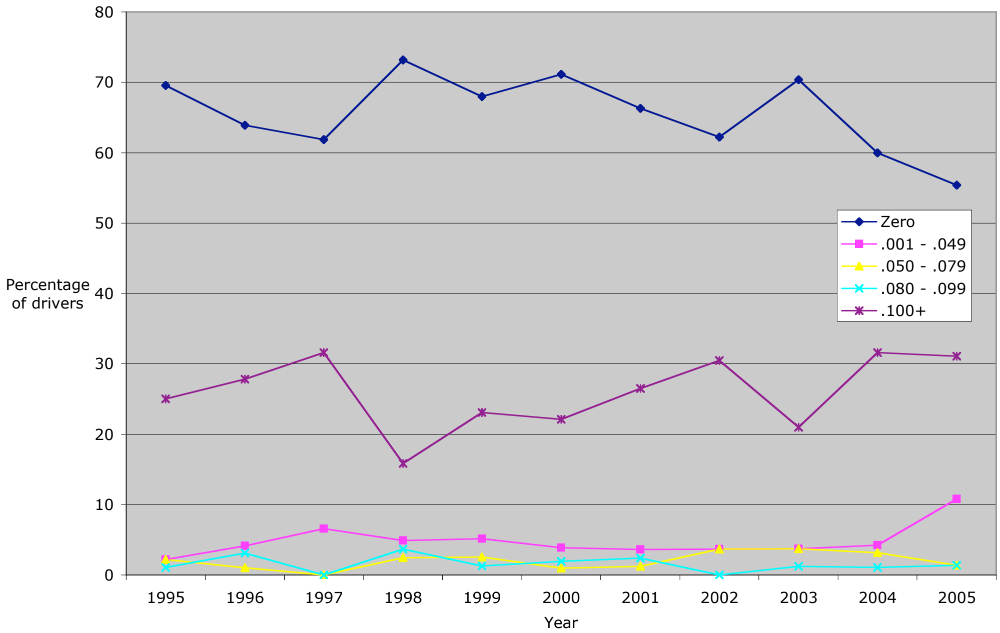

Figure 2.4
Percentage of drivers and motorcycle riders fatally injured by known BAC category, 1995-2005

The percentage of drivers seriously injured by known BAC levels is presented in Table 2.22 and shown graphically in Figure 2.5. 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 2005, approximately 22 per cent of drivers seriously injured in a crash had a BAC of .050g/100ml or greater, which was slightly higher than the previous years. The percentage of drivers with a BAC above 0.100 g/100ml in 2005 was 18.8 per cent, which was also slightly higher than previous years. Note that the percentage of seriously injured drivers with a BAC above 0.100g/100ml was considerably smaller than the percentage above this BAC level for fatally injured drivers (31.1%, refer to Table 2.21). The percentage of known BAC levels for seriously injured drivers in 2005 increased slightly but still remained at a low level of about 66 per cent.

In summary, these results are indicative of a slightly higher level of alcohol involvement in serious injury crashes and similar levels of alcohol involvement for fatal injury crashes (although higher BAC levels) for 2005 compared to previous years.

Table 2.22
Percentage of drivers and motorcycle riders seriously injured in road crashes by known BAC category, 1995-2005

Year	Zero	.001 - .049	.050 - .079	.080 - .099	.100 - .199	.200 - .299	.300+	> .050	Number of known cases	% known	Total number
1995	73.20	3.45	2.19	2.04	13.79	5.02	0.31	23.35	638	79.65	801
1996	78.05	4.16	1.43	0.91	11.82	3.51	0.13	17.80	770	79.55	968
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

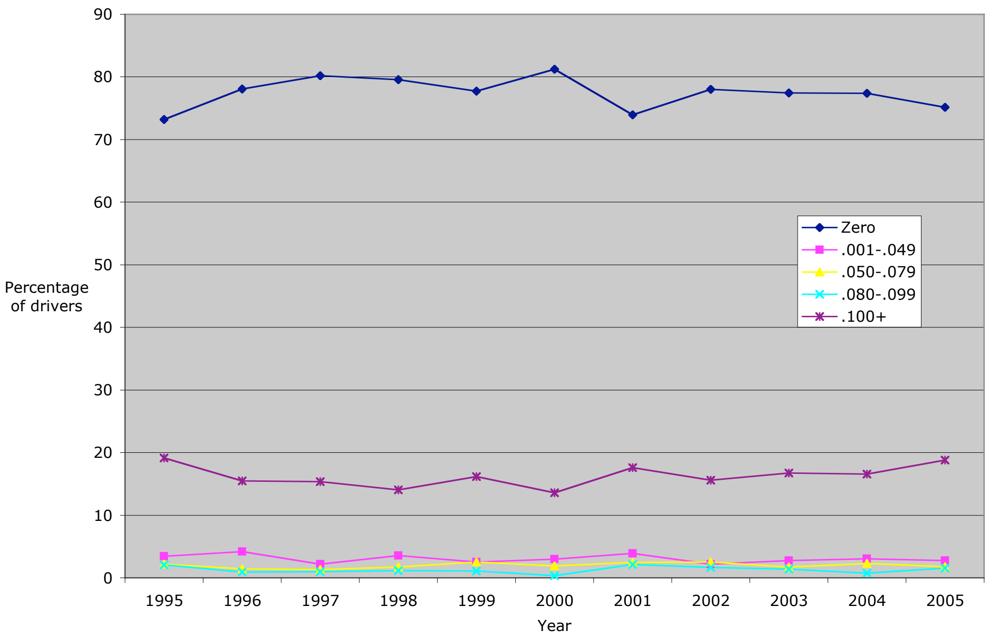

Figure 2.5
Percentage of drivers and motorcycle riders seriously injured by known BAC category, 1995-2005

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

During 2005, publicity campaigns continued to target drink driving and support random breath testing operations. A publicity campaign previously used in 2004 continued in the Adelaide metropolitan area and South Australian rural regions in the first half of 2005. The campaign was intended to highlight the potential consequences of drink driving and the risk of being detected by police. The primary audience for the campaign was drivers aged 18 to 29 years but it was also expected that all drivers and riders would be receptive to the messages.

A television commercial titled "The Moment of Decision" was aired during January (to coincide with school holidays and enforcement campaigns), and in May. This advertisement highlighted the decision to drive after drinking and the consequences of this decision. The campaign was supplemented by billboard advertisements and radio commercials.

A new anti-drink drive campaign was introduced in the latter half of 2005. This campaign had a similar focus to the previous campaign, being designed to highlight the risks and consequences associated with drink driving. However, this campaign also aimed to portray drink driving as an antisocial behaviour and reinforce the importance and responsibility of designated drivers. The main target audiences were young drivers, particularly males aged 16 to 39 years, and motorcyclists. The same campaign was adopted in the Adelaide metropolitan area and rural regions. The new campaign slogan was "0.05. The Point of No Return".

As part of this campaign, two new television commercials were developed. One featured a central male character "Twin Boy", and the other featured a central female character "Twin Girl". These commercials depicted the consequences of what happens if a driver is just a bit over the legal limit. For example, a driver may be able to steer a vehicle but their ability to make instant decisions is impaired.

The campaign was accompanied by Internet advertising on official Australian Football League websites (Adelaide Crows and Port Power), convenience advertising (posters and urinal stickers "Aim below 0.05"), and drink drive messages delivered by RADD (Recording Artists, Athletes and Actors Against Drink Driving). To further supplement the campaign, a segment on the "Motovision" television show on Channel 9 was purchased. This resulted in free exposure on the Channel 9 television news service.

The television campaign was aired in September to coincide with football finals and in December to tie in with Christmas. Supplementary advertising was distributed and promoted during September, October and December. Extra advertisements were placed in the press and on television in the Riverland during the RAID (drink driving) police enforcement campaign in December.

An additional anti-drink drive campaign featured during November and December of 2005 to inform South Australian drivers about the new "immediate loss of licence" drink drive legislation. The legislative campaign aimed to inform drivers of the new drink driving offence and the associated penalties including loss of licence for drivers registering a BAC of 0.08 and above. The campaign message was communicated primarily through radio and press, and targeted all road users, particularly young male drivers from rural areas.

Estimated costs for anti-drink driving advertising for the calendar year 2005 totalled $824,875. This was a six per cent increase since the last reported campaign costs in 2004 of $775,371 (Baldock *et al.*, 2007). In 2005, $552,916 was spent on media and planning, and $271,959 spent on production. Note that costs for the drink driving legislative campaign are not included in the total cost. The legislative changes campaign expenditure was $112,968 but this also included advertising that promoted changes to speeding legislation.

3 Speeding

This section explores performance indicators for speed enforcement. Current speed enforcement methods of operation will be 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 2005 is provided.

3.1 Speed enforcement practices and levels of operation

Effective speed enforcement is required to create high levels of both specific deterrence, through high levels of apprehension and punishment, and general deterrence, through the belief in the high likelihood of encountering speed limit enforcement. Current theories of speed management in Australia contend that balanced methods of covert and overt, and static and mobile, enforcement are required to deter motorists, both specifically and generally (McInerney, Cairney, Toomath, Evans & Swadling, 2001; Wundersitz, Kloeden, McColl, Baldock & McLean, 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).

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 the 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. Due to data retrieval problems, police were unable to provide the number of staff and speed cameras available for use in 2005 (there were 37 staff and 17 cameras in 2004). The speed cameras operate from unmarked vehicles to give some degree of anonymity 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), which reduces 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 15 December, 2003. DTEI records indicate that there were 28 sites in which 17 dual purpose cameras were operating. This is similar to the level reported by DTEI in 2004 (27 sites, 16 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 booked. Hand held radars are used more frequently on open roads, with few operating in the metropolitan area. SAPOL were unable to provide the number of non-camera speed detection devices used in metropolitan and rural areas during 2005. Therefore, the number of non-camera detection devices for 2004 are presented in Table 3.1 to give an idea of previous levels. Laser gun devices were the most common form of non-camera speed detection in South Australia at this time.

Table 3.1
Non-camera detection devices used in South Australia, 2004

Non-camera detection devices	Metro	Rural	Total
Lasers	85	73	158
Mobile Radars	45	46	91
Handheld Radars	9	25	34

The coordination of police operated speed detection is managed by Police 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 laser per day. 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.

3.1.1 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 2005, is depicted in Figure 3.1. The location of the speed detection device determines whether speed detection hours are recorded as metropolitan or rural.

In 2005, the total number of speed detection hours for South Australia increased by approximately 34 per cent to the highest recorded level during this time period. The increase in speed detection was evident for both metropolitan and rural areas (36% and 32% increase, respectively). 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.

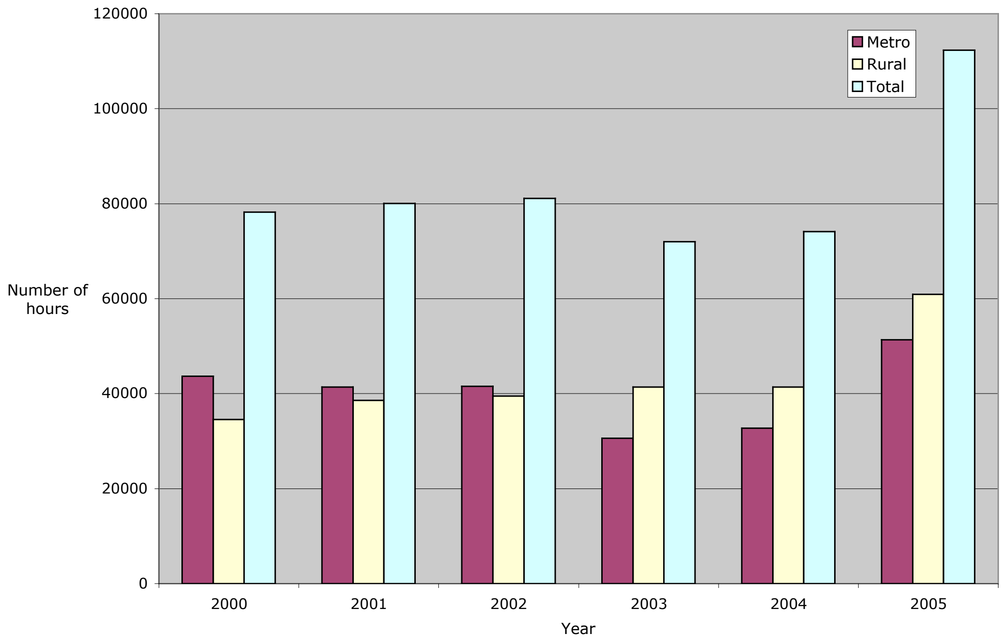

Figure 3.1
Number of speed detection hours in South Australia, 2000-2005

Table 3.2 summarises the hours spent on speed detection by speed cameras only from 2000 to 2005 for metropolitan and rural areas. Speed cameras were used predominantly in the metropolitan area. The number of hours for speed camera operation have steadily increased since 2003, and rose by 22 per cent in 2005. However, 2005 levels are still below those recorded before 2003.

Table 3.2
Number of hours for speed detections by speed cameras in South Australia, 2000-2005

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

In contrast to speed cameras, non-camera devices were used more widely in rural areas (see Table 3.3). Non-camera devices include laser guns, mobile radar and handheld radar. In 2005, the total number of non-camera hours increased considerably (66%), to the highest level recorded from 2000 to 2005. Large increases were reported in both rural (51%) and metropolitan areas (112%).

Table 3.3
Number of hours for speed detections by non-camera devices in South Australia, 2000-2005

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

DAY OF WEEK

The number of hours spent on speed detection from 2000 to 2005 by day of week is presented in Table 3.4 for speed cameras and in Table 3.5 for non-speed camera devices. Speed detection hours are given in terms of the percentage of all tests performed 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 3.4
Number of speed detection hours for speed cameras by day of week, 2000-2005 (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

Table 3.5
Number of speed detection hours for non-camera devices by day of week, 2000-2005 (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

TIME OF DAY

Figure 3.2 depicts 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 2005. 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 was a noticeable dip in the distribution of detection hours around lunchtime (12 - 2pm). In 2005, there was also a dip in detections from 4 to 6pm.

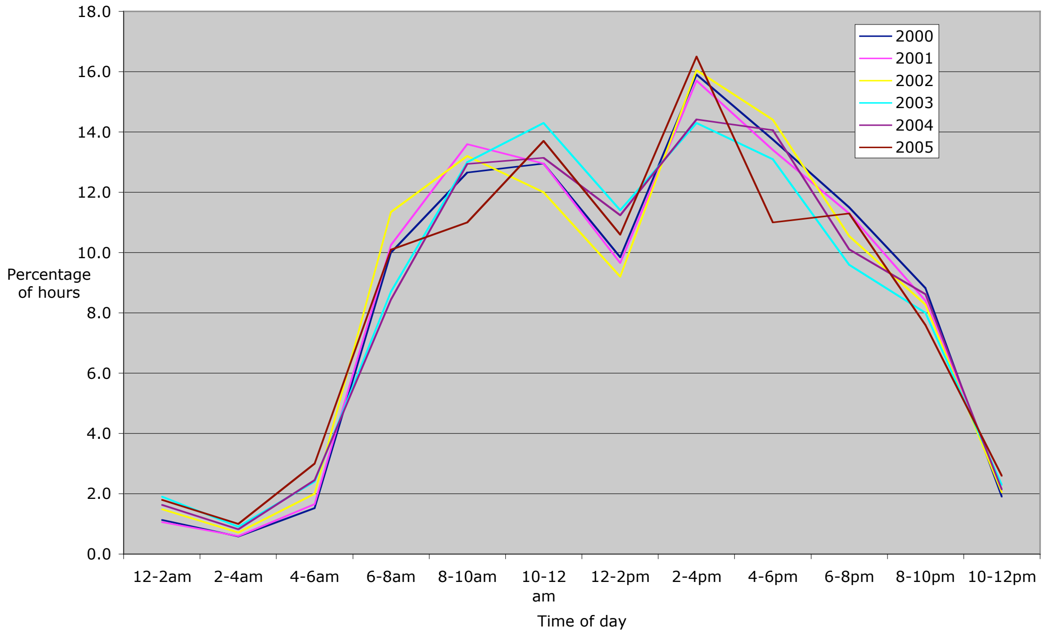

Figure 3.2
Hours spent on speed detection in South Australia by time of day, 2000-2005

The distribution of hours spent on speed detection by time of day is presented separately for speed cameras (Table 3.6) and for non-camera devices (Table 3.7). In 2005, the distribution of speed camera hours by time of day differed slightly from that of previous years. Speed camera detection hours increased during the hours before and after school (i.e. 6 - 8am and 2 - 4am) and from 6 to 8 pm, with decreasing detection from 8 to 10am and from 4 to 6pm. Speed cameras were operated least frequently at night and in the early hours of the morning (8pm - 6am).

Table 3.6
Number of speed detection hours for speed cameras by time of day, 2000-2005 (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

Non-camera devices were operated predominantly from 8am to 6pm. The pattern of non-camera speed detection hours closely resembled that of previous years. 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 3.2, was evident only for speed camera detection.

Table 3.7
Number of speed detection hours for non-camera devices by time of day, 2000-2005 (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

DETECTION HOURS BY MONTH

Table 3.8 shows the distribution of speed detection hours by month for speed camera and non-camera devices in 2004 and 2005. Non-camera devices were operated relatively evenly throughout the year for both 2004 and 2005. However, speed camera hours varied considerably during 2005. Very low levels of speed camera operation from July to September 2005 can be attributed to industrial action taken by speed camera operators. Most speed cameras were inactive during this three-month period. Despite this period of inactivity, the total number of hours spent on speed camera detection increased.

Table 3.8
Number of speed detection hours by month for speed cameras and non-camera devices, 2004 and 2005 (expressed as a percentage of total hours each year)

Month	2004			2005		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	4.6	9.2	7.7	14.5	8.5	10.1
Feb	8.5	7.5	7.8	9.2	7.5	8.0
Mar	9.3	6.6	7.5	7.1	9.1	8.6
Apr	7.4	9.2	8.6	14.1	8.7	10.1
May	9.7	7.3	8.1	14.5	8.3	10.0
Jun	8.5	6.8	7.4	12.2	7.3	8.6
Jul	8.2	9.4	9.0	0.0	7.8	5.8
Aug	8.7	9.2	9.1	0.1	8.9	6.5
Sep	3.8	9.2	7.4	0.2	9.1	6.7
Oct	10.2	8.5	9.0	11.3	7.6	8.6
Nov	12.2	7.5	9.1	5.9	7.5	7.1
Dec	9.0	9.5	9.3	10.7	9.7	10.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

3.2 Level of speeding

3.2.1 Number of speed detections

The number of speed detections, by speed cameras and non-cameras, in South Australia for the years 2000 to 2005 can be seen in Table 3.9. Inspection of the number of speed detections divided by the number of licensed drivers in South Australia indicates that approximately 12 per cent of licensed drivers were detected for a speeding offence in 2005.

Dual purpose red light/speed cameras operated for the first time in 2004. However, the speed camera detection data for 2005 were not available due to data extraction problems. Consequently, the total number of speed detections in 2005 will be an underestimate and cannot be directly compared with the previous year.

When not including red light speed camera detections in 2004, a decrease in the number of detections was still evident in 2005 (a 20% decrease). Of interest, only the number of speed camera detections decreased in 2005. The decrease in speed camera detections is an interesting finding given that speed camera operation hours increased by 22 per cent (even though most speed cameras were inactive for three months).

As noted in Section 2.1, 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 just over 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.

Due to the limited operation of speed cameras during a three-month period, the examination of detection rates in the next section will give a more accurate picture of the actual level of detections in comparison to previous years.

Table 3.9
Number and percentage of licensed drivers detected speeding in South Australia, 2000-2005

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*	% 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	No data	48,171	132,736	1,093,550	12.1

Source: Driver's Database, Registration and Licensing Section, Transport SA
* Licence data reported at 30 June 2005.

3.2.2 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. Speeding detection rates for camera and non-camera devices are summarised in Table 3.10 for metropolitan and rural areas, for the years 2000 to 2005. If the speeding detection rate is interpreted as the level of speeding behaviour, the results suggest that speeding has decreased since the year 2000 by around 64 per cent, to an average level of 1.2 detections per hour in 2005.

In previous years, the decrease in the detection rate was observed primarily in the camera detection data, while non-camera detections have remained stable in number over this period. In 2005, however, a reduction in detection rates was noted for both speed cameras (41% decrease) and non-camera devices (39% decrease), particularly non-camera devices in the metropolitan area (50% decrease).

It is likely that the general overall reduction in the speeding detection rate since 2000 (see final column of Table 3.10) would be partly due to increases in the proportion of speed enforcement that is conducted using non-camera devices (see Table 3.2 and Table 3.3). For example, in 2005 non-camera devices comprised 73 per cent of the hours spent on speed enforcement in comparison to 54 per cent in 2000. As these devices have lower detection rates than speed cameras (2.82 detections per hour in 2005 compared with 0.59 for non-camera devices), this greater use of non-camera devices would have lowered the overall detection rate. As noted previously, the main reason for this greater detection rate of speed cameras is most 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 officers to pull over and charge speeding offenders when operating these devices.

The reduction in the overall detection rate from 2004 to 2005, however, cannot be explained solely in terms of greater use of non-camera devices. The substantial decreases in detection rates for both cameras and non-camera devices in both metropolitan and rural areas is the chief reason for the overall detection rate nearly halving in 2005.

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 a later section. Incidentally, the 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 3.10
Speeding detection rates, 2000-2005 (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

DAY OF WEEK

The following tables examining detection rates per hour have been separated by detection method due to the differences in detection rates noted above. Table 3.11 indicates that speed camera detection rates were highest on weekends in 2005, consistent with previous years. Rates per day were lower in 2005 compared to 2004, reflecting the overall drop noted in Table 3.10.

Table 3.11
Speeding detection rates per hour for speed cameras by day of week, 2000-2005

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

Table 3.12 gives the detection rates for non-camera devices by day of the week from 2000 to 2005. Similar to previous years, 2005 detection rates were very consistent across the days of the week, with a slight increase on Sunday.

Table 3.12
Speeding detection rates per hour for non-camera devices by day of week, 2000-2005

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

TIME OF DAY

The speeding detection rates for speed cameras by the time of day from 2000 to 2005 are presented in Table 3.13. In 2005, speed detection rates for cameras were similar across the day. However, detection rates were much lower at night time between 6pm and 6am. The detection rate was highest in the afternoon from 2pm to 4pm.

Table 3.13
Speeding detection rates per hour for speed cameras by time of day, 2000-2005

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

Table 3.14 shows the speeding detection rates for non-camera devices by time of day for the years 2000 to 2005. In 2005, as in previous years, detection rates with non-camera devices were generally lower from midnight to 6am but this may 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 3.14
Speeding detection rates per hour for non-camera devices by time of day, 2000-2005

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

DETECTION RATES BY MONTH

The speeding detection rates by month for speed cameras and non-camera devices for 2004 and 2005 are presented in Table 3.15. During 2005, detection rates for non-camera devices were reasonably constant throughout the year. Detection rates for speed cameras were relatively consistent during the first six months of 2005 before the rate decreased considerably. Speed camera detection rates were low from July to September (when most speed cameras were inactive) and very low in November and December.

Table 3.15
Speeding detection rates per hour by month for speed cameras and non-camera devices, 2004 and 2005

Month	2004			2005		
	Camera	Non-cam	Total	Camera	Non-cam	Total
Jan	5.21	0.93	1.79	3.26	0.57	1.60
Feb	5.10	1.03	2.50	3.10	0.63	1.39
Mar	5.05	1.01	2.67	3.05	0.61	1.15
Apr	4.35	1.00	1.96	3.94	0.59	1.84
May	5.34	0.98	2.71	3.46	0.55	1.68
Jun	4.49	0.88	2.26	3.84	0.57	1.80
Jul	4.62	0.85	1.98	0.28	0.61	0.61
Aug	5.27	0.96	2.34	0.28	0.57	0.57
Sep	5.39	0.97	1.72	0.49	0.62	0.62
Oct	4.82	1.09	2.48	2.72	0.57	1.33
Nov	3.44	0.93	2.05	0.02	0.54	0.42
Dec	5.41	0.98	2.40	0.03	0.59	0.43
Total	4.80	0.97	2.24	2.82	0.59	1.18

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 3.16 shows the detection rates for males and females from 2000 to 2005 for non-camera devices. The ratio of male to female speeding detection rates in 2005 remained at a very similar level to previous years, with males 2.6 times more likely to be detected than females. Clearly, speeding continues to be a greater problem among male drivers.

Table 3.16
Number and sex of licence holders, detected speeding by non-camera devices, 2000-2005

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

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

3.2.3 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. In this section, speed detection rates are calculated based on the number of speeding vehicles per 1,000 vehicles recorded passing the detection point, to determine whether the higher detection rates in metropolitan areas may be attributed to greater traffic volumes. Equivalent data were not available for non-speed camera devices.

Table 3.17 shows the speeding detection rates per 1,000 vehicles passing the speed camera for the years 2000 to 2005. Consistent with detection rates per hour of speed enforcement, detection rates per vehicle passing also decreased in 2005, by 27%. Together, these findings suggest that the level of speeding decreased in 2005.

It can be seen that 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. While the detection rate per vehicles passing has decreased by over 50 per cent in rural areas since 2000-01, 2005 was the first year recorded in which detection rates dropped substantially in the metropolitan area.

Table 3.17
Number of vehicles passing speed cameras and speeding detection rates (per 1,000 vehicles passing), 2000-2005

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

Table 3.18 and Table 3.19 show speeding detection rates per 1,000 vehicles passing by day of week and time of day for speed cameras in the years 2001 to 2005. It is evident that higher speeding detection rates were recorded on weekends in 2005, a finding generally consistent with previous years. With respect to the time of day, detection rates were highest from midnight to 10am and lowest at night from 6pm to midnight. This pattern differs slightly from 2004 when detection rates were generally highest during daytime hours.

Table 3.18
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by day of week, 2001-2005

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

*Data unavailable but rates calculated using data for other variables

Table 3.19
Speeding detection rates for speed cameras (per 1,000 vehicles passing) by time of day, 2001-2005

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

*Data unavailable but rates calculated using data for other variables

Figure 3.3 shows speed detection rates per 1,000 vehicles passing by month of the year for the years 2003 to 2005. There is no consistent pattern across the three years. In 2005, the highest detection rates occurred from April to June. Similar to detection rates per hour, very low detection rates were observed from July to September (when most speed cameras were inactive) and in November and December. Note that a speeding campaign featured during October and November (see Section 3.3).

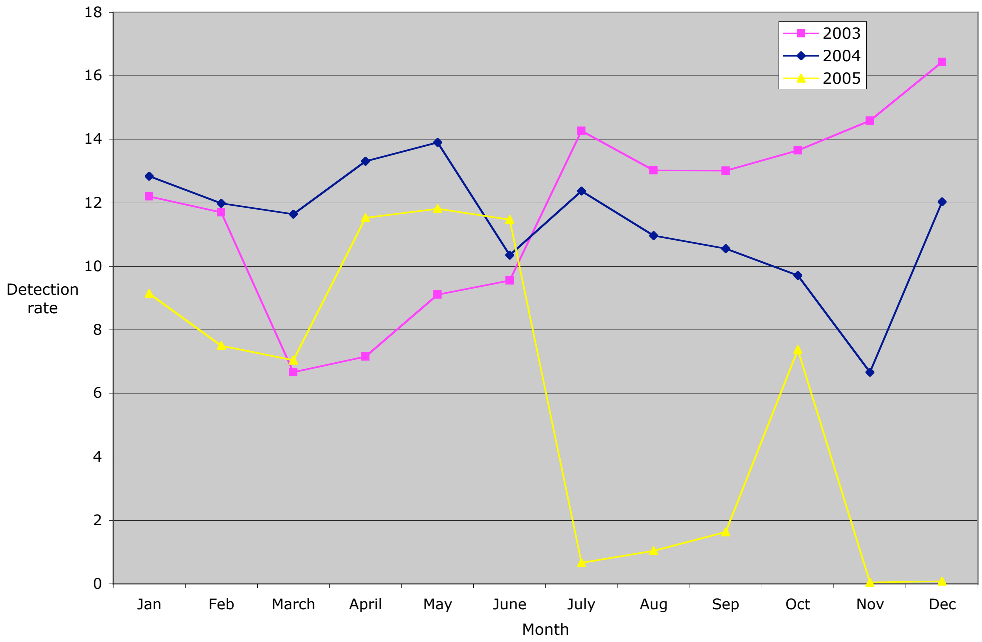

Figure 3.3
Speed camera detection rate (per 1,000 vehicles passing) in South Australia by month, 2003-2005

3.2.4 '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.

Table 3.20 indicates that there appears to have been relatively few speed-related fatal road crashes in 2005. However, the small numbers of fatal crashes makes it difficult to draw conclusions. In any case, these are certainly under estimates of the percentage of speed related crashes for the reasons given above. Table 3.21 shows that, from 2000 to 2005, 'excessive speed' was listed as the major driver error in approximately three to four per cent of serious injury crashes (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).

Table 3.20
'Excessive speed' as the apparent error in fatal crashes, 2000-2005

Year	'Excessive Speed'		Other apparent errors	Total crashes
	(N)	(%)		
2000	15	9.93	136	151
2001	21	15.44	115	136
2002	15	10.87	123	138
2003	17	12.59	118	135
2004	9	7.03	119	128
2005	11	8.73	115	126

Table 3.21
'Excessive speed' as the apparent error in serious casualty crashes, 2000-2005

Year	'Excessive speed'		Other apparent errors	Total crashes
	(N)	(%)		
2000	37	3.01	1192	1229
2001	34	2.73	1213	1247
2002	48	4.00	1151	1199
2003	37	3.17	1149	1167
2004	39	3.65	1030	1069
2005	43	4.33	949	992

Serious and fatal crashes are combined in Table 3.22 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 2005 was consistent with those of previous years. However, the proportion of 'excessive speed' crashes in rural regions increased to the highest level for all years represented in the table, and exceeded the percentage in the metropolitan area.

Table 3.22
'Excessive speed' as the apparent error in serious and fatal crashes by location of crash, 2000-2005

Year	Metro 'Excessive Speed'		Total metro crashes	Rural 'Excessive Speed'		Total rural crashes
	(N)	(%)	(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

Table 3.23 shows that the majority of serious and fatal crashes with an apparent error of 'excessive speed' have traditionally involved male drivers. In 2005, all of the drivers deemed to have been responsible for speed-related crashes were male.

Table 3.23
'Excessive speed' as the apparent error in serious and fatal crashes by sex of driver, 2000-2005

Year	Male		Female		Total 'excessive speed' crashes
	(N)	(% of known)	(N)	(% of known)	
2000[a]	44	88.00	6	12.00	52
2001	45	81.82	10	18.18	55
2002	60	95.24	3	4.76	63
2003	43	89.58	5	10.42	48
2004[b]	45	95.74	2	4.26	48
2005[c]	46	100.00	0	0.00	54

[a] 2 cases sex unknown
[b] 1 case sex unknown
[c] 8 cases sex unknown

3.2.5 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. McInerney et al. (2001) reported that regular speed information was collected in only New South Wales, Victoria, and South Australia.

This report summarises the outcomes from speed surveys, conducted by DTEI, throughout South Australia. The variables most relevant in the context of this report are:

- *Free speeds* – determined to be vehicles that have greater than a four second gap to the vehicle in front, implying that the driver is "free" to adopt a travel speed independent of influence from other traffic.
- The *mean free speed* represents the average speed of all vehicles with a gap of more than four seconds, passing a certain point on the road. Small changes in the mean free speed can reflect substantial changes to the whole speed distribution
- The *85th percentile* of free speeds is the speed below which 85 per cent of vehicles with a gap of more than four seconds are travelling. Conversely, 15 per cent of drivers choose to travel over this speed. The 85th percentile is commonly used by engineers to set road design standards and treatments.

While the speed of all vehicles is an important consideration in crash causation in general, free speeds are of interest in the context of this report as they better reflect drivers' choices of travelling speed.

URBAN ON-ROAD SPEED SURVEYS

There are no systematic on-road speed surveys conducted in the Adelaide metropolitan area. Occasionally, speed surveys are undertaken for other purposes, usually on a needs basis but they do not constitute a reliable source of data for determining historical trends.

On 1 March 2003, the default urban speed limit was reduced from 60 to 50 km/h on local roads and most collector roads. The speed limit on arterial roads remained unchanged at 60 km/h. In 2002 and 2003, speed surveys were conducted as part of an evaluation of the 50km/h default urban speed limit (see Kloeden *et al.*, 2004). In 2005, a follow-up survey of the same 50 km/h sites as presented in the 2003 report was completed by DTEI. The survey was designed to determine if the initial reductions observed after the introduction of the 50 km/h default urban speed limit have been sustained over time. Selected findings from this survey are included in this section. For the detailed outcome of this evaluation, see Kloeden et al. (2006).

Surveys of on-road vehicle speeds were conducted using traffic classifiers at 52 locations in urban areas (including the Adelaide metropolitan area and South Australian regional towns). The surveys were conducted at randomly selected sites, with 30 surveys undertaken on local access streets (18 urban, 12 rural), 12 surveys on collector roads and 10 surveys on arterial roads. The surveys were undertaken in late November and early December to match the timing with previous speed surveys. A minimum of 24 hours worth of speed data were recorded during weekdays at each site.

The free travelling speeds of all vehicles at each site were averaged for each of the three years: 2002, 2003, and 2005. These results are shown in Table 3.24. Note that the speed limit on arterial roads remained unchanged at 60 km/h.

Of the 52 sites: 41 (79%) had lower mean free travelling speeds in 2003 compared to 2002; 41 (79%) had lower mean free travelling speeds in 2005 compared to 2003; 47 (90%) had lower mean free travelling speeds in 2005 compared to 2002. Thus, overall and for each road type, the mean free travelling speed of vehicles is clearly decreasing over time.

Table 3.24
Mean free travelling speeds on the measured roads by year of survey

Road type	Road name	Mean free travelling speed 2002 (km/h)	Mean free travelling speed 2003 (km/h) [a]	Mean free travelling speed 2005 (km/h) [b]
Arterial	Prospect Road	58.6	56.3	54.7
Arterial	Tapleys Hill Road	63.0	61.6	61.0
Arterial	Montacute Road	58.8	59.3	59.0
Arterial	Goodwood Road	53.5	54.6	52.2
Arterial	Greenhill Road	55.7	52.3	52.7
Arterial	Kenihans Road	57.7	56.2	56.5
Arterial	Springbank Road	61.1	60.6	59.6
Arterial	Fullarton Road	52.4	51.9	52.2
Arterial	North East Road	61.9	62.5	61.2
Arterial	Burbridge Road	63.5	63.1	54.5
Collector	Claremont Avenue	50.2	49.4	48.2
Collector	Blair Park Drive	61.7	61.6	59.2
Collector	Seaview Road	43.7	47.9	46.1
Collector	Barcelona Road	59.9	54.1	52.8
Collector	Milan Terrace	59.1	57.9	54.4
Collector	Jetty Road	52.4	50.2	49.1
Collector	Perry Barr Road	57.3	53.0	50.7
Collector	Scenic Way	58.5	55.3	55.4
Collector	Valetta Street	55.7	52.2	49.6
Collector	Sydenham Road	49.0	47.4	46.5
Collector	Sixth Avenue	51.8	51.1	49.8
Collector	Bonython Avenue	54.0	52.4	51.9
Urban local	Bowyer Street	40.1	37.1	37.1
Urban local	Charles Road	46.2	44.1	45.3
Urban local	Adelaide Street	41.6	36.2	40.8
Urban local	Hambledon Road	53.0	48.5	50.4
Urban local	Gilbertson Road	55.6	52.7	52.5
Urban local	Northcote Street	50.2	48.5	44.5
Urban local	Vincent Road	49.7	49.6	47.1
Urban local	Andrew Avenue	37.1	36.0	33.6
Urban local	Esplanade	44.3	42.1	38.5
Urban local	Olive Avenue	40.1	41.1	37.5
Urban local	Commercial Street	43.2	40.8	37.6
Urban local	Bermudez Crescent	48.6	46.4	48.4
Urban local	London Drive	44.0	40.7	38.5
Urban local	Farrell Street	36.3	36.5	35.7
Urban local	Main Street	52.8	50.7	47.8
Urban local	George Street	33.5	29.7	30.4
Urban local	Archer Street	45.0	44.9	43.0
Urban local	Coorara Avenue	57.7	52.1	51.9
Rural local	Conroe Drive	49.8	50.5	47.9
Rural local	Reginald Street	44.2	43.8	42.7
Rural local	Stratford Street	29.0	33.6	24.2
Rural local	Cedar Avenue	56.5	52.6	50.7
Rural local	Hobbs Street	31.1	31.6	32.0
Rural local	Fiedler Street	48.8	47.7	47.1
Rural local	Meander Avenue	36.3	40.8	39.0
Rural local	Bruce Road	63.1	57.7	56.2
Rural local	Parham Crescent	45.8	46.4	45.4
Rural local	Woodford Street	32.8	32.6	32.2
Rural local	Bowman Street	41.4	41.3	40.2
Rural local	Thomas Street	30.6	29.6	32.0

[a] Red denotes an increase in the mean free speed from 2002, green denotes a decrease from 2002.
[b] Red denotes an increase in the mean free speed from 2003, green denotes a decrease from 2003.

The changes in overall mean free travelling speeds between the years for the given road types are shown in Table 3.25. Clear reductions in mean free travelling speeds are evident for all road types in the year following the introduction of the 50 km/h default limit and further reductions were also observed from 2003 to 2005.

Table 3.25
Overall relative reductions in mean free travelling speeds

Road type	Reduction in mean free travelling speed (km/h) in 2003 from 2002	Reduction in mean free travelling speed (km/h) in 2005 from 2003
Arterial*	0.72	1.57
Collector	1.77	1.76
Urban local	3.07	1.09
Rural local	1.17	1.57
All roads changed to 50 km/h	2.19	1.43

* Arterial roads retained a 60 km/h speed limit

The distributions of free travelling speeds from the 2002, 2003 and 2005 surveys are compared for collector roads in Figure 3.4. There was an obvious shift to the left since the introduction of the 50km/h urban default speed limit (evident in the 2003 and 2005 surveys) indicating an overall reduction in free travelling speeds. Similar trends were evident in the distributions for all other road types. Local roads also showed a narrowing of the distribution as the number of vehicles travelling at higher speeds decreased.

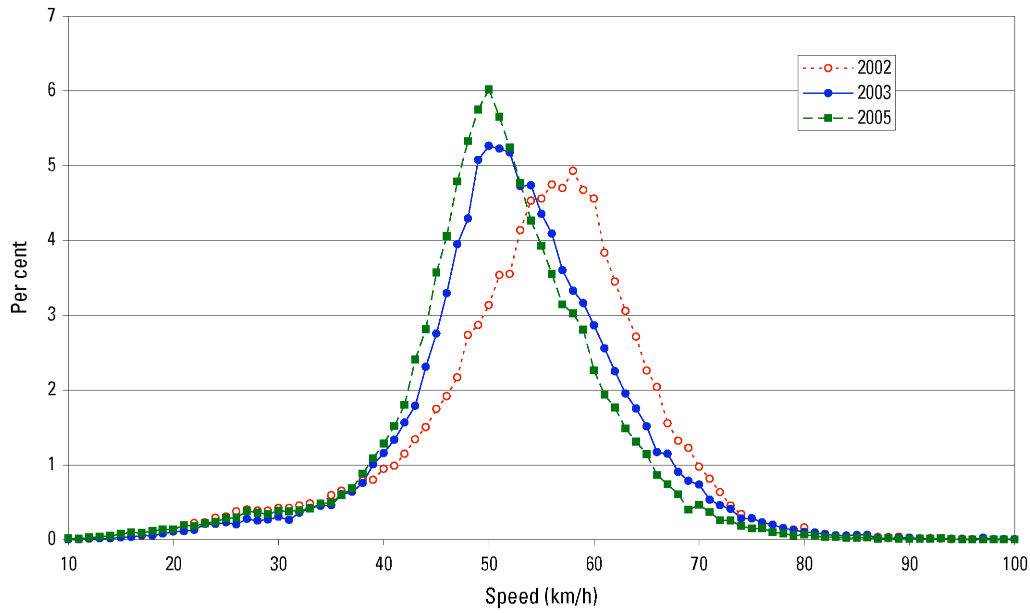

Figure 3.4
Distribution of free travelling speeds on collector roads over time

In summary, speed surveys conducted in urban areas in both rural and metropolitan environments have shown a reduction in travelling speeds in 2005, most likely associated with the introduction of the 50 km/h default urban speed limit in 2003. Arterial roads, where the speed limit remained unchanged, were also observed to have a small reduction in travelling speeds.

RURAL SPEED ON-ROAD SPEED SURVEYS

Annual on-road speed surveys using traffic classifiers have been conducted by DTEI on an annual basis from the year 2000 throughout rural South Australia. The surveys are undertaken at 21 locations: six in country towns on 60 km/h or 50 km/h speed zoned roads, six on 100 km/h zoned roads, six on 110 km/h zoned roads and three on remote outback roads. The regions for each measurement site were chosen on a convenience basis but the road to be surveyed in each region was selected randomly. The surveys are usually conducted around the beginning of August because this month was found to most closely represent the annual average daily traffic. A minimum of one week's worth of speed and volume data were collected for traffic travelling in both directions. Data presented here represent all vehicle categories.

A summary of the aggregated speed parameters and traffic volumes for all free speed vehicles in the rural speed surveys conducted from 2000 to 2005 in South Australia is shown in Table 3.26. The average of the mean and 85th percentile speeds for each speed limit group was weighted by free speed volume. Subtracting the mean from the 85th percentile speed provides an approximation of the variation in speeds. This provides an indication of the likely range of speeds of the majority of vehicles around the mean speed. Tables showing speeds for individual sites are included in Appendix A.

Table 3.26
Surveyed free speeds in rural areas for all vehicles by speed zones, 2000-2005

	Free Speeds (km/h)			Volumes (veh./week)	
	Mean	85th pc	Variation (Mean – 85th pc)	Free Speed Vehicles	All Vehicles
60 km/h					
2000	62.2	70.2	8.0	93,529	107,202
2001	62.0	69.6	7.7	94,394	110,131
2002	61.2	68.6	7.4	93,347	107,760
2003	58.7	66.2	7.4	59,801	68,254
2004	57.8	65.2	7.4	61,508	70,488
2005	59.2	66.6	7.3	61,545	70,533
100 km/h					
2000	92.5	105.9	13.4	34,694	39,925
2001	90.8	103.3	12.5	35,035	41,270
2002	91.8	104.1	12.3	35,446	41,383
2003	92.6	105.2	12.6	40,522	48,075
2004	92.8	104.8	12.0	40,473	47,147
2005	93.2	104.5	11.3	42,231	50,013
110 km/h					
2000	104.2	115.4	11.2	40,855	47,570
2001	102.0	113.3	11.2	42,243	49,287
2002	102.9	113.6	10.7	44,293	51,528
2003	104.2	114.3	10.1	41,152	48,205
2004	103.2	113.0	9.8	43,288	51,138
2005	104.4	114.5	10.2	42,818	50,772

Speeds on the sampled 60 km/h roads remained below levels experienced before the large drop in 2003 for both the mean and 85th percentile speeds. The decrease in traffic volumes in 2003 and 2004 was due to the omission of two of the six measured roads that had their speed limits reduced to 50 km/h (see Appendix A). The variation in speeds continued to remain stable with an initial reduction from 2000 to 2002 sustained during 2005.

Speeds on the sampled 100 km/h roads appear to trend slightly upward from 2001 for the mean speed, although the 85th percentile speeds remain relatively constant. Traffic volumes on these roads increased in 2003 due to the addition of a new road into this group.

Free speeds and 85th percentile free speeds on the sampled 110km/h roads have fluctuated from year to year since 2000, with a small increase in 2005. The slight decrease in traffic volume in 2003 can be explained by the omission of one of the six roads that had its speed limit decreased to 100 km/h in 2003. However, the overall increase in volume experienced in 2004 was sustained in 2005.

Speeds on the two 50 km/h roads in the survey are presented in Table 3.27. There was a decrease in measured travelling speeds across all the speed parameters in 2005 for the Nuriootpa road, although the mean speed remained well above the 50 km/h speed limit. Traffic volumes at each of these sites have remained relatively constant.

Table 3.27
Surveyed free speeds on rural 50 km/h roads 2003-2005

	Mean	85th pc	Variation	Free speed volume	Total volume
Freeling					
2003	52.5	61.1	8.6	8,144	8,554
2004	54.8	63.5	8.7	7,922	8,314
2005	54.3	62.7	8.4	8,406	8,817
Nuriootpa					
2003	62.3	68.2	5.9	26,401	32,844
2004	64.0	70.5	6.5	26,703	32,910
2005	61.0	66.8	5.8	28,085	34,709

Speeds from the outback locations are shown in Table 3.28. Each site shows annual fluctuation with no discernable trends present in any of the speed parameters. Annual fluctuations can be attributed in part to the lower volumes of traffic on these roads. Two of the three sites have experienced large declines in their volumes. At Lyndhurst, the volume has almost halved since 2000.

Table 3.28
Surveyed free speeds in rural areas for all vehicles by speed zones, 2000-2005

	Mean	85th pc	Variation	Free speed volume	Total volume
Quorn (110 km/h)					
2000	104.9	118.3	13.4	3,030	3,214
2001	104.1	118.0	13.9	2,693	2,780
2002	107.6	121.4	13.8	2,219	2,288
2003	100.5	113.5	13.0	2,320	2,397
2004	101.8	114.1	12.3	2,208	2,292
2005	102.5	115.0	12.5	2,344	2,450
Woomera (110 km/h)					
2000	104.1	119.8	15.7	2,337	2,422
2001	110.2	126.7	16.5	2,241	2,311
2002	110.2	127.4	17.2	2,558	2,643
2003	107.9	121.4	13.5	2,690	2,787
2004	110.5	127.6	17.1	2,737	2,800
2005	104.4	117.9	13.5	2,906	3,012
Lyndhurst (100 km/h) unsealed surface					
2000	81.9	95.5	13.6	1,080	1,101
2001	75.5	94.7	19.2	794	815
2002	79.7	100.7	21.0	740	765
2003	72.3	91.9	19.6	586	597
2004	77.0	95.6	18.6	651	661
2005	82.3	96.2	13.9	553	562

3.3 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 "Wipe Off 5" anti-speeding campaign, developed in 2004, continued in 2005. It was designed to inform the community of the risks associated with speeding and that even small increases in speed can significantly increase the risk of crashing and the severity of those crashes. The campaign included a television commercial adapted from the Victorian Traffic Accident Commission "Slow Mo". The commercial demonstrated the difference an extra 5 km/h in speed makes to stopping distance and crash impact. The campaign was supported with billboard advertising, radio commercials and Australian Traffic Network reports. The campaign ran throughout March (Easter) and June in 2005.

In the second half of 2005, a new anti-speeding campaign was developed with the slogan "Speeding. What's Your Excuse? Stop. Think." The main target audiences of this campaign were young drivers (particularly males) and passengers, and motorcyclists. The campaign was designed to generate awareness of the risks and consequences of speeding, reinforce the value of speed limits, and alter speeding-related community attitudes and driving behaviours. A new television commercial titled "Speeding. What's your Excuse" explained the consequences of speeding and stated that there was no excuse for speeding at any level. A variety of media strategies was employed to supplement television, including radio commercials, bus shelter posters, regional banners and speed feedback/variable message sign trailers. The television commercial was aired during November while other media activities featured during October and November. These months were chosen to coincide with police enforcement operations that focused on speeding, and with the start of the festive season.

Another new publicity campaign in 2005 focused on informing the South Australian public about changes to excessive speed legislation and the associated penalties, specifically the immediate loss of licence for drivers exceeding the speed limit by 45 km/h or more. Furthermore, this campaign aimed to increase knowledge of the consequences of speeding and provide incentive to comply with speed limits. This legislation-based campaign primarily targeted the same groups as the "What's your excuse" anti-speeding campaign. The campaign consisted primarily of press advertisements that were published in November and December.

In total, $843,261 was invested in anti-speeding advertising in 2005. This was only marginally higher than expenditure in 2004 ($827,298) (Baldock *et al.*, 2007). Of the total advertising costs in 2005, $707,656 was spent on media planning and $135,605 on production. All publicity campaigns in 2005 were adopted in the Adelaide metropolitan area and rural regions.

Note that the costs associated with the excessive speed legislation campaign were not included in this total. The legislative changes campaign expenditure was $112,968 but this also included advertising promoting changes to drink driving legislation.

4 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.

4.1 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. Legislation for the compulsory use of restraints was introduced in South Australia 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). The so-called 'blitz' approach appeared to have long-term effects when involving high levels of enforcement over a short period, usually one to four weeks that is repeated several times a year.

Restraint enforcement, like speeding enforcement, 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 have legal responsibility for passenger restraint use, particularly for children under 16 years of age. The driver must 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 2005. Therefore, 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.

4.2 Levels of restraint use

4.2.1 Restraint non-use offences

There are seven different types of restraint-related offences. The frequencies of these offences for the years 2001 to 2005 are listed in Table 4.1. Note that the driver of the vehicle is held legally responsible for the last four offences listed. The total number of offences detected increased slightly by 3.4 per cent in 2005 but was still lower than in years prior to 2004. This increase in 2005 may be due to lower seatbelt wearing rates or to increased police enforcement activity.

Consistently, the most common restraint offence involved the driver failing to wear a seat belt adjusted and fastened properly. Approximately four per cent of offences specifically involved failing to restrain children under the age of 16 years. It is likely that the true number of offences involving unrestrained children is higher, as some of the other restraint offence types may have included children. All types of restraint offences are aggregated in the subsequent tables.

Table 4.1
Restraint offences and detections, 2001-2005

Restraint offences	2001		2002		2003		2004		2005	
	(N)	(%)	(N)	(%)	(N)	(%)	(N)	(%)	(N)	(%)
Fail to wear seatbelt properly adjusted and fastened (driver)	8812	85.8	8671	85.6	9157	83.5	7916	85.7	8158	85.4
Fail to wear seatbelt properly adjusted and fastened (passenger)	1060	10.3	1041	10.3	1211	11.0	923	10.0	927	9.7
Fail to occupy seat fitted with a seatbelt	30	0.3	14	0.1	6	0.1	15	0.2	9	0.1
Sit in front row of seat when not permitted	2	<0.1	1	<0.1	4	<0.1	0	0.0	2	<0.1
Fail to ensure child under 1 year old restrained	26	0.3	32	0.3	39	0.4	49	0.5	58	0.6
Fail to ensure child under 16 wears seatbelt	264	2.6	283	2.8	366	3.3	315	3.4	326	3.4
Fail to ensure front row passenger properly restrained	79	0.8	85	0.8	180	1.6	19	0.2	75	0.8
Total	10273	100.0	10127	100.0	10963	100.0	9237	100.0	9555	100.0

Table 4.2 shows restraint offences detected in metropolitan and rural areas from 2000 to 2005. The slight increase in restraint offences in 2005 was due to a large increase (30.7%) in rural areas, where the level of offences was the highest on record at 38 per cent of the total (Note that if all the unknowns from 2000 to 2002 in Table 4.2 were rural, in none of these years would the rural percentage have reached 38). The number of offences in the metropolitan area decreased in 2005 by 12 per cent but was still 1.6 times the number of rural offences.

Table 4.2
Restraint offences detected by region, 2000-2005

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

DAY OF WEEK

Table 4.3 displays restraint offences detected by day of week for the six years from 2000 to 2005, in terms of the percentage of total offences detected each year. Restraint offences were detected evenly throughout the week, although the percentage of offences detected on Mondays was slightly lower.

Table 4.3
Number of restraint offences detected by day of week, 2000-2005 (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

TIME OF DAY

The distribution of restraint-related offences detected from 2000 to 2005 by time of day is presented in Table 4.4. Data were not available for 2005.

Table 4.4
Number of restraint offences detected by time of day, 2000-2005 (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								

RESTRAINT OFFENCES BY MONTH

Restraint offences are shown in Table 4.5 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 the last three months of the year and lower during May and June. These trends were similar in both the metropolitan area and in rural areas.

Table 4.5
Number of restraint offences detected by month in 2005 (expressed as a percentage of total offences detected each year)

Month	Metro	Rural	Total
January	7.9	10.1	8.8
February	9.8	8.7	9.3
March	7.6	7.4	7.6
April	7.5	6.9	7.3
May	6.8	5.4	6.3
June	6.6	6.2	6.4
July	7.7	7.0	7.4
August	8.7	6.1	7.7
September	6.8	9.3	7.8
October	10.4	7.7	9.4
November	10.8	14.8	12.3
December	9.4	10.4	9.7

SEX AND AGE

Detected restraint offences by sex and age for 2004 and 2005 are presented in Table 4.6. Note that age was unknown for a large proportion (45%) of restraint offences in 2005 due to data extraction problems. Consequently, age-related results should be interpreted with caution. For both years, males were over three times more likely to be detected for a restraint offence than females. No data were available for children aged less than 16 years since the driver of the vehicle is legally responsible for the restraint offence.

Table 4.6
Number and percentage of restraint offences detected by sex and age, 2004-2005

	2004						2005					
	Male		Female		Total		Male		Female		Total	
Age	N	%	N	%	N	%	N	%	N	%	N	%
16-19 yrs	635	9.0	195	9.3	830	9.0	356	5.0	101	4.4	457	4.8
20-29 yrs	2450	34.8	765	36.3	3215	34.8	1148	16.1	279	12.1	1427	14.9
30-49 yrs	2791	39.7	844	40.1	3635	39.4	1689	23.7	480	20.7	2169	22.7
50 yrs +	1157	16.4	301	14.3	1458	15.8	932	13.1	208	9.0	1140	11.9
Unknown age	2	<0.1	1	<0.1	3	<0.1	3012	42.2	1247	53.9	4259	44.6
Unknown sex					96	1.0					103	1.1
Total	7035	100.0	2106	100.0	9237	100.0	7137	100.0	2315	100.0	9555	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.

4.2.2 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. Restraint use is only recorded in the TARS database if a vehicle occupant is injured. Restraint status is categorised into six different groups in the database but these 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 provide 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 included.

Restraint use for fatally injured vehicle occupants from 2000 to 2005 is presented in Table 4.7. In 2005, restraint use in fatal crashes was 66 per cent. Restraint status was known for 78 per cent of all fatally injured vehicle occupants in 2005.

Table 4.7
Restraint usage of fatally injured vehicle occupants, 2000-2005

Year	Restraint worn (N)	Restraint worn (%)	Number of known cases	Total occupant fatalities
2000	52	62.7	83	128
2001	59	80.8	73	107
2002	49	65.3	75	111
2003	53	55.7	95	121
2004	58	68.2	85	103
2005	58	65.9	88	113

Table 4.8 shows the restraint usage for seriously injured vehicle occupants from 2000 to 2005. 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 2005, the

percentage known to be wearing restraints was 86 per cent. Restraint status was reported for only 64 per cent of seriously injured vehicle occupants in 2005. Of note, each year restraint use was higher for seriously injured occupants than for fatally injured occupants.

Table 4.8
Restraint usage of seriously injured vehicle occupants, 2000-2005

Year	Restraint worn (N)	Restraint worn (%)	Number of known cases	Total occupants injured
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	542	86.2	629	986

Restraint usage for fatally and seriously injured vehicle occupants is presented in Table 4.9 and Figure 4.1 according to the region where the crash occurred. Overall, restraint use was at its highest recorded level in 2004, but decreased slightly to 84 per cent in 2005. Injured vehicle occupant restraint wearing rates remained slightly higher for crashes in the Adelaide metropolitan area (87%) than for crashes in rural regions (82%).

Table 4.9
Restraint usage of fatally and seriously injured vehicle occupants by region, 2000-2005

Year	Metro Worn (N)	Metro Worn (%)*	Rural Worn (N)	Rural Worn (%)*	Total Worn (N)	Total Worn (%)*	Total Killed/ Injured
2000	303	87.0	382	85.7	685	86.4	1,358
2001	280	87.0	361	83.0	641	84.7	1,339
2002	287	84.9	374	82.2	661	83.4	1,299
2003	297	88.7	323	80.1	620	84.0	1,247
2004	293	90.2	336	84.6	629	87.1	1,101
2005	252	86.6	348	82.1	600	83.9	1,099

* Percentage of known

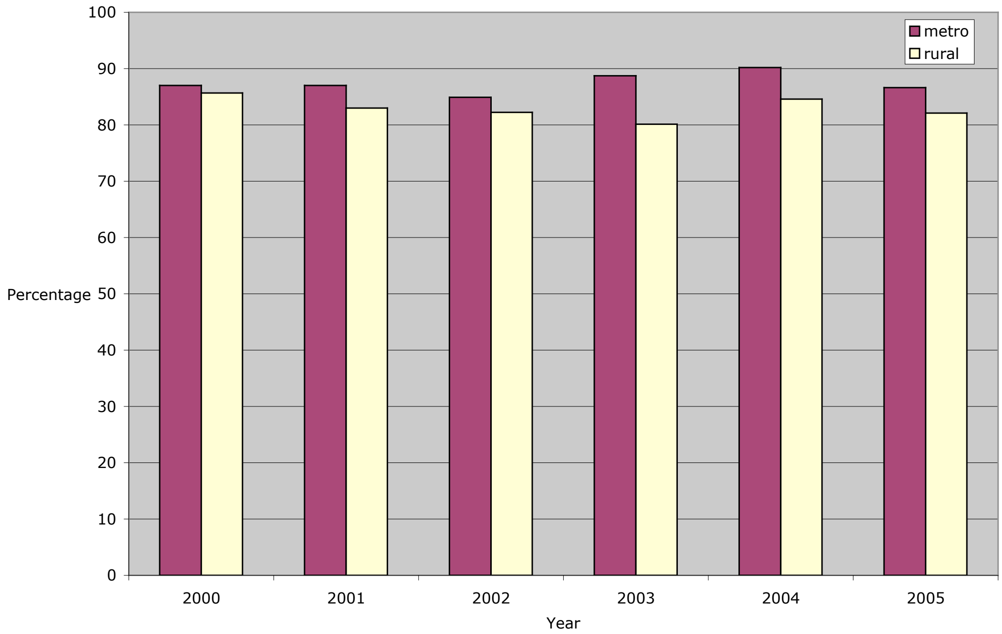

Figure 4.1
Restraint usage of fatally and seriously injured vehicle occupants, by location, 2000-2005

Table 4.10 and Figure 4.2 show the number and percentage of fatally and seriously injured vehicle occupants wearing restraints, by sex. Injured males had considerably lower restraint usage rates than injured females. In 2005, male restraint use was similar to previous years at approximately 80 per cent. After reaching the highest level of restraint usage on record in 2004, female rates decreased to a level of 89 per cent in 2005.

Table 4.10
Restraint usage of fatally and seriously injured vehicle occupants by sex, 2000-2005

Year	Male Worn		Female Worn		Total
	(N)	(%)*	(N)	(%)*	Killed/ Injured
2000	311	80.8	368	91.5	1,358
2001	317	80.9	321	88.7	1,339
2002	351	80.3	309	87.0	1,299
2003	315	81.8	300	89.3	1,247
2004	322	80.7	307	95.0	1,101
2005	318	79.9	282	89.0	1,099

* Percentage of known

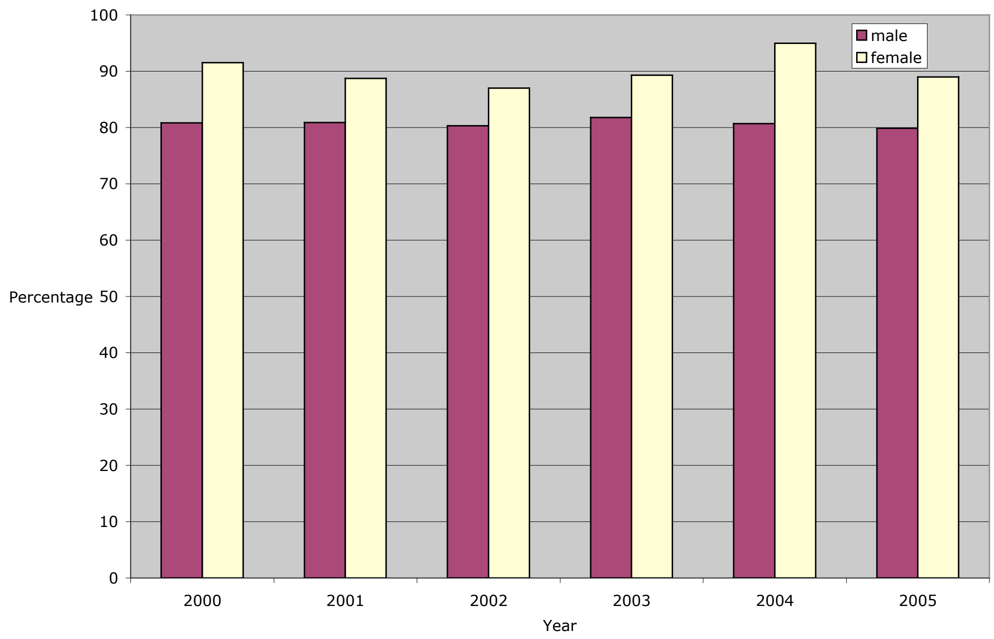

Figure 4.2
Restraint usage of fatally and seriously injured vehicle occupants, by sex, 2000-2005

4.2.3 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 2005. Results from previous surveys are described in the 2002 report on annual performance indicators of enforced driver behaviours (Wundersitz & McLean, 2004).

4.3 Restraint publicity

In the beginning of 2005, restraint publicity was based on a campaign developed and implemented in 2004. This campaign was comprised of television and radio commercials aired in both the Adelaide metropolitan area and rural regions, and aimed to reach a primary target audience of parents with young children. The campaign was structured to inform road users about the strong relationship between injury and restraint usage, emphasise the risk of detection when not wearing a restraint, and reinforce the potential consequences of not wearing a restraint. The radio commercial warned parents about the possible consequences of their child being involved in a crash while unrestrained and the penalties incurred when detected with an unrestrained child passenger, specifically a $182 fine and three demerit points. The television commercial "Demonstration" depicted the possible consequences when involved in a crash of not restraining children. The radio and television advertisements were aired in February 2005.

A new campaign encouraging restraint use was developed in the latter part of 2005. The primary target audience included young drivers and passengers aged 16 to 24 years (particularly male drivers), parents/carers of children, and vehicle occupants in rural areas. The campaign was developed to reinforce and highlight the risks and consequences of not wearing a restraint, even on short trips. It was anticipated that such consequences would provide an incentive for vehicle occupants to comply with restraint laws. The campaign also served to remind vehicle occupants of the penalties incurred for non-restraint use. The campaign was encompassed by the slogan "No trip's too short for a seatbelt".

An integral part of the campaign was a television commercial "Written all over their face", designed to convey the consequences of not wearing a restraint, even when driving for a short distance (i.e. to the video store). The television commercial was accompanied by radio, regional banners, and variable message signs reinforcing the campaign slogan. The television and radio commercials were aired in October and November 2005 to coincide with the statewide police "Operation Belt Up" launched in November.

In 2005, a total of $232,384 was invested in restraint-related advertising, an increase in spending from the last reported campaign costs in 2004 ($183,653; see Baldock et al, 2007). Of this, $119,680 was spent on production, and $112,704 spent on media buying.

5 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) recognised the importance of systematic monitoring of driver behaviour by independent institutions to create road safety performance indicators. Following the recommendations of the ETSC, this annual report quantifies the effects of the enforcement of drink driving, speeding and non-wearing of restraint legislation in South Australia.

5.1 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 depends critically 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 high visibility of 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, 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'. However, the effects of unrestricted mobile RBT could not be evaluated comprehensively because detailed data on RBT detections were not available in 2005.

LEVELS OF TESTING

In 2005, the level of random breath testing level in South Australia decreased very slightly (by 2%). The number of tests conducted has fluctuated in recent years. While a decrease in testing was experienced in rural areas, the level increased in the metropolitan area. Around 59 per cent of licensed drivers were breath tested in 2005, which was slightly less than the previous year. Nevertheless, the overall level of testing was greater than the recommendation of White and Baldock (1997) that one in two licensed drivers be tested, and exceeded the target of 600,000 tests per year.

Comparisons with other Australian jurisdictions revealed that South Australia tested a greater proportion of the population than the Northern Territory and Western Australia but a smaller proportion than the remaining states. In Tasmania, RBT levels were just over one test for every person in the state per year, compared to less than one in every two people in South Australia. In comparison to other states, the lower level of testing per head of population undertaken in South Australia suggests that South Australia could justifiably increase its level of RBT.

Of the testing conducted in 2005, 12 per cent was mobile RBT, an increase from the level of 7 per cent in 2004. The increase in mobile testing is most likely due to the extension of mobile RBT to full time in mid 2005. Even though the level of mobile testing increased in South Australia, comparisons with other states showed that mobile testing made up a much smaller proportion of total tests in South Australia. The state with the next smallest proportion of tests conducted using mobile RBT was New South Wales with 19 per cent, while the state with the highest was Tasmania with 69 per cent. The proportion of mobile testing in South Australia is expected to be more comparable with other states in 2006, when mobile methods would have operated on an unrestricted basis for the entire 12-month period.

VISIBILITY OF RBT

Homel (1990) suggests that to increase the perceived probability of detection, 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.

With regard to the day of week, the most recent late night surveys in metropolitan Adelaide indicated that drink driving rates were highest on Wednesday and Thursday nights, and after midnight (Kloeden & McLean, 1997). More recent roadside breath testing surveys conducted in Perth (Friday to Sunday, 10pm-3am) in 1999, 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). Harrison (2001) suggested that enforcement taking place early in the decision making process leading to drink driving may be more effective in deterring drink driving than enforcement targeting decisions later on, particularly in rural areas.

Complete data on RBT testing by the day of week, time of day and month were not available in 2005. The only 2005 data available were for mobile testing, and so the following comments refer to trends in mobile testing. During 2005, the greatest percentage of mobile breath tests continued to be performed from Friday to Sunday, with the greatest proportion on Saturdays. Higher testing levels on weekends would be due, at least partly, to the requirement for mobile RBT to only be conducted during 'prescribed periods' for the first six months of 2005.

With respect to time of day, the greatest proportion of mobile RBT was conducted at night from 6pm until 2am in 2005, similar to the previous year. However, because comparable static RBT operation times were unavailable for 2005, it is unknown whether mobile RBT, the form of RBT most likely to detect drink drivers, was over represented when drink driving rates were highest (after midnight). In addition, it could not be determined whether static RBT (i.e. highly visible) operations were conducted in the early part of the evening when potential drink drivers would see them on their way to drinking venues, consequently increasing their perceived risk of detection, and general deterrence.

EFFECTIVENESS

For specific deterrence, it is important to apprehend a large proportion of drink drivers. In 2005, the total number of RBT detections in South Australia was the highest for all years from 2000 onwards. However, per head of population, the number of detections in SA (0.39%) was lower than those of the comparison states of Tasmania, Queensland, Victoria, and Western Australia. Of particular interest, there appeared to be a trend whereby detection rates per capita were higher in states where there were higher levels of testing and a higher proportion of testing conducted with mobile methods. However, South Australia had a similar detection rate per capita to New South Wales, despite a lower proportion of tests conducted using mobile RBT.

Detection rates (drink drivers detected per 1,000 drivers tested) in South Australia were the highest since 1997, with detection rates in rural areas the highest on record. Generally, a high detection rate is interpreted as indicating a higher level of drink driving activity, or, reflecting enforcement practices that concentrate largely on detection rather than deterrence. The high detection rate in 2005 was most likely partly due to the operation of unrestricted mobile RBT for six months in 2005. The greater proportion of all tests conducted using mobile RBT would have increased the overall detection rate, as mobile RBT detection rates were much higher than the rates for static RBT. Research suggests that mobile RBT provides a better means of detecting drink drivers, particularly those trying to avoid static RBT sites (Harrison, Newman, Baldock & McLean, 2003). Note that few studies have formally evaluated mobile RBT methods and, in most studies, RBT data have been confounded with those of stationary RBT (Harrison et al, 2003). The present report indicates that mobile RBT is associated with much higher detection rates than static RBT (also see Baldock et al, 2007).

Interestingly, static RBT detection rates also increased in 2005. A lack of detailed information on static RBT practices in 2005 precluded any investigation of the effect of enforcement practices on the detection rate. Nevertheless, mobile RBT data showed that a higher level of mobile testing was conducted on days (later in the week) and at times (6pm - 2am) when detection rates were highest.

Of interest was the finding that the ratio of mobile to static RBT detection rates was much higher in rural regions (9.4 versus. 3.8). This finding suggests that mobile RBT is of particular benefit for detecting drink drivers in rural regions. This would be due to mobile RBT providing a solution to the limited police personnel available in rural regions and the 'grapevine effect' known to undermine the potential value of a highly visible static RBT station. Harrison (2001) investigated anti-drink driving enforcement strategies in rural communities in Victoria and South Australia and concluded that detection of drink drivers would be the most useful strategy in such communities and was best achieved through unpredictable, smaller, covert mobile operations.

The percentage of drivers involved in a fatal crash with an illegal BAC in 2005 was similar to the previous year, remaining at a high level (34% above 0.05g/100ml). The proportion of fatally injured drivers with a high BAC level increased, continuing the trend of recent years. However, the small number of fatalities means that there is much more fluctuation from year to year. Data for serious injury crashes suggested a slight increase in the proportion of drivers with an illegal BAC in 2005 (22% above 0.05g/100ml). The larger 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 still low in 2005 for both fatal (80%) and serious injury crashes (66%). Improving the matching process of blood samples with the TARS database would create a more complete and reliable database, and provide a more accurate indicator of the level of drink driving.

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

PUBLICITY

In 2005, expenditure on anti-drink driving publicity increased marginally, by 6 per cent, from that in 2004. The campaigns encompassed both metropolitan and rural regions and used a variety of innovative media.

Homel (1990) specified that publicity accompanying RBT activities should not simply be educational but have a deterrent value. The anti-drink driving publicity campaign developed in 2005 accompanied police drink driving operations but did not specifically focus on deterrence. Instead, the campaign focused on the consequences of when a driver is only slightly over the legal limit, particularly the impairment of decision making.

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). While the 2005 campaigns focused on decision making, they tended to examine the decision to drive after drinking. Harrison's alternative strategy should be considered for future anti-drink driving campaigns.

5.2 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.

Dual purpose red light speed cameras were introduced in 2004 to detect speeding motorists. These cameras continued to be used in 2005 but data extraction problems precluded use of the data in this report.

LEVEL OF OPERATIONS

The number of hours spent on speed enforcement in South Australia in 2005 increased by approximately 34 per cent to the highest recorded level since 2000. 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 what is stated here.

The number of speed camera hours was substantially higher in 2005 compared to 2004 in both metropolitan and rural areas but was still lower than the number of hours of such enforcement in 2000 to 2002. For non-camera devices (laser devices, hand-held radars and mobile radars), the hours of operation in 2005 increased by 66 per cent to the highest recorded level. Non-camera devices are generally used less frequently in the metropolitan area but this is where the greatest increase was recorded in 2005.

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 undertaken (Swadling, 1997). Therefore, 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 hours in South Australia, for both speed cameras and non-camera devices, 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 marginally from 2000 to 2005. Therefore, it appears that speed detection has been organised to produce a high level of general deterrence by operating at times when the majority of drivers are on the road.

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. The fact that speed enforcement was conducted across all days of the week appears to constitute a good balance between operations during high traffic periods (weekdays) and high speeding days (weekends). Detection rates per hour of enforcement in 2005 indicated higher rates of speeding during the day time hours. However, detection rates accounting for volume of traffic suggested speeding was more prevalent at night and in the early morning from midnight to 10am.

A noticeable reduction in speed camera operations was observed in the period from 12 to 2pm, around lunch time. This decrease may simply be related to speed camera operator's lunch break, or to this period being a common time at which camera locations are changed. This time of day may be considered as 'lunch time peak hour' when many potential speeders are on the roads (high visibility). Staggering speed camera operators' lunch times or the times at which locations are changed may be an easy way to minimise this aberration in the timing of speed detection and increase the perceived likelihood of detection.

EFFECTIVENESS

In 2005, only 12 per cent of licensed drivers in South Australia were detected for speeding offences, less than half the percentage of licensed drivers in 2000, but this excludes the number detected with dual purpose red light/speed cameras. An analysis of speed camera detections only revealed that they decreased in number despite an increase in speed camera detection hours. Note that over half of the detections were made with conventional speed cameras. This is due to the greater efficiency of speed cameras. Speed cameras check the speeds of all vehicles, not just those that the police officer chooses to check with non-camera devices. Non-camera devices are used more in rural areas, which are characterised by lower levels of traffic density.

Detection rates give a more accurate picture of the actual level of detection, given the limitations of the detection data (speed cameras were mostly inactive for three months and no data were available for dual purpose red light/speed cameras). The overall detection rate in 2005 (detections per hour of enforcement, excluding red light cameras) continued to decrease to the lowest of all years since records began in 2000: a level of 1.2 detections per hour or 8 detections per 1,000 vehicles passing. Interestingly, both the metropolitan area and rural regions reported the lowest speeding detection rates per hour and per 1,000 vehicles passing speed cameras on record during 2005. These low detection rates were accompanied by an increase in speed detection hours for camera and non-camera devices in both the metropolitan and rural regions. Together, these findings suggest that the lower detection rate in 2005 may reflect the positive effects of increased levels of speed enforcement, deterring drivers from speeding. Nonetheless, detection rates accounting for traffic volumes were higher in rural areas, suggesting a greater prevalence of speeding in rural areas. Thus, high levels of speed enforcement are needed in rural areas.

It can be argued that the incidence of speed-related crashes and the measurement of on-road vehicle speeds 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, a problem with crash data is the under-reporting of the involvement of speeding in crashes in the TARS database, leading to an under-estimation of the role of speeding in crashes in South Australia. Combining serious and fatal crashes, 4.6 per cent of metropolitan crashes and 5 per cent of rural crashes were attributed to speed, which was consistent with previous years. Interestingly, the proportion of rural speed crashes increased substantially to the highest level since 2000, exceeding the percentage 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 finding that all speed-related crashes in which the driver's sex was known involved male drivers emphasises the importance of deterring male drivers from speeding to reduce crashes. Males were also two and a half times as likely as females to have been detected speeding by non-camera devices (data by sex for camera detections were not available).

The measurement of on-road travel speeds in urban areas is not undertaken in a systematic manner in South Australia, making it difficult to use on-road speed data to evaluate enforcement operations. However, on-road urban travel speed surveys were conducted in 2002, 2003 and 2005 to assess the effects of the change in the default urban speed limit in 2003. The change in the speed limit was associated with a slowing of travel speeds in 2003 and travel speeds in 2005 were, in turn, slower than those in 2003. Small reductions in travel speed were even observed on arterial roads, where the speed limit remained unchanged.

The measurement of on-road travel speeds in rural areas is undertaken on a more consistent basis than is the case for urban areas. Decreases in travel speeds observed in rural areas in 2004 were not maintained in 2005, with roads zoned at 60, 100, and 110 km/h all demonstrating increases in travel speeds. Travel speeds on 50 km/h zoned rural roads were the only ones to decrease. Note that low traffic volumes in rural areas make it difficult to draw firm conclusions from these data.

PUBLICITY

Publicity raises the perceived risk of detection and assists in the process of changing behaviour by providing public acceptance of enforcement (Elliot, 1993; Zaal, 1994). An evaluation of anti-speeding television advertising in the Adelaide metropolitan area reported slight but statistically significant decreases in mean free speeds (Woolley et al., 2001).

Expenditure on speed-related publicity increased substantially in 2003, and continued to remain at this higher level during 2004 and 2005. In 2005, the spending on publicity covered the continued airing of a campaign used in 2004 and a new campaign developed in 2005. The new campaign was designed to generate awareness of the risks and consequences of speeding and reinforce the value of speed limits in the community. A television advertisement was aired during the same month as police enforcement operations. Thus, media and publicity has been used in South Australia to support the effects of speed enforcement and this practice should continue.

5.3 Restraint use

In comparison with the enforcement of speeding and drink driving, a lack of information on restraint enforcement operations made it very difficult to assess its effectiveness. On-road observational surveys of restraint use provide the best indication of restraint use levels. However, observational surveys were not undertaken in 2005. 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 2005.

LEVELS OF RESTRAINT ENFORCEMENT

The total number of restraint offences detected in South Australia increased very slightly (by 3%) in 2005. The proportion of rural offences increased substantially (up to 38% of all offences) while the proportion of metropolitan offences decreased. 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. Thus, the slight increase in offences in 2005 may be attributed to either less compliance with restraint laws or higher levels of enforcement, particularly in rural areas.

Restraint usage can be increased through high levels of enforcement over short periods, when applied repeatedly (ETSC, 1999). A state-wide restraint enforcement campaign was conducted during October and November. An increase in restraint detections from October to December (particularly during November) in both metropolitan and rural areas suggests that the number of detected offences reflects enforcement activities. Furthermore, the number of detected offences suggests that restraint enforcement was spread relatively evenly throughout the week. This was consistent with previous years. Information about restraint offences by time of day was not available in 2005.

Although the proportion of offences detected in rural areas increased in 2005, the majority of offences were still detected in the metropolitan region. This could be due to greater enforcement in the metropolitan area or to this area's greater traffic volumes and, thus, its greater number of potential offenders. Males were three times as likely as females to be detected for a restraint offence in 2005, 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 was 86 per cent in 2005, which was slightly less than the previous year but generally comparable to other years. The level of restraint use of 66 per cent in fatal crashes was also broadly consistent with previous years, except for 2001 (an anomalously high level of 81%). Similar to previous years, in 2005 restraint wearing rates for injured vehicle occupants in serious and fatal crashes were somewhat lower in rural regions than in the metropolitan area, 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). A possible reason for the finding of lower wearing rates in fatal, compared to serious injury, crashes is that police overestimate seat belt usage in less severe crashes (see Schiff & Cummings, 2004). It is less likely, however, that such differences exist between judgements for fatal and serious injury crashes. It is more likely that restraint wearing rates were lower in fatal crashes because the higher severity of the injuries sustained was directly related to the vehicle occupant being unrestrained. Restraint use status 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 large proportion of injured vehicle occupants in serious (36%) and fatal (22%) crashes. The percentage unknown for fatal crashes has increased from 17% in 2004. Better records of restraint use need to be kept to improve database reliability and accuracy, and for the evaluation of restraint enforcement practices.

As there were no observational restraint use surveys during 2005, 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 2005 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 (89%) decreased from the previous year's record to a level similar to that in 2003. The level of restraint use for males was similar to previous years (80%) and was much lower than the level for females. Self-reported restraint use has also been found by researchers to be lower among males (Milano, McInturff & Nichols, 2004; Reinfurt, Williams, Wells & Rodgman, 1996). Therefore, males remain an important target for restraint enforcement.

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, high levels of publicity of enforcement is recommended (Zaal, 1994).

The amount of money invested in restraint use publicity in South Australia in 2005 increased by almost 27 per cent from $184,000 in 2004 to $232,000. The increase supported a new mass media campaign incorporating both the metropolitan and rural areas. In the beginning of 2005, restraint publicity was based on a campaign used in 2003 and 2004. In the latter part of 2005, a new campaign was developed. The advertisement used in the previous campaign concentrated on the consequences of not using restraints (potential injury, fines and demerit points). The new campaign also focused on the risks and consequences of not wearing a restraint, particularly on short trips. Although the airing of television and radio advertisements deliberately coincided with a state-wide police restraint use operation, the advertisements did not publicise restraint enforcement to increase the perceived likelihood of being caught. Future restraint enforcement operations in South Australia would benefit from accompanying publicity concentrating on deterrence, particularly one or two weeks prior, and during an enforcement period (see Stefani, 2002).

Research indicates that 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, they also noted that unpaid media was not effective by itself to reach high-risk groups (i.e. young males). The level of unpaid restraint use publicity for 2005 is unknown but should be encouraged to enhance future restraint use publicity campaigns and enforcement.

The publicity campaigns encouraging restraint use targeted parents of young children and males. The targeting of males was supported by the restraint offence and crash data. Unfortunately, little data were available on child restraint use in 2005 to confirm whether parents of young children should remain a target of restraint use publicity campaigns. Restraint offence data for children are difficult to interpret as they most likely reflect enforcement practices rather than restraint use.

6 Conclusions

The establishment of consistent performance indicators for drink driving, speeding and restraint use enforcement practices will assist in optimising enforcement operations, related publicity and further reduce road trauma on South Australian roads. Providing a consistent framework to collect and evaluate this information will help in achieving these aims.

The main findings from the performance indicators for each enforced behaviour in South Australia in 2005 are summarised. Note that there were considerable problems with data on police enforcement operations and detections in 2005 resulting in the unavailability of some 2005 data. Consequently, the full assessment of some enforced behaviours was not possible.

DRINK DRIVING

In 2005, the level of random breath testing in South Australia decreased very slightly. While a decrease in testing was observed in rural areas, testing increased in the metropolitan area. Despite the overall decrease, the level of testing was greater than the recommended level of one in two licensed drivers.

Mobile RBT comprised 12 per cent of total tests in 2005, compared to 7 per cent in 2004. The increase in mobile testing was most likely due to the abolition of the requirement that mobile testing only be conducted during 'prescribed periods'. In June 2005, the restriction was lifted and mobile RBT was conducted on a full time basis. Detection rates with mobile RBT were much higher than those associated with static RBT, thus causing an increase in the overall detection rate to a level higher than those in all years since 1997. Note that a detailed analysis of the effectiveness of RBT, particularly the introduction of unrestricted mobile RBT, could not be completed because a full data set on RBT testing and detections by the day of week, time of day and month was not available in 2005.

Interstate comparisons revealed that detection rates per capita were higher in states with a high number of overall tests and a high proportion of all tests conducted using mobile testing. South Australia, comparatively speaking, had a low number of tests (per capita) and a low proportion of tests conducted with mobile testing (due to it being the only state in which mobile RBT was conducted only during prescribed periods for six months), and, thus, a low detection rate per capita. To be on par with other jurisdictions in Australia, South Australia would need to increase its level of testing and increase the proportion of tests conducted using mobile RBT. The proportion of mobile testing in South Australia is expected to be more comparable with other states in 2006, when mobile methods would have operated on an unrestricted basis for 12 months.

There was a slight increase in the involvement of alcohol in serious injury crashes in 2005 but the BAC of drivers was unknown for a considerable percentage (34%) of these crashes, 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 matching process of blood samples with 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 2005, expenditure on anti-drink driving publicity increased by 6 per cent. The campaigns encompassed both metropolitan and rural regions and used a variety of media. While the 2005 campaigns focused on decision making, they tended to examine the decision to drive after drinking rather than earlier decisions such as how to get to the drinking venue.

SPEEDING

The number of hours spent on speed enforcement in South Australia in 2005 increased by 34 per cent to the highest recorded level since 2000. This total does not include hours of operation of dual purpose red light/speed cameras because this information was unavailable in 2005. Thus, the actual number of speed detection hours is an underestimate. Increases in speed detection hours were evident for cameras and non-camera devices in both the metropolitan area and rural regions.

Speed detection hours were concentrated during the daytime and were relatively evenly spread across the week. This provided a good balance between operation during high traffic periods (weekdays) 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).

In 2005, only 12 per cent of licensed drivers in South Australia were detected for speeding but this number omits red light/speed camera detections. When an analysis of speed camera detections only was conducted, it revealed that these decreased in number in 2005 despite an increase in speed camera hours of operation.

Given the limitations of the detection data (speed cameras were mostly inactive for three months and no data were available for dual purpose red light/speed cameras), detection rates provided a more accurate picture of the actual level of detection. The overall detection rates in 2005, detections per hour of enforcement and per 1,000 vehicles passing speed cameras, continued to decrease to the lowest of all years since records began in 2000. The decrease in speed detection rates was experienced in both the metropolitan area and rural regions. The combination of a low detection rate and an increase in the hours of speed detection in 2005 suggests that the low detection rate may reflect the positive effects of increased levels of speed enforcement.

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

On-road travel speed surveys are not conducted in a systematic manner in urban areas. However, a survey was conducted in 2005 to assess the effects of change in the urban default speed limit in 2003. Travel speeds on 50 km/h roads reduced between 2003 and 2005, and there were also speed reductions on arterial roads, where the speed limit was unchanged. While travel speeds on 50km/h zoned roads in rural areas decreased, travel speeds on rural roads with 60, 100 and 110km/h speed limits increased in 2005.

During 2005, publicity continued to support speed enforcement. Expenditure on speed-related publicity continued to remain at a high level, similar to that recorded in 2004.

RESTRAINT USE

Determining the effectiveness of restraint use enforcement was difficult because of the lack of information on specific hours of restraint enforcement undertaken in 2005. The number of restraint offences provides some indication of the level of enforcement. Restraint offences in 2005 increased very slightly from the number in 2004.

Unfortunately, no observational surveys were undertaken in 2005 to provide data that could assist in determining the effectiveness of restraint use enforcement. 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 2005 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 enforcement.

The amount of money spent on restraint use publicity in 2005 increased substantially, by around 27 per cent, to support a new campaign incorporating metropolitan and rural areas.

Although the publicity campaign accompanied police enforcement operations, the campaign focused on the consequences of not using restraints rather than increasing the perceived risk of detection.

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Appendix A - Rural travel speeds for individual sites

Table A1
Mean and 85th percentile free speeds on rural 60 km/h roads 2000-2005

	Freeling*	Nuriootpa*	Clare	Pt Lincoln	Naracoorte	Waikerie
Mean free speed (km/h)						
2000	57.9	66.0	63.0	64.3	55.0	61.1
2001	59.8	64.3	63.0	65.8	54.2	61.7
2002	58.1	65.1	60.8	64.9	55.4	59.6
2003			61.2	63.3	52.8	57.1
2004			59.8	62.7	53.2	55.4
2005			61.2	62.0	56.1	56.9
85 pc speed (km/h)						
2000	68.1	73.1	69.8	74.2	63.8	68.6
2001	68.9	70.8	69.5	76.1	62.6	69.8
2002	67.1	71.5	66.9	75.0	63.9	66.8
2003			67.3	72.9	60.7	64.5
2004			66.2	72.8	60.8	62.4
2005			67.2	71.4	64.4	64.0

* Speed limit changed from 60 to 50 km/h in 2003

Table A2
Free speed volumes and total traffic volumes on rural 60 km/h roads 2000-2005

	Freeling*	Nuriootpa*	Clare	Pt Lincoln	Naracoorte	Waikerie
Free speed volume						
2000	7,326	26,333	22,281	9,710	12,875	15,004
2001	7,967	26,591	22,285	9,613	13,103	14,835
2002	7,573	25,269	22,828	9,766	13,063	14,848
2003			22,607	9,795	12,885	14,514
2004			23,523	9,935	13,795	14,255
2005			24,004	9,941	13,435	14,165
Total volume						
2000	7,677	32,913	27,568	10,304	13,736	15,004
2001	8,415	33,293	27,845	10,213	13,955	16,410
2002	7,910	30,857	28,312	10,358	13,848	16,475
2003			28,169	10,379	13,669	16,037
2004			29,344	10,607	14,721	15,816
2005			29,987	10,568	14,327	15,651

* Speed limit changed from 60 to 50 km/h in 2003

Table A3
Mean and 85th percentile free speeds on rural 100 km/h roads 2000-2005

	Hart	Currency Creek	Belvidere	Lyndoch	Morgan	Kimba*	Yorketown#
Mean free speed (km/h)							
2000	104.4	86.7	93.2	96.4	98.1	109.3	
2001	106.5	86.9	92.7	92.9	96.2		
2002	104.3	85.5	93.6	99.0	95.7		
2003	105.4	87.1	93.1	97.3	98.3		97.9
2004	106.8	86.8	94.3	97.9	100.8		95.3
2005	104.4	86.2	92.9	100.4	98.0		99.7
85 pc speed (km/h)							
2000	119.9	99.6	108.5	109.9	114.7	125.3	
2001	120.6	99.5	105.8	105.2	111.4		
2002	117.3	97.7	107.5	111.6	110.9		
2003	118.5	99.7	107.5	109.6	113.3		112.1
2004	118.9	98.8	107.9	109.3	115.3		110.3
2005	115.6	97.8	105.8	111.1	114.4		111.8

* Speed limit changed from 100 to 110 km/h in 2001

Speed limit changed from 110 to 100 km/h in 2003

Table A4
Free speed volumes and total traffic volumes on rural 100 km/h roads 2000-2005

	Hart	Currency Creek	Belvidere	Lyndoch	Morgan	Kimba*	Yorketown#
Free speed volume							
2000	1,228	15,620	4,815	10,241	1,393	1,397	
2001	1,766	16,815	5,049	10,045	1,360		
2002	1,690	17,206	5,216	10,015	1,319		
2003	1,669	18,108	5,328	11,759	1,137		2,521
2004	1,900	17,778	5,621	10,916	1,117		3,141
2005	1,833	18,690	5,338	12,216	1,153		3,001
Total volume							
2000	1,237	18,954	5,196	11,658	1,425	1,455	
2001	1,803	20,840	5,488	11,749	1,390		
2002	1,720	21,344	5,638	11,336	1,345		
2003	1,698	22,746	5,782	14,049	1,162		2,638
2004	1,943	22,048	6,150	12,604	1,133		3,269
2005	1,872	23,509	5,804	14,521	1,178		3,129

* Speed limit changed from 100 to 110 km/h in 2001

Speed limit changed from 110 to 100 km/h in 2003

Table A5
Mean and 85th percentile free speeds on rural 110 km/h roads 2000-2005

	Kimba	Reedy Creek	Berri	Orroroo	Mosquito Creek	Yorketown#	Kimba*
Mean free speed (km/h)							
2000	104.8	110.0	103.6	97.0	106.4	100.0	
2001	101.8	108.3	98.9	98.2	106.9	97.9	110.4
2002	103.1	107.0	100.0	100.3	106.8	101.8	106.9
2003	103.4	107.3	102.1	99.8	107.9		107.5
2004	103.3	105.7	100.8	100.8	106.3		106.7
2005	102.6	105.9	104.1	98.6	106.8		105.8
85 pc speed (km/h)							
2000	117.3	122.0	114.8	109.5	115.7	114.9	
2001	114.5	119.2	109.9	111.6	116.8	113.1	126.4
2002	114.9	117.1	111.0	114.3	115.4	116.0	119.8
2003	115.2	117.6	112.3	113.1	116.4		120.9
2004	114.7	115.9	110.8	113.5	114.7		117.5
2005	113.9	115.4	114.7	110.3	115.0		119.2

* Speed limit changed from 100 to 110 km/h in 2001

Speed limit changed from 110 to 100 km/h in 2003

Table A6
Free speed volumes and overall traffic volumes on rural 110 km/h roads 2000-2005

	Kimba	Reedy Creek	Berri	Orroroo	Mosquito Creek	Yorketown#	Kimba*
Free speed volume							
2000	3,439	3,894	17,226	3,574	9,999	2,723	
2001	3,498	3,725	17,819	3,335	10,124	2,715	1,027
2002	3,801	4,005	18,005	3,409	10,436	3,178	1,459
2003	3,838	4,203	17,719	3,660	10,760		972
2004	3,789	4,017	18,677	3,623	11,128		2,054
2005	3,932	4,224	19,153	3,800	10,598		1,111
Total traffic volume							
2000	3,568	4,009	21,976	3,750	11,454	2,813	
2001	3,626	3,857	22,737	3,490	11,711	2,823	1,043
2002	3,948	4,159	22,990	3,592	12,023	3,304	1,512
2003	4,003	4,386	22,537	3,875	12,419		985
2004	3,955	4,183	24,034	3,813	13,002		2,151
2005	4,096	4,392	24,635	4,030	12,490		1,129

* Speed limit changed from 100 to 110 km/h in 2001

Speed limit changed from 110 to 100 km/h in 2003