

SPEEDING IN METROPOLITAN ADELAIDE: A SITUATION ANALYSIS

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ABSTRACT

The current situation in speeding and speed related crashes in metropolitan Adelaide was examined to assist in the development of a combined anti-speeding media and enforcement campaign. A review of the literature on 'best practice' speed enforcement and anti-speeding publicity in metropolitan areas within Australia was conducted. Road crash statistics from the Traffic Accident Reporting System (TARS) database were analysed although it was found that the database did not contain comprehensive or reliable information on the incidence of speeding in crashes. Additionally, speed enforcement strategies by police were assessed. Market research was undertaken to determine self reported attitudes and behaviours to speeding in metropolitan Adelaide amongst targeted demographic groups. Five focus groups were also conducted to explore specific attitudes and behaviours further. These research findings have implications for reducing the prevalence of speeding behaviour in metropolitan Adelaide.

INTRODUCTION

An analysis of the current situation in speeding and speed related crashes in metropolitan Adelaide was conducted by the Road Accident Research Unit of the University of Adelaide for Transport SA. The situation analysis was required to facilitate the development of a research based anti-speeding media and enforcement campaign and reduce the incidence of speeding in metropolitan Adelaide.

The situation analysis consists of four parts. Firstly, a literature review identifies the 'best practice' speed enforcement measures conducted interstate and the role of media publicity in altering speeding behaviour. The second section attempts to develop a profile of speed related crashes using road crash statistics from the Traffic Accident Reporting System (TARS) database and the third section investigates recent enforcement strategies and specific activities within metropolitan Adelaide. In the final section, telephone interviews and focus group discussions provide an insight into social norms and behaviour rationalisations relating to urban speeding, and the influence of legal sanctions and enforcement tactics on speeding behaviour.

LITERATURE REVIEW

It is well accepted that exceeding the speed limit or 'speeding' is a dangerous exercise that leads to the increased risk of having a crash. Research has reinforced this belief by demonstrating a relationship between speeding and crash risk in South Australian urban areas (Kloeden et al, 1997) and rural areas (Kloeden et al, 2001). In both studies it was found that there was an exponential increase in risk with increasing travelling speed. In the metropolitan area, more than two thirds of the speeding crash involved drivers were travelling at a speed below 75 km/h. This shows that even small speeding violations play a large role in real world crash causation.

There has been a great deal of activity involving the development and testing of countermeasures for speeding in general. Considerable debate has resulted from the need to optimise the partitioning of police enforcement resources between visible and non-visible enforcement, between mobile and stationary enforcement, and between 'manned' and automatic enforcement.

A variety of market research programs have been used to develop media campaigns to support police enforcement of speed limits. Evaluations of the effects of enforcement and media campaigns have demonstrated mixed results and it is not clear what factors make up a successful media campaign. There have been small changes in crash rates resulting from changes to the level of enforcement (eg Diamantopoulou et al, 1998) and detectable changes in self-reported attitudes resulting from anti-speeding publicity (eg Thompson, 1998). Bliss et al (1998), found small reductions in vehicle speeds, as well as in crash rates and self-reported attitudes after a major program of publicity and increased enforcement in New Zealand. The changes in crash rates in metropolitan areas were far greater than those in rural areas. However, the validity of the reported results have been questioned (White et al, 2000) due to claims regarding the lack of robustness of reported relationships between variables, and that crash rates were falling before the introduction of the countermeasures studied. Other results include the failure to find effects of either exposure to enforcement (Harrison and Pronk, 1997) or level of enforcement being undertaken (Graham et al, 1998) on perceived likelihood of detection.

A recent South Australian media evaluation study found that television advertising was shown to have an immediate effect on speed behaviour statistically independent of enforcement (Woolley, et al 2001). Although the reduction in mean free speed was small, it was statistically significant. It was also revealed that faster drivers reduced their speed significantly after advertising while little reductions in speed were found for the main body of drivers.

Nonetheless, the current theories of speed management in metropolitan areas of Australia are that balanced methods of police enforcement are required to deter motorists, both specifically and generally, and that this enforcement needs to be supported by regular anti-speeding publicity. Furthermore, this publicity needs to emphasise high levels of speed limit enforcement (Homel, 1988), and needs to target an audience of predominantly male motorists who believe that good drivers can drive at higher speeds without an increased crash risk (Fildes et al, 1991).

PROFILING SPEED RELATED CRASHES

Data from police reports on road crashes maintained by the Traffic Accident Reporting System (TARS) of Transport SA was used in this attempt to profile speed related crashes. The TARS database recorded the 'apparent error' in the crash, as listed on the police report. The assessment of 'apparent error' is often self reported by the drivers involved in property damage crashes, and even casualty crashes are rarely fully investigated, particularly with respect to the identification of excessive speed. Consequently, 'excessive speeding' is listed as an 'apparent error' in only about 2 per cent of casualty crashes, a percentage that certainly under-represents the true situation. In an attempt to compensate for this obvious under-reporting, those crashes in which the speed limit was recorded as having been exceeded by 10 km/h or more by one or more of the vehicles involved in the crash were added to those recorded as 'excessive speed' and are referred to here as 'speeding' crashes.

The 'speeding' rates for motor vehicles involved in casualty crashes by year is shown in Table 1. The rate appears to have been reasonably constant over the 13 years examined with a slight peak in 1995 and an indication of a drop since then. It should be stressed again that 'speeding' as defined here is certainly an underestimate of the actual situation and may be subject to unknown biases. The very small numbers of 'speeding' vehicles can also emphasise random fluctuations that do not represent real trends especially when the data is broken down into many categories.

Table 1: 'Speeding' Rates by Year for Motor Vehicles Involved in Casualty Crashes, Adelaide, South Australia 1986-1998

Year	All Motor Vehicles	'Speeding' Vehicles	Per Cent 'Speeding'
1986	7927	160	2.0
1987	6948	146	2.1
1988	6309	161	2.6
1989	6295	159	2.5
1990	6250	155	2.5
1991	5261	133	2.5
1992	4781	121	2.5
1993	4799	124	2.6
1994	4826	161	3.3
1995	4834	162	3.4
1996	4856	142	2.9
1997	4866	139	2.9
1998	5450	126	2.3
Total	73402	1889	2.6

Table 2 shows the crash injury severity, defined as the most severe injury suffered by any crash participant, for 'speeding' crashes. The rate of 'speeding' increased markedly with increasing crash injury severity with nearly 16 per cent of fatal crashes being classified as a 'speeding' crash. This may, at least partly, reflect the more thorough investigation and reporting of the more serious crashes.

Table 2: Crash Injury Severity by 'Speeding' for Motor Vehicle Casualty Crashes in Metropolitan Adelaide, 1986-1998

Crash Injury Severity	All Motor Vehicle Crashes	'Speeding' Crashes	Per Cent 'Speeding'
Hospital Treated	31272	1066	3.4
Hospital Admitted	11573	644	5.6
Fatal	1059	165	15.6
Total	43904	1875	4.3

Further analysis of 'speeding' casualty crashes found male drivers/riders were 2.6 times more likely to have been involved than were female drivers/riders. This is in general agreement with other road safety research that consistently finds males to be more likely than females to be involved in dangerous risk taking behaviour.

A clear relationship was found between ‘speeding’ and age whereby younger driver/riders were more likely to have been classified as ‘speeding’. The rate decreased with age for both males and females. Within each age group, except for the 51+ year olds, the rate for males was at least double that for females.

High rates of ‘speeding’ were found for drivers/riders on learner’s permits, provisional licences and particularly for unlicensed drivers/riders. Motorcyclists were particularly over-represented although it was not clear how much this represented an actual greater rate of speeding as opposed to the perceptions of the police or the types of crashes these vehicle were involved in.

The rate of ‘speeding’ peaked at night time between 12 and 4am and on weekends. The rates were also highest in the outer suburbs of metropolitan Adelaide.

ENFORCEMENT STRATEGIES

Mobile testing and speed cameras are the two types of speed enforcement currently used in South Australia.

Mobile Testing

Mobile testing is conducted by police using laser devices, hand held radars and mobile radars (in Police vehicles). The speeds of vehicles are measured and offending drivers are pulled over to the side of the road to be booked. Hand held radars and mobile radars are generally only used on open roads and not in the Metropolitan area. The coordination of mobile testing is handled by Police Local Service Areas (LSAs) of which there are seven that cover the Adelaide metropolitan area. 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. The actual amount of activity is monitored through information published on the Police intranet and also through regular and extensive performance reviews of the LSA.

The locations and times of speed detection activity are determined using the local knowledge of patrol officers 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.

Speed Cameras

The Police Security Services Branch, a semi-independent body, operates speed cameras in South Australia. It is contracted to perform 86 hours of activity per day over the entire year, and normally exceeds that target. There are 37 staff, using 20 vehicles. The speed cameras operate from unmarked vehicles to give some degree of anonymity to the operations but signs are placed after the location to advise that a camera has been passed.

A list of camera locations for each day is produced by a computer program, based on road crash statistics weighted for the speed nature of the crash. The program can be adjusted to schedule locations that are the subject of complaints regarding speeding and locations that exhibit very high speeds or are known areas 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.

Speed Detection Activity

The general philosophy of speed detection activity is to maintain high visibility in addition to detecting and fining speeding drivers. General speed detection activity occurs throughout the entire day, however, the amount is lower between 11pm and 8am. The total number of hours of speed detection and the number of detections made for the year 2000 are shown in Table 3. On average there were 5 speed detection devices in operation at any given time and a detection was made every 2.4 minutes. Speed cameras were also seen to be much more efficient in detecting speed violations than mobile devices.

Table 3: Speed Detection Hours and Detections by Device, South Australia 2000

Detection Method	Hours in Operation	Number of Detections	Detections per hour
Speed camera	31,834	199,988	6.3
Laser/mobile radar/hand held radar	11,698	19,819	1.7
Total	43,532	219,807	5.0

MARKET RESEARCH AND FOCUS GROUPS

Methodology

Quantitative market research was undertaken to determine self-reported attitudes to speeding and speeding behaviour in the Adelaide metropolitan area amongst targeted demographic groups. Surveys were conducted by

telephone in metropolitan Adelaide and a total of 800 questionnaires were completed. Five focus groups were also undertaken to explore specific attitudes and behaviours further.

Self-Reported Speeding Behaviour

The frequency of self-reported speeding by speed is presented in Table 4. Generally, 7 per cent were speeders 'all' or 'most' of the time. Seventy five per cent of drivers reported travelling 5 km/h faster than the speed limit at least occasionally, 31 per cent at 10 km/h faster than the speed limit and 6 per cent at 20 km/h faster. Males reported they were more likely than females to travel 5km/h (81% vs 68%), 10 km/h (48% vs 34%) and 20 km/h (22% vs 13%) faster than the speed limit at least occasionally.

Table 4: Self Reported Frequency of Exceeding the Speed Limit by Speed

Drive Faster than Speed Limit	Exceed limit		5 km/h Faster		10 km/h Faster		20 km/h Faster	
	N	%	N	%	N	%	N	%
All the time	14	1.8	15	1.9	4	0.5	1	0.1
Most of the time	45	5.6	60	7.5	-	-	-	-
Half the time	59	7.4	82	10.3	12	1.5	1	0.1
Occasionally	480	60.0	439	54.9	233	29.1	45	5.6
Never	201	25.1	203	25.4	550	68.8	753	94.1
Don't know	1	0.1	1	0.1	1	0.1	-	-
Total (N)	800	100.0	800	100.0	800	100.0	800	100.0

Table 5 shows the self-reported frequency of driving faster than the speed limit by speed and age. Respondents aged 20 to 29 years were more likely than the other age groups to drive 5 km/h (79%) and 10 km/h (49%) faster than the speed limit at least occasionally. However those aged 16 to 19 years were more likely than the other groups to report driving 20 km/h over the speed limit (29%) at least occasionally.

Table 5: Self Reported Frequency of Exceeding the Speed Limit by Speed by Age

Drive Faster than Speed Limit (%)	5 km/h Faster			10 km/h Faster			20 km/h Faster		
	16-19	20-29	30-50	16-19	20-29	30-50	16-19	20-29	30-50
	yrs	yrs	yrs	yrs	yrs	yrs	yrs	yrs	yrs
All the time	0.8	2.6	1.8	1.2	0.5	0.6	-	-	0.9
Most of the time	8.5	9.6	5.8	-	-	-	-	-	-
Half the time	11.6	13.7	7.5	2.3	2.3	1.9	-	1.0	-
Occasionally	45.7	53.1	59.0	32.6	46.3	45.3	29.0	16.2	16.7
Never	33.3	21.0	25.8	64.0	50.9	51.6	71.0	82.9	82.5
Don't know	-	-	0.3	-	-	0.6	-	-	-
Total (N)	129	271	400	129	271	400	129	271	400

Behaviour Rationalisations

Respondents were asked to give their main reason for speeding and not speeding. The most common reason given for exceeding the speed limit was 'not paying attention' (31%) followed by 'running late' (24%) and to 'keep up with the traffic flow' (10%).

The main reasons given by all respondents for not speeding were associated with safety ('dangerous/not safe' 32%), and the risk of crashing ('may crash' 18%). The high cost of fines was mentioned by 15 per cent of all drivers. The oldest group was more likely to mention the high cost of fines (18%) than the possibility of crashing (14%). Younger drivers (16-19 years) considered the risk of crashing when speeding a stronger deterrent than did the other groups (24%).

A subsequent question asked if the thought of certain circumstances had deterred them from speeding either temporarily or permanently. Responses related to penalties and enforcement were more prevalent, with paying the high cost of fines the greatest deterrent (80%). This was followed by having a crash (77%), sighting police (76%) and being caught by a speed camera (74%).

Social Norms

Drivers were asked if they considered it to be dangerous to travel at 10 km/h or 20 km/h faster than the speed limit on main roads and residential streets in the Adelaide metropolitan area (Table 6). Travelling 20 km/h over the speed limit was seen as being more dangerous than 10 km/h over the speed limit. Driving faster than the speed limit was seen as more dangerous on residential streets than on main roads. Males were less likely than females to perceive travelling 10 or 20 km/h over the speed limit as very dangerous on both main roads and residential streets.

Focus groups generally agreed that there was less chance of being caught in back streets. Reasons ranged from lack of speed enforcement to conditions less amenable to speeding. Fifty eight per cent of surveyed respondents disagreed with the statement 'speed traps are often set up in residential streets'.

Table 6: Perceived Danger by Travel Speed Over the Speed Limit and Type of Road

Perceived Danger (%)	Travelling Speed			
	10 km/h Over Speed Limit		20 km/h Over Speed Limit	
	Main Roads	Residential Streets	Main Roads	Residential Streets
Very dangerous	20.0	48.0	78.9	91.3
Dangerous	62.9	47.8	19.5	8.4
Not at all dangerous	14.6	3.6	1.0	0.3
Don't know	2.5	0.6	0.6	0.1
Total (N)	800	800	800	800

Enforcement

Speed cameras (89%), laser guns (79%) and police cars with radars (76%) were all commonly sighted speed detection equipment. Only 3 per cent of drivers had not seen any devices during the last six months. Males were more likely than females to spot speed cameras and laser guns.

Table 7 shows the percentage of drivers who received speeding fines in the Adelaide metropolitan area during the last six months by sex and age. Altogether, 13 per cent of males received a fine compared to 8 per cent of females. Seventeen per cent of males aged 20 to 29 years reported obtaining a fine compared to 11 per cent of all respondents. Older females were the least likely to report receiving a fine (7%).

Table 7: Speeding Fine in Last Six Months by Age and Sex

Received Fine for Speeding? (%)	Male			Female		
	16-19yrs	20-29yrs	30+yrs	16-19yrs	20-29yrs	30-50yrs
Yes	9.6	17.1	12.5	10.7	10.1	6.5
No	89.0	82.1	87.5	89.3	89.9	93.5
Can't remember	1.4	0.8	-	-	-	-
Total (N)	73	123	200	56	148	200

Those interviewed were asked what they perceived the likelihood of being caught when regularly exceeding the speed limit by 10 km/h in the Adelaide metropolitan area (Table 8). Sixty five per cent of all drivers thought they were 'certain' or 'likely' to be caught when speeding. Females were more likely than males to feel they were 'certain' or 'likely' to be caught (71% vs 59%). There were no age differences.

Table 8: Perceived Likelihood of Being Caught if Regularly Exceeding Speed Limit by 10 km/h by Sex

Perceived Likelihood of Being Caught? (%)	Sex		
	All	Male	Female
Certain	27.5	26.8	28.2
Likely	37.3	32.1	42.3
Half and half	23.9	25.3	22.5
Unlikely	9.3	13.4	5.2
Not at all	1.4	1.3	1.5
Don't know	0.8	1.3	0.2
Total (N)	800	396	404

DISCUSSION

The police reports on crashes in the TARS database do not contain comprehensive or reliable information on the incidence of speeding in crashes, for the reasons noted earlier in this paper. However, a recent case control study of the relationship between travelling speed and the risk of involvement in a casualty crash in metropolitan Adelaide found that there was an exponential increase in risk with increasing travelling speed and that even small reductions in travelling speed could be expected to greatly reduce crash frequency (Kloeden et al, 1997).

South Australia Police has indicated it is committed to speed detection and has allocated resources (speed cameras and mobile testing) to the problem in metropolitan Adelaide. The 'ideal' level of enforcement activity is unknown, however the activity is substantial, and sufficient to commence an integrated publicity and enforcement campaign.

Crash statistics from the TARS database suggest campaigns should be weighted towards outer suburbs where the 'speeding' crash rates were highest. Market research and focus groups did not investigate speeding behaviour comparing the inner city to the outer suburbs. However, it was found that travelling faster than the speed limit was perceived to be more dangerous on residential streets than main roads. Drivers also believed there was less chance of being caught on residential streets. Speed enforcement should be promoted as targeting both main streets and residential streets to increase the perceived likelihood of detection.

Although it has been shown that crash risks rise exponentially with increasing speed, the contribution of speeding to crash causation is much greater at speeds less than 15 km/h over the speed limit because more drivers are travelling within this 61 to 74 km/h speed range (Kloeden et al, 1997). Furthermore, market research found that the majority (75%) of drivers self-reported exceeding the speed limit by 5 km/h at least occasionally in the Adelaide metropolitan area and were more likely to report exceeding the speed limit by 5 km/h, than 10 or 20 km/h. Hence, enforcement and publicity targeting speeds less than 10 km/h over the speed limit would result in significant crash reductions.

Using the 'speeding' crash data from metropolitan Adelaide, there was an over-representation in male driver/riders under 30 years of age, of drivers/riders unlicensed or holding learners permits or provisional licences, of motorcyclists, night-time drivers/riders, weekend drivers/riders and of drivers/riders in outer suburbs.

Results from the market research indicated that males, particularly those aged 20-29 years, more frequently reported exceeding the speed limit by 5 and 10 km/h and were most likely to be caught and fined for speeding. However, young males (16-19 years) were most likely to report travelling at 20 km/h over the speed limit. Males were more likely than females to see speed cameras, were less likely to perceive they would be caught and were also less likely to believe it was dangerous to exceed the speed limit by 10 and 20 km/h. Based on these findings, males would be an obvious target in an anti-speeding campaign, those aged 20 to 29 years at lower travel speeds and those aged 16 to 19 years when targeting higher end speeding.

In conclusion, these research findings provide a basis for the development of a combined advertising and enforcement campaign to reduce the incidence of speeding in metropolitan areas in South Australia.

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