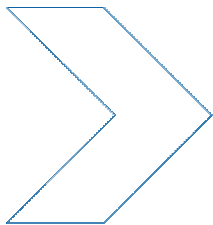


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## On-road observational survey of restraint and child restraint use, 2009

LN Wundersitz, RWG Anderson

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## TITLE

On-road observational survey of restraint and child restraint use, 2009

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## ABSTRACT

On-road observational surveys of restraint use provide a valuable means of obtaining information on the current level of restraint use and on the characteristics (vehicle, occupant, location) of non-use of restraints. Several observational surveys of restraint use in passenger vehicles have been conducted in South Australia between 1998 and 2002. This report presents the results of a new on-road observational survey undertaken in March 2009 to monitor the levels of restraint use by occupants of passenger vehicles in areas previously surveyed in South Australia: metropolitan Adelaide and five rural regions. Trained field observers recorded the vehicle type, plates displayed on the vehicle, and the seating position, gender and restraint use of vehicle occupants including the uses and types of any child restraints. For the first time in this series of surveys, restraint use was observed on weekends in addition to weekdays. Observed rates of restraint wearing for all vehicle occupants were relatively high, ranging from 98.9% in Murray Bridge (on a weekend) to 96.8% in Clare (on a weekday). Rear seat passengers had the lowest observed rates of restraint wearing. Adult males wore seat belts less often than adult females. Child restraint use varied by region but was relatively high. Findings from this survey might assist in the development of restraint use publicity campaigns and the monitoring of their effectiveness.

## KEYWORDS

Seat belt use, Child restraints, Observational survey

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The views expressed in this report are those of the authors and do not necessarily represent those of the University of Adelaide or the funding organisations.

## Summary

On-road observational surveys of restraint use provide valuable information on the levels of restraint use in the community. They also identify the characteristics of those vehicle occupants who are not using restraints. This report presents the results of an on-road observational survey undertaken in March 2009 by the Centre for Automotive Safety Research for the Department for Transport, Energy, and Infrastructure and the South Australia Motor Accident Commission. The survey was designed to monitor the levels of restraint use by occupants of passenger vehicles in areas previously surveyed in South Australia. Trained field observers recorded information on individual vehicles including the vehicle type, any plates displayed on the vehicle, and the seating position, gender and restraint use of vehicle occupants, including the usage of any child restraints.

A total of 9,938 vehicles and 14,170 vehicle occupants were observed on weekdays in metropolitan Adelaide and in five rural regions: Whyalla, the Riverland, Mt Gambier, Murray Bridge and Clare. For the first time in this series of surveys, observations were made on weekends. These observations were made in metropolitan Adelaide and in Murray Bridge. There were 1,586 vehicles and 2,720 vehicle occupants observed on weekends. Relative to vehicles observed during the week, the vehicles observed on the weekend tended to have more occupants, and drivers with restricted licences were more prevalent. Vehicles in rural regions tended to have more children on board.

### RESTRAINT USE BY REGION AND SEATING POSITION

A summary of the results is presented in the Table below.

Summary of restraint use (%) by region and seating position, 2009

Seating position	Weekdays						Weekend	
	Adelaide	Whyalla	Riverland	Mt Gambier	Murray Bridge	Clare	Adelaide	Murray Bridge
Driver	98.7	98.0	97.8	98.6	97.9	96.3	99.0	98.6
Front passenger	98.5	96.8	97.6	96.8	97.4	98.1	98.5	99.4
Rear passenger	95.8	97.4	95.1	98.2	94.8	97.5	95.7	99.0
All occupants	98.4	97.7	97.5	98.2	97.5	96.8	98.5	98.9

Overall rates of restraint use were relatively high. Observed rates for all occupants ranged from 98.9% in Murray Bridge (on a weekend) to 96.8% in Clare (on a weekday). The rate of restraint use on weekdays was higher in Adelaide than in the Riverland, Murray Bridge and Clare (by a statistically significant margin). Drivers in Clare had lower rates of restraint use than drivers in the other regions. The lowest rates of restraint wearing were observed in rear seat passengers, specifically in Murray Bridge, the Riverland and Adelaide (weekdays and weekends). Restraint use in Murray Bridge was significantly higher on the weekend than on weekdays for both front and rear seat passengers, while in Adelaide, restraint use was similar on both weekdays and weekends.

### RESTRAINT USE BY SEX AND AGE

Restraint use was higher among adult females (ranging from 98% to 99%) than adult males (ranging from 95% to 99%) at all survey locations. The level of restraint use by children varied by region but was generally higher than the level for adult males. The apparent rate of appropriate child restraint use was lowest in Adelaide (96.6%). Moreover, child restraint use was lower than for adults in Adelaide on both weekdays and weekends. Other issues concerning child restraint use were that 10% of children who appeared to be aged 0 to 4 years were restrained in adult seat belts alone and about 4% of children aged 0 to 4 years were sitting in the front seat of a vehicle.

### RESTRAINT USE OVER TIME

The levels of restraint use observed in the current survey were the highest since surveys began in 1998. Observed restraint use has increased significantly in metropolitan Adelaide, the Riverland, Murray Bridge and Clare since the last survey in 2002, and the main contribution to the increase has been a rise in restraint use by drivers.

## FUTURE RESTRAINT USE SURVEYS

The results of this survey represent restraint use at only the times and locations where surveys were undertaken (i.e. day time, town/city centres, intersections, lower speed limit zones). It is not clear how well the results can be applied to represent restraint use in South Australia as a whole. Consideration could be given to conducting future restraint use surveys on different types of roads (i.e. 80/100km/h rural roads, back streets) and at different times (i.e. night time) to those in the current survey. In addition, it is probable that the times and places at which the survey was taken do not capture the wearing rates of the population at risk of being killed in a crash. A different, logistically difficult survey design, possibly at the locations and times at which serious crashes have occurred would be required to investigate restraint use amongst this population.

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# 1 Introduction

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Approximately a third of all vehicle occupants killed on South Australian roads each year are not wearing a seat belt at the time of the crash. Information on current levels of restraint use, and on the characteristics of those occupants, vehicles and locations associated with non-restraint use, may assist in strategies to further increase compliance with restraint use laws. On-road observational surveys of restraint use provide a means of obtaining such information and can also assist in monitoring the effectiveness of seat belt publicity campaigns.

The South Australian Department of Transport, Energy and Infrastructure (DTEI) conducted several observational surveys of restraint use in passenger vehicles in the period 1998 to 2002. The first two surveys (February 1998, March 1999) were conducted in metropolitan Adelaide, Mount Gambier, Riverland and Whyalla, and in the third and fourth surveys (May 2000, April 2002) Murray Bridge and Clare were also included. The information gathered from the first two surveys was used to develop a rural restraint use campaign that was run from 1998 to 2001. The last two surveys were conducted to monitor the success of the campaigns. The last survey in 2002 reported that restraint usage was at least 95 per cent in both metropolitan Adelaide and the five selected rural areas.

This report presents the results of a new on-road observational survey undertaken in March 2009 by the Centre for Automotive Safety Research for DTEI and MAC. The motivation was to determine if restraint use has been sustained at the high levels observed previously. Restraint use was observed on weekends and weekdays (the previous surveys only included weekday observations).

This report begins by describing the method used in the observational surveys. Section three describes the characteristics of the sampled vehicles and vehicle occupants for weekdays and the weekend. Section four presents the results of the restraint survey, separately for weekdays and the weekend. The report concludes with a short discussion of how future restraint use surveys might be conducted.

## 2 Method

The observational methods and the observation sites used in this survey were consistent with previous surveys to allow comparisons to be made. The observational method was adapted from a New South Wales observational survey by Preece, Johansen and Norrish (1993) (see Appendix A).

The survey was conducted over a three-week period from 16 March to 1 April 2009, consistent with the time of year used in the preceding surveys. The surveys were conducted in previously surveyed areas: metropolitan Adelaide, Mount Gambier, the Riverland (Berri, Loxton, Renmark), Whyalla, Murray Bridge, and Clare. Surveys were conducted on weekdays and on a weekend.

### 2.1 Locations

Data on restraint use was collected by direct observation by trained staff working at selected locations in metropolitan Adelaide and in rural centres (see Table 2.1). Observations were conducted at 61 intersections or sites. Note that observations conducted on weekends were undertaken at a selection of the sites used on weekdays in that region.

Table 2.1  
General location of observations, number of sites and number of vehicle occupant observations

Location	Minimum no. of vehicle occupant observations	No. of sites	Actual no. of vehicle occupant observations
Weekday			
Adelaide	1500	12	2089
Whyalla	1500	12	2546
Riverland	1500	12	2517
Mt Gambier	1500	12	2827
Murray Bridge	1200	9	2400
Clare	800	4	1791
Weekend			
Adelaide	800	7	1524
Murray Bridge	800	7	1196
Total	10,400	61 <sup>a</sup>	16,890

<sup>a</sup> Total excludes sites revisited on weekends.

The sites were originally selected to include all vehicles leaving or entering the city and towns in all directions and to capture a range of occupant types (e.g. local traffic, people travelling to and from work). In the present survey, observations were conducted at two additional sites in Clare to obtain a greater range of vehicle and occupant types. In addition, some of the observation positions at intersections had to be altered because of footpath obstructions (i.e. café dining) or changes to the road geometry since the last survey.

In order to observe stationary or slowed traffic, only intersections controlled by traffic lights, stop signs, give way signs and large roundabouts were chosen. Different intersections were surveyed in the morning and afternoon to prevent double counting of the same vehicles (e.g. as they go to and from work).

Generally, only vehicles in the kerb and median lanes were observed as the data required direct observation of the interior of the vehicle. Observations were conducted from a raised median or a footpath, and not from a position on the carriageway itself.



Two observers spent approximately one hour at each site.

## 2.2 Observation times

Consistent with previous surveys, the majority of surveys were conducted on weekdays within two three-hour periods: 7.00am to 10.00am and 3.00pm to 6.00pm. These times were originally chosen to include times of heavy traffic so as to minimise observation time and with the intention of including a wide range of road users.

While interstate surveys have found no differences in restraint use between weekdays and weekends, there is no recent data on weekend restraint use in South Australia. Consequently, restraint use was observed for one weekend in the Adelaide metropolitan area and one weekend in Murray Bridge. Observations were conducted between 10am and 2pm on Saturdays and between 11am and 2pm on Sundays, times when traffic volumes were highest.

The observation days did not include school or public holidays.

## 2.3 Observer training and pilot testing

Prior to data collection, training sessions were held in which the observers were briefed on the observational procedures and data sheets. A pilot observation period was also conducted at an intersection in metropolitan Adelaide. During the on-road testing, the observational procedures of observers were monitored and any problems with observations were addressed during the following debriefing session.

## 2.4 Observation method

At observation sites located at traffic lights, the observer waited until vehicles were stationary at a red light. The first observer began with the second vehicle back from the lights and the second observer with the third. The first observer continued observing even-numbered vehicles in the queue and the second observer with odd-numbered vehicles. A vehicle was not surveyed if they were more than 50m from the lights when the lights changed to red. This was to ensure that the survey was not over-represented by drivers who are cautious at traffic lights, in comparison to drivers who go through red and amber lights. Observers recorded details for each stationary vehicle in the line of traffic until traffic began to move off. At intersections controlled by stop signs, give way signs or roundabouts, details of vehicles that slowed were recorded. Vehicles in the lane closest to the observer were selected, usually the left kerbside lane, and an attempt was made to record all relevant details, regardless of the difficulty of the observation.

## 2.5 Vehicles observed

The survey was restricted to cars and car derivatives. This included any car, station wagon, four-wheel-drive, utility, van, or taxi used for private or commercial purposes. Service vehicles such as police cars, ambulances or fire vehicles were excluded in addition to wedding cars and limousines.

## 2.6 Data collected

The details of each vehicle were recorded on an observation sheet specifically developed for this survey. A copy of the data collection sheet for site details (Figure B1) and the vehicle (Figure B2) are in Appendix B.

Vehicle details included the type of vehicle (taxi or not), any learner or provisional plates displayed and the number of occupants. The number plate of each vehicle was also recorded to ensure that details for each vehicle were only recorded once during each observation session. (Exclusions were determined later, after data had been entered into a database.)

The following details were recorded for each occupant in a vehicle: seating position, gender (if adult), estimated age (if child), child restraint type (if child), and wearing of restraint. For children, two age group categories (Preschool - 0 to 4 years, Primary school - 5 to 12 years) were used. New Australian Road Rules, expected to be introduced in 2009/2010, will require children up to the age of seven to be appropriately restrained based on their age. Children up to the age of six months will be required to be restrained in a rearward facing child restraint (e.g. infant capsule). From six months until the age of four, children must be restrained in either a rearward or forward facing child restraint (e.g. child safety seat). From four years until the age of seven, children must be restrained in either a forward facing child restraint or booster seat restrained by a correctly adjusted and fastened restraint or child safety harness. In addition, children up to four years must be restrained in the rear of the vehicle where a vehicle has two or more rows of seats. Children aged four to seven years are not permitted to sit in the front seat of a vehicle unless children aged less than seven years occupy all other rear seats.

In previous surveys, a distinction was made between 'correct' and 'incorrect' usage (e.g. twisted, not worn over shoulder) of restraints. However, these surveys found it difficult to consistently ascertain the 'correct usage' of restraints, particularly by passengers in the middle rear-seat. For this reason, the current survey did not attempt to make a distinction. The data is simply recorded in terms of whether or not a restraint is being 'used'.

In addition to restraint usage, any driver observed using a hand held mobile phone was noted as such on the data sheet.

## 2.7 Data analysis

The survey results are summarised in this report using frequencies and cross tabulation. If any observation omitted to record a variable, that observation was excluded from the tabulation of the variable.

Initially, a statistical analysis (chi-square) was performed to ensure that restraint use levels at individual sites in each region did not differ significantly from the mean for the region; that is, checks were undertaken to ensure there were no results at any of the individual sites that would prevent the aggregation of the results for each region. The results indicated that restraint use at individual sites within a region did not vary from the region's mean by any more than what would be expected by chance. Consequently, the results of sites were aggregated into regional results.

Levels of restraint use were then compared between regions, between seating positions, between weekdays and weekends, and over time using the chi-square test for independence. In all analyses, a level of statistical significance of 0.05 was adopted. In some cases the exact probabilities or *p*-values are reported.

Standard errors for proportions not using restraints were calculated where appropriate. In doing so it was assumed that the survey could be characterised as a random sample from a large unrestricted population. The standard error is a measure of the variation of any estimate that is produced by sampling a given population. A higher standard error indicates that the estimate is more variable in relation to the true rate.

## 2.8 Limitations

The results of the current survey are of the specific sites and times observed (i.e. day time, in town/city centres, at intersections, in lower speed limit zones). Locations were selected where there was heavy traffic and where a wide range of vehicles types and occupants might be observed. The observation sites are not a random or a representative sample of locations in South Australia, and so the results should not be generalised to the whole State.

Observer bias cannot be excluded. However, the training session should have limited it.

### 3 Characteristics of sampled vehicles and vehicle occupants

The characteristics of the vehicles and vehicle occupants observed are presented separately for each region and separately for weekdays and the weekend in the following sections.

#### 3.1 Weekdays

##### VEHICLE OCCUPANCY AND TYPE

The unit of analysis in the following tabulations is vehicles. Details of restraint use for vehicle occupants were recorded for 9,938 vehicles on weekdays during the survey period. The distribution of the number of vehicle occupants by geographical region is presented in Table 3.1. In each region, the majority of surveyed vehicles contained a single occupant. The Adelaide metropolitan area recorded the greatest proportion of single occupant vehicles (76%).

Table 3.1  
Number of vehicle occupants by region, weekdays

Number of vehicle occupants	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
1	75.7	1208	65.0	1122	69.1	1207	69.0	1381	66.1	1088	68.1	829
2	19.1	305	23.1	451	22.3	389	23.0	461	25.5	420	21.8	265
3	4.3	68	5.8	109	5.6	98	5.9	118	6.1	100	6.7	82
4	0.7	11	1.8	31	2.4	41	1.8	36	1.6	27	2.3	28
5	0.2	3	0.5	13	0.6	10	0.3	6	0.6	10	0.9	11
6	-	-	0.1	1	0.1	2	-	-	0.1	1	0.2	2
7	-	-	-	-	-	-	-	-	0.1	1	-	-
8	0.1	1	-	-	0.1	1	-	-	-	-	0.1	1
Total	100.0	1596	100.0	1727	100.0	1748	100.0	2002	100.0	1647	100.0	1218

Table 3.2 shows that only a small minority of vehicles were taxis. The sample with the highest proportion of taxis was vehicles observed in the Adelaide metropolitan area.

Table 3.2  
Type of vehicle by region, weekdays

Vehicle type	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
Non-taxi	98.6	1573	98.7	1705	99.3	1736	98.6	1974	99.6	1641	98.4	1198
Taxi	1.1	18	0.8	13	0.3	6	0.8	16	0.1	2	0.4	5
Unknown	0.3	5	0.5	9	0.3	6	0.6	12	0.2	4	1.2	15
Total	100.0	1596	100.0	1727	100.0	1748	100.0	2002	100.0	1647	100.0	1218

The presence or absence of license restriction plates and the type of plates (i.e. 'L' or 'P') displayed on a vehicle provided an approximate guide of the type of licence held by the driver. It is acknowledged that not all drivers will display the correct plates and drivers with a P2 provisional licence do not need to display P-plates<sup>1</sup>. Table 3.3 suggests that the majority of vehicle drivers observed in the present survey did not have restricted licences. Samples from rural regions had a slightly greater proportion of drivers with restricted licenses than the Adelaide metropolitan area.

Table 3.3  
Plates displayed on vehicle (licence type) by region, weekdays

Plates displayed	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
L - Learners	0.3	4	0.4	7	0.5	9	0.4	7	0.3	5	0.6	7
P - Provisional	2.8	45	5.6	97	5.2	91	6.4	129	3.6	59	4.0	49
No plates	96.4	1539	93.5	1614	93.9	1642	92.6	1854	95.9	1580	94.2	1147
Unknown	0.5	8	0.5	9	0.3	6	0.6	12	0.2	3	1.2	15
Total	100.0	1596	100.0	1727	100.0	1748	100.0	2002	100.0	1647	100.0	1218

## SAMPLE STRUCTURE

The following tables describe the structure of the sample of occupants observed in the weekday surveys. The number of vehicle occupants observed during the survey on weekdays was 14,170. The distribution of values of the variable that described either the sex of occupant (if adult) or the age (if child) is displayed in Table 3.4. Samples from rural areas contained a greater proportion of children. The sample with the greatest proportion was from Clare (15%). Consistent across all regions was that there were more children aged 5 to 12 years observed than children aged 0 to 4 years. The proportion of each sample that consisted of adult males varied from 50% in the Adelaide metropolitan area to 42% in Clare. The proportion that consisted of adult females varied from 46.8% in Mount Gambier to 40.0% in Whyalla.

Table 3.4  
Distribution of sex of adult and age of child, weekdays

Sex/age	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
Child 0-4 yrs	2.5	53	4.8	122	3.2	81	3.9	110	2.8	66	4.4	79
Child 5-12 yrs	3.8	80	8.3	212	9.2	230	4.9	137	7.7	185	10.8	193
Adult female	43.6	911	40.0	1017	43.8	1101	46.8	1324	41.8	1002	42.6	762
Adult male	50.0	1045	46.9	1193	43.8	1100	44.4	1256	47.8	1147	42.3	757
Total	100.0	2089	100.0	2544	100.0	2512	100.0	2827	100.0	2400	100.0	1791

Note: Data is missing for 7 vehicle occupants.

Table 3.5 indicates that the majority of vehicle occupants observed were drivers, the highest proportion being 77% in the Adelaide metropolitan area. The proportion of occupants that were rear seat passengers ranged from 8% in Adelaide to 14% in Clare while the proportion of occupants that were front seat passengers ranged from 16% in Adelaide to 21% in Murray Bridge.

<sup>1</sup> Drivers must hold a P1 provisional licence for a minimum of two years and pass a hazard perception test. Drivers with a P1 licence can fast track to a P2 licence after one year if they do not incur any demerit points. If a P1 driver has no more than three demerit points in the preceding year, they may get a P2 licence after passing the Driver Awareness Course.

Table 3.5  
Distribution of seating position, weekdays

Seating position	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
Driver	76.5	1597	67.9	1729	69.5	1748	70.8	2002	68.7	1648	68.0	1218
Mid front	0.5	11	<0.1	1	0.2	4	0.1	2	0.1	3	0.3	5
Left front	15.3	319	19.8	505	18.6	467	18.8	530	20.8	500	17.4	312
Right rear	2.2	46	5.0	126	4.3	109	3.6	103	3.8	90	4.9	87
Mid rear	1.1	22	1.9	48	1.7	43	1.5	41	1.8	42	2.9	51
Left rear	4.3	89	5.1	129	5.4	135	5.2	148	4.5	109	6.3	112
Other	0.2	5	0.3	8	0.4	11	<0.1	1	0.3	8	0.3	6
Total	100.0	2089	100.0	2546	100.0	2517	100.0	2827	100.0	2400	100.0	1791

## 3.2 Weekend

A total of 1,586 vehicles were observed on weekends in Adelaide and Murray Bridge. Table 3.6 shows the distribution of the number of vehicle occupants per vehicle for the two regions surveyed. The proportion of vehicles with a single occupant was lower on the weekend than on weekdays (56% vs 76% in Adelaide and 45% vs 66% in Murray Bridge).

Table 3.6  
Number of vehicle occupants by region, weekend

Number of vehicle occupants	Adelaide		Murray Bridge	
	%	N	%	N
1	55.5	520	44.5	289
2	32.6	305	37.8	245
3	7.0	66	9.6	62
4	4.0	37	5.6	36
5	0.8	7	2.5	16
6	0.2	2	0.2	1
Total	100.0	937	100.0	649

Table 3.7 shows that the vehicle types observed on the weekend were relatively consistent with the vehicle types observed on weekdays (see Table 3.2).

Table 3.7  
Type of vehicle by region, weekend

Vehicle type	Adelaide		Murray Bridge	
	%	N	%	N
Non-taxi	98.3	921	99.2	644
Taxi	1.6	15	0.2	1
Unknown	0.1	1	0.6	4
Total	100.0	937	100.0	649

If plates displayed on vehicles are seen as an indicator of licence status, Table 3.8 suggests that while the greatest proportion of vehicles surveyed were operated by drivers without restricted licences, the proportion with restricted licences was greater on weekends than on weekdays (see Table 3.3).

Table 3.8  
Plates displayed on vehicle (licence type) by region, weekend

Plates displayed	Adelaide		Murray Bridge	
	%	N	%	N
L	0.5	5	1.7	11
P	3.4	32	4.9	32
No plates	95.9	899	92.8	602
Unknown	0.1	1	0.6	4
Total	100.0	937	100.0	649

## SAMPLE STRUCTURE

The following tables describe the structure of the sample of occupants observed in the weekend surveys. A total of 2,720 vehicle occupants were observed on the weekend. Consistent with observations made on weekdays, the sample from Murray Bridge had a higher proportion of children than the sample observed in the Adelaide metropolitan area (Table 3.9). The proportions of the sample that were adult males and adult females were similar to those observed on weekdays (see Table 3.4).

Table 3.9  
Distribution of sex of adult and age of child, weekend

Sex/age	Adelaide		Murray Bridge	
	%	N	%	N
Child 0-4 yrs	3.0	46	4.4	53
Child 5-12 yrs	5.0	76	6.5	78
Adult female	44.1	672	42.7	511
Adult male	47.9	730	46.3	554
Total	100.0	1524	100.0	1196

Table 3.10 shows the distribution of seating positions among occupants observed on the weekend surveys. While the largest proportion of vehicle occupants were drivers, vehicles had more passengers on the weekend than they did on weekdays for both locations (Adelaide 62% vs 77%, Murray Bridge 54% vs 69%).

Table 3.10  
Distribution of seating position, weekend

Seating position	Adelaide		Murray Bridge	
	%	N	%	N
Driver	61.5	937	54.3	649
Mid front	0.1	1	0.2	2
Left front	25.5	388	28.9	346
Right rear	4.7	71	5.7	68
Mid rear	2.2	33	2.3	28
Left rear	5.6	86	8.0	96
Other	0.5	8	0.6	7
Total	100.0	1524	100.0	1196

## 4 Results: Restraint use

The results reported in this section are based on the observed restraint use of the vehicles' occupants. Restraint use could be determined for 16,657 vehicle occupants (13,964 on weekdays in six regions and 2,693 on a weekend in two regions). The results are presented separately for weekdays and weekends. Note that the tables have omitted observations for which the restraint use could not be determined ( $n=232$ ).

### 4.1 Restraint use on weekdays

The distribution of restraint use is tabulated by region and seating position for weekdays in Table 4.1. The survey results indicate that restraint-wearing rates for all vehicle occupants was relatively high ranging from 98.4% in the Adelaide metropolitan area to 96.8% in Clare. A similar pattern of usage was observed for drivers. Restraint use by front seat passengers was similar to that of drivers. The highest rate of restraint use by front seat passengers was recorded in Adelaide (98.5%) and the lowest rates were observed in Whyalla and Mount Gambier (96.8%). Rear seat passenger restraint use was slightly lower than that for front seat passengers and drivers in Adelaide, the Riverland and Murray Bridge. Rear seat passenger compliance rates ranged from 98.2% in Mount Gambier to 94.8% in Murray Bridge. Generally, restraint use was lower for passengers than for drivers in all regions except Clare.

Table 4.1  
Restraint use by region and seating position for weekdays

Seating position	Adelaide		Whyalla		Riverland		Mount Gambier		Murray Bridge		Clare	
	%	N	%	N	%	N	%	N	%	N	%	N
Driver												
Worn	98.7	1564	98.0	1694	97.8	1709	98.6	1972	97.9	1609	96.3	1173
Not worn	1.3	21	2.0	34	2.2	39	1.4	28	2.1	34	3.7	45
Total	100.0	1585	100.0	1728	100.0	1748	100.0	2000	100.0	1643	100.0	1218
S. E.	0.3		0.3		0.4		0.3		0.4		0.5	
Front passenger												
Worn	98.5	320	96.8	488	97.6	455	96.8	513	97.4	487	98.1	304
Not worn	1.5	5	3.2	16	2.4	11	3.2	17	2.6	13	1.9	6
Total	100.0	325	100.0	504	100.0	466	100.0	530	100.0	500	100.0	310
S. E.	0.7		0.8		0.7		0.8		0.7		0.8	
Rear passenger												
Worn	95.8	136	97.4	264	95.1	232	98.2	269	94.8	220	97.5	238
Not worn	4.2	6	2.6	7	4.9	12	1.8	5	5.2	12	2.5	6
Total	100.0	142	100.0	271	100.0	244	100.0	274	100.0	232	100.0	244
S. E.	1.7		1.0		1.4		0.8		1.5		1.0	
All passengers												
Worn	97.6	456	97.0	752	96.8	687	97.3	782	96.6	707	97.8	542
Not worn	2.4	11	3.0	23	3.2	23	2.7	22	3.4	25	2.2	12
Total	100.0	467	100.0	775	100.0	710	100.0	804	100.0	732	100.0	554
S. E.	0.7		0.6		0.7		0.6		0.7		0.6	
All occupants												
Worn	98.4	2020	97.7	2446	97.5	2396	98.2	2754	97.5	2316	96.8	1715
Not worn	1.6	32	2.3	57	2.5	62	1.8	50	2.5	59	3.2	57
Total	100.0	2052	100.0	2503	100.0	2458	100.0	2804	100.0	2375	100.0	1772
S. E.	0.3		0.3		0.3		0.3		0.3		0.4	

Note. Excludes cases for which restraint use was unknown.

S.E.= standard error of the proportion not worn (%).



Table 4.2 displays the results of chi-square analyses comparing restraint use (worn – not worn) between the regions surveyed on weekdays. The results indicate that overall, the level of restraint use in metropolitan Adelaide was higher than in the Riverland, Murray Bridge and Clare by a statistically significant margin. The difference between the rates observed in Mount Gambier and Clare was also statistically significant, although the actual difference was only 1.4%.

Statistically significant results to note are as follows:

- Drivers in Clare had a lower rate of restraint use than drivers in any other region.
- Drivers in the Riverland had a lower level of restraint use than drivers in Adelaide.
- Rear seat passengers in Mount Gambier had a higher level of restraint use than rear seat passengers in the Riverland and in Murray Bridge.

Table 4.2  
Comparison of restraint use between regions for weekdays: results of chi-square analysis

	Whyalla	Riverland	Mount Gambier	Murray Bridge	Clare
<i>Driver</i>					
Adelaide metro	2.09	3.86*	0.04	2.67	16.82**
Whyalla		0.29	1.83	0.04	8.17*
Riverland			3.67	0.11	5.59*
Mount Gambier				2.42	17.98**
Murray Bridge					6.88**
<i>Front passenger</i>					
Adelaide metro	2.14	0.65	2.24	1.04	0.15
Whyalla		0.59	<.01	0.30	1.12
Riverland			0.65	0.06	0.16
Mount Gambier				0.34	1.19
Murray Bridge					0.37
<i>Rear passenger</i>					
Adelaide metro	0.82	0.10	2.09	0.18	0.93
Whyalla		1.97	0.36	2.31	0.01
Riverland			3.89*	0.02	2.08
Mount Gambier				4.34*	0.25
Murray Bridge					2.41
<i>All occupants</i>					
Adelaide metro	3.03	5.08*	0.36	4.68*	11.49**
Whyalla		0.32	1.63	0.23	3.53
Riverland			3.44	0.01	1.82
Mount Gambier				3.07	9.77**
Murray Bridge					2.00

\*p<.05. \*\*p<.01.

The results of statistical analyses for restraint use by seating position within each region are presented in Table 4.3. Statistically significant results to note are as follows:

- In Adelaide, the Riverland and Murray Bridge, rear seat passengers were less likely to be restrained than drivers.
- Front seat passengers were less likely to be restrained than drivers in Mount Gambier.

Table 4.3  
Comparison of restraint use between seating positions for weekdays: results of chi-square analysis

	Seating position	
	Front passenger	Rear passenger
Adelaide metro		
Driver	0.09	7.12**
Front passenger		3.10
Whyalla		
Driver	2.60	0.44
Front passenger		0.21
Riverland		
Driver	0.03	6.20*
Front passenger		3.34
Mount Gambier		
Driver	7.84**	0.30
Front passenger		1.30
Murray Bridge		
Driver	0.50	8.18**
Front passenger		3.18
Clare		
Driver	2.37	0.92
Front passenger		0.18

\*p<.05. \*\*p<.01.

Table 4.4 shows the survey results disaggregated according to the sex of the occupant (if over 12) or by age group (if child). Sex was not recorded for children estimated to be aged 12 years or less. In total, restraint use was observed among 6,089 adult females, 6,459 adult males and 1,416 children aged up to 12 years. Restraint use was generally higher among adult females than adult males and relatively consistent across regions at around 98%. There was greater variation in adult male restraint use with levels ranging from 98.5% in metropolitan Adelaide to 94.6% in Clare. Due to small numbers, restraint use levels for children are difficult to interpret and they tend to vary by region. Nevertheless, child restraint use appears to be relatively high in most regions, particularly Whyalla, Mount Gambier and Clare. Of interest, in metropolitan Adelaide restraint use levels for children (96.6% when combining two age groups) are lower than those for adult males (98.5%) and adult females (98.7%).

Table 4.4  
Restraint use by sex of adult and age of child for all seating positions for weekdays

Region	Adult female		Adult male		Child 0-4yrs		Child 5-12yrs	
	%	N	%	N	%	N	%	N
<b>Adelaide metro</b>								
Worn	98.7	887	98.5	1018	95.6	43	97.3	72
Not worn	1.3	12	1.5	16	4.4	2	2.7	2
Total	100.0	899	100.0	1034	100.0	45	100.0	74
S.E.	0.4		0.4		3.1		1.9	
<b>Whyalla</b>								
Worn	98.5	1000	97.0	1146	98.2	108	98.0	192
Not worn	1.5	15	3.0	36	1.8	2	2.0	4
Total	100.0	1015	100.0	1182	100.0	110	100.0	196
S.E.	0.4		0.5		1.3		1.0	
<b>Riverland</b>								
Worn	98.5	1081	96.5	1058	96.9	63	97.0	194
Not worn	1.5	16	3.5	38	3.1	2	3.0	6
Total	100.0	1097	100.0	1096	100.0	65	100.0	200
S.E.	0.4		0.6		2.2		1.2	
<b>Mount Gambier</b>								
Worn	98.3	1294	97.9	1224	100.0	109	99.2	127
Not worn	1.7	23	2.1	26	-	-	0.8	1
Total	100.0	1317	100.0	1250	100.0	109	100.0	128
S.E.	0.4		0.4		-		0.8	
<b>Murray Bridge</b>								
Worn	98.6	985	96.6	1101	98.4	60	97.1	170
Not worn	1.4	14	3.4	39	1.6	1	2.9	5
Total	100.0	999	100.0	1140	100.0	61	100.0	175
S.E.	0.4		0.5		1.6		1.3	
<b>Clare</b>								
Worn	98.4	750	94.6	716	98.6	72	98.3	177
Not worn	1.6	12	5.4	41	1.4	1	1.7	3
Total	100.0	762	100.0	757	100.0	73	100.0	180
S.E.	0.5		0.8		1.4		1.0	

Note. S.E. = standard error of the proportion not worn (%).  
Excludes cases for which restraint use was unknown.

Table 4.5 shows the restraint use status of passengers in vehicles disaggregated according to the sex of the driver and the driver's own restraint use. Note that the distribution of driver and passenger restraint use is not representative of restraint use over all surveyed regions as the sample is biased to the regional areas. Consequently, the data should be viewed as an indication of trends rather than in terms of absolute numbers or percentages.

The results suggest that when a driver was not wearing a restraint, there was generally a greater likelihood that the passenger was also unrestrained. This trend was most evident for male drivers.

Table 4.5  
Comparison of restraint use between driver and passengers for weekdays

Restraint use by passenger	Female driver				Male driver				Total	
	Worn		Not worn		Worn		Not worn		%	N
	%	N	%	N	%	N	%	N		
Passengers aged 12 years or under										
Worn	98.0	1039	100.0	5	98.2	334	66.7	4	97.9	1382
Not worn	2.0	21	-	-	1.8	6	33.3	2	2.1	29
Total	100.0	1060	100.0	5	100.0	340	100.0	6	100.0	1411
Passengers aged 13 years and over										
Worn	96.1	954	87.5	7	97.6	1548	77.1	27	96.7	2536
Not worn	3.9	39	12.5	1	2.4	38	22.9	8	3.3	86
Total	100.0	993	100.0	8	100.0	1586	100.0	35	100.0	2622

Note. Restraint status was unknown for 20 drivers.

## CHILD RESTRAINTS

The number of children observed in some regions was small so child restraint data from all of the regions are aggregated. Therefore, the distribution of child restraint use is not representative of restraint use over all surveyed regions. Nevertheless, the following tables provide an indication of where children are sitting when restrained and unrestrained, and whether children are wearing age appropriate restraints.

The distribution of seating position for children aged up to 12 years is presented in Table 4.6. Just over 4% ( $n=21$ ) of children aged 0 to 4 years were sitting in the front seat. If a vehicle has two or more rows of seats, the new national child restraint laws will require children under the age of four years to be restrained in the rear of the vehicle. Children aged four to seven years will also not be allowed to sit in the front seat of a vehicle unless children aged less than seven years occupy all other rear seats.

Table 4.6  
Child restraint use by seating position, weekdays

Seating position	Child 0-4 yrs		Child 5-12 yrs	
	%	N	%	N
Left front	4.1	21	39.5	410
Mid front	-	-	0.5	5
Right rear	29.4	150	24.0	249
Mid rear	24.3	124	7.9	82
Left rear	40.9	209	26.4	274
Other	1.4	7	1.6	17
Total	100.0	511	100.0	1037

Table 4.7 shows the type of restraint worn by children who were restrained. While it is acknowledged that there may be considerable variation in the size and weight of children of the same age, current research recommends children aged 0 to 4 years are restrained in either a baby capsule (up to 6 months) or a child seat (6 months to 4<sup>th</sup> birthday) while children aged four to seven years should be restrained in a booster seat (see Anderson & Hutchinson, 2008). These age-based recommendations will be introduced as new child restraint laws in 2009/2010. It is somewhat concerning that 10% of children ( $n=46$ ) aged 0 to 4 years are restrained in adult seat belts. None of these children were travelling in a taxi (children are not required to use a child restraint in a taxi if one is not available).

Table 4.7  
Child restraint type for children wearing a restraint, weekdays

Child restraint type	Child 0-4 yrs		Child 5-12 yrs	
	%	N	%	N
Baby capsule	7.3	33	-	-
Child seat	71.7	326	1.2	11
Booster	10.6	48	5.7	53
Lap	0.4	2	1.8	17
Lap-sash	9.7	44	87.0	811
Unknown	0.4	2	4.3	40
Total	100.0	455	100.0	932

The seating position of the 29 unrestrained children is shown in Table 4.8. Eight children (28%) were sitting unrestrained in the front left passenger seat of vehicle, with two of the children aged 0 to 4 years.

Table 4.8  
Seating position for unrestrained children, weekdays

Seating position	Child 0-4 yrs	Child 5-12 yrs
Left front	2	6
Mid front	-	-
Right rear	1	8
Mid rear	1	1
Left rear	3	6
Other	1	-
Total	8	21

## 4.2 Restraint use on weekends

The level of restraint use on weekends was observed in the Adelaide metropolitan area and in one rural region, Murray Bridge. The results are presented in Table 4.9 by seating position. Compared to weekdays, restraint use on weekends was similar in Adelaide (98.5% vs 98.4%) and higher in Murray Bridge (98.9% vs 97.5%,  $\chi^2(1)=7.64$ ,  $p=.006$ ). Examination by seating position shows that restraint use in Murray Bridge was higher on the weekend than on weekdays for front seat passengers (99.4% vs 97.4%,  $\chi^2(1)=4.78$ ,  $p=.029$ ) and rear seat passengers (99.0% vs 94.8%,  $\chi^2(1)=5.53$ ,  $p=.019$ ).

Table 4.9  
Restraint use by region and seating position for weekends

Seating position	Adelaide		Murray Bridge	
	%	N	%	N
<b>Driver</b>				
Worn	99.0	927	98.6	639
Not worn	1.0	9	1.4	9
Total	100.0	936	100.0	648
S. E.	0.3		0.5	
<b>Front passenger</b>				
Worn	98.5	382	99.4	343
Not worn	1.5	6	0.6	2
Total	100.0	388	100.0	345
S. E.	0.6		0.4	
<b>Rear passenger</b>				
Worn	95.7	178	99.0	188
Not worn	4.3	8	1.0	2
Total	100.0	186	100.0	190
S. E.	1.5		0.7	
<b>All passengers</b>				
Worn	97.6	560	99.2	531
Not worn	2.4	14	0.8	4
Total	100.0	574	100.0	535
S. E.	0.6		0.4	
<b>All occupants</b>				
Worn	98.5	1487	98.9	1170
Not worn	1.5	23	1.1	13
Total	100.0	1510	100.0	1183
S. E.	0.3		0.3	

Note. Excludes cases for which restraint use was unknown.

S.E.= standard error of the proportion not worn (%).

Table 4.10 shows that there were no statistically significance differences in restraint use status by seating position between the two regions surveyed on a weekend.

Table 4.10  
Comparison of restraint use between regions, weekends:  
results of chi-square analysis

	Murray Bridge
<i>Driver</i>	
Adelaide metro	0.62
<i>Front passenger</i>	
Adelaide metro	1.58
<i>Rear passenger</i>	
Adelaide metro	3.83
<i>All occupants</i>	
Adelaide metro	0.91

\*p<.05. \*\*p<.01.

Statistical analyses of the differences in restraint use between seating positions within each region on weekends is presented in Table 4.11. It shows that, in metropolitan Adelaide, the difference between the restraint use by drivers and rear seat passengers was statistically significant, as was the difference between restraint use by front seat passengers and rear seat passengers.

Table 4.11  
Comparison of restraint use between seating positions, weekends:  
results of chi-square analysis

	Seating position	
	Front passenger	Rear passenger
<i>Adelaide metro</i>		
Driver	0.84	11.60**
Front passenger		4.01*
<i>Murray Bridge</i>		
Driver	1.35	0.13
Front passenger		0.37

\*p<.05. \*\*p<.01.

Table 4.12 shows the restraint use status of passengers in vehicles disaggregated according to the sex of the driver and the driver's own restraint use. Consistent with weekday data, restraint use levels on weekends were similar for adult males and females in Adelaide, and higher for adult females in Murray Bridge. Restraint use was observed only for a small number of children in each region on the weekend. When results for the two age groups are combined, it is evident that restraint use for children in Adelaide (97.4%) was lower than restraint use for the adults while in Murray Bridge child restraint use (99.2%) was higher than for adult males. These trends are consistent with weekday restraint use observations.

Compared to weekdays, the only statistically significant difference in the level of restraint use on the weekend was for adult males in Murray Bridge; restraint use was higher on the weekend (98.4% vs 96.6%,  $\chi^2(1)=4.15$ ,  $p=.042$ ).

Due to the small number of children observed on the weekend (i.e. only 4 children were not wearing restraints), child restraint data will not be further disaggregated by restraint type and seating position.

Table 4.12  
Restraint use by sex of adult and age of child for all seating positions for weekends

Region	Adult female		Adult male		Child 0-4yrs		Child 5-12yrs	
	%	N	%	N	%	N	%	N
Adelaide metro								
Worn	98.5	661	98.6	716	100.0	44	95.7	66
Not worn	1.5	10	1.4	10	-	-	4.3	3
Total	100.0	671	100.0	726	100.0	44	100.0	69
S.E.	0.5		0.4		-		2.4	
Murray Bridge								
Worn	99.4	508	98.4	535	98.0	50	100.0	77
Not worn	0.6	3	1.6	9	2.0	1	-	-
Total	100.0	511	100.0	544	100.0	51	100.0	-
S.E.	0.3		0.5		2.0		-	

Note. Excludes cases for which restraint use was unknown.

S.E.= standard error of the proportion not worn (%).

Table 4.13 shows the restraint use status of passengers in vehicles disaggregated according to the sex of the driver and the driver's own restraint use (given the same limitations as Table 4.5). The small number of observations makes it difficult to draw any meaningful conclusions.

Table 4.13  
Comparison of restraint use between driver and passengers for weekends

Restraint use by passenger	Female driver				Male driver				Total	
	Worn		Not worn		Worn		Not worn		%	N
	%	N	%	N	%	N	%	N		
Passengers aged 12 years or under										
Worn	98.9	88	-	-	98.0	149	-	-	98.3	237
Not worn	1.1	1	-	-	2.0	3	-	-	1.7	4
Total	100.0	89	-	-	100.0	152	-	-	100.0	241
Passengers aged 13 years and over										
Worn	97.6	248	100.0	1	100.0	601	100.0	4	98.4	854
Not worn	2.4	6	-	-	-	8	-	-	1.6	14
Total	100.0	254	100.0	1	100.0	609	100.0	4	100.0	868



## 5 Change in restraint use over time

Prior to the present survey, four on-road observational restraint use surveys were conducted in South Australia from 1998 to 2002. The current survey used the same methodology as previous surveys and was conducted predominantly at the same sites in metropolitan Adelaide and in a number of rural regions. Levels of restraint use by seating position for all regions surveyed from 1998 to 2009 are presented in Table 5.1. The results from statistical analyses comparing wearing rates for the last restraint use survey in 2002 and the current survey in 2009 are also presented in the Table.

Table 5.1  
Restraint use by seating position, region and survey year

	Year of survey										$\chi^2$ <sup>b</sup>	P value
	Feb 1998		March 1999		May 2000		May 2002		March 2009 <sup>a</sup>			
	%	N	%	N	%	N	%	N	%	N		
<i>Driver</i>												
Adelaide metro	92.9	2500	91.4	2348	96.0	1872	96.4	2228	98.7	1564	18.59	**
Whyalla	86.1	1941	93.4	2342	97.9	1741	97.2	1555	98.0	1694	2.23	NS
Riverland	88.6	2073	90.8	2214	96.5	1474	95.2	1403	97.8	1709	16.21	**
Mount Gambier	88.1	2401	90.5	2243	96.7	1804	98.3	2439	98.6	1972	0.62	NS
Murray Bridge	-	-	-	-	96.2	1292	96.7	1625	97.9	1609	5.02	*
Clare	-	-	-	-	92.1	796	94.2	736	96.3	1173	4.73	*
<i>Front passenger</i>												
Adelaide metro	93.3	531	94.3	581	96.0	396	96.9	438	98.5	320	1.93	NS
Whyalla	82.6	490	92.5	630	99.0	482	97.5	311	96.8	488	0.31	NS
Riverland	84.7	542	90.5	599	95.8	424	95.2	377	97.6	455	3.79	NS
Mount Gambier	86.3	597	92.0	648	96.6	475	97.2	590	96.8	513	0.16	NS
Murray Bridge	-	-	-	-	98.7	317	96.9	464	97.4	487	0.25	NS
Clare	-	-	-	-	90.2	225	95.7	202	98.1	304	2.44	NS
<i>Rear passenger</i>												
Adelaide metro	81.5	207	89.7	236	94.1	522	94.5	120	95.8	136	0.24	NS
Whyalla	73.2	213	89.4	344	99.2	635	97.1	68	97.4	264	0.02	NS
Riverland	75.7	202	83.0	289	93.5	613	92.7	164	95.1	232	1.08	NS
Mount Gambier	80.5	269	89.9	358	94.8	753	95.8	254	98.2	269	2.53	NS
Murray Bridge	-	-	-	-	97.1	384	93.5	157	94.8	220	0.34	NS
Clare	-	-	-	-	89.6	366	99.0	100	97.5	238	0.78	NS
<i>All occupants</i>												
Adelaide metro	92.1	3239	91.8	3165	95.6	2399	96.4	2805	98.4	2020	18.82	**
Whyalla	84.1	2646	92.8	3316	98.3	2380	97.3	1937	97.7	2446	0.87	NS
Riverland	86.7	2817	89.9	3104	95.6	2158	95.0	2000	97.5	2396	19.55	**
Mount Gambier	87.1	3267	90.7	3250	96.2	2572	97.9	3295	98.2	2754	0.71	NS
Murray Bridge	-	-	-	-	96.5	1723	96.5	2254	97.5	2316	4.27	*
Clare	-	-	-	-	91.2	1177	95.0	1039	96.8	1715	5.91	*
Total Worn (N)	11,969		12,835		12,409		13,330		13,647			

Notes: Observational surveys in Murray Bridge and Clare were conducted from May 2000. Excludes cases for which restraint use was unknown. N = total number of occupants wearing restraints.

<sup>a</sup> Data for 2009 includes weekday data only.

<sup>b</sup> Chi-square analysis results compares 2002 and 2009 restraint use.

\* p<.05. \*\*p<.01.

For all vehicle occupants, restraint use levels in 2009 were the highest observed since surveys began in 1998. Current restraint use levels in metropolitan Adelaide, the Riverland, Murray Bridge and Clare were statistically significantly higher than in the previous survey in 2002. A similar result was found for

drivers in these regions. There were no statistically significant changes in restraint use for front or rear seat passengers from 2002 to 2009 in any of the regions.

## 6 Future restraint use surveys

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The results from the current restraint use survey represent restraint use at only the times and places where surveys were undertaken (i.e. day time, in town/city centres, at intersections, in lower speed limit zones). Observation sites have heavy traffic and contain a wide range of vehicle types and occupants. The passenger vehicle traffic at these observation sites are unlikely to be a representative sample of all passenger vehicles in South Australia, and may not capture the vehicle occupants that are most likely not to be wearing a seatbelt. Since restraint use at these sites is now very high, it may be time to think of alternative survey designs that are more likely to characterise low restraint use, and particularly high-risk low restraint use. A number of suggestions for future restraint use surveys are provided below.

### BACK STREETS

Market research undertaken for the Motor Accident Commission suggests that restraint use is lower on back streets where drivers are typically making short trips. Such back streets are generally local or residential streets that usually have a speed limit of 50km/h or less. While a lower speed limit is conducive to making observations of restraint use, a lack of intersections with traffic controls (i.e. traffic signals, stop signs) that slow down traffic on these roads could make observations more difficult. However, many of these types of roads have roundabouts. In the present restraint survey, roundabouts controlled some observation sites in rural town centres. Observers commented that restraint use observations at roundabouts could be completed effectively if there was sufficient site distance preceding the roundabout to record vehicle details. While observations can easily be made on back streets where there are no visual obstructions, traffic volumes are lower so longer hours of observation may be necessary to obtain enough data. Note that surveys conducted on back streets provide a measure of restraint use on a different type of road but they will still provide an indication of restraint use in cities and towns in lower speed limit zones.

### RURAL ROADS

The current survey included rural regions but the survey sites were all in the centre of rural towns or cities. As it is, we do not know if the results from these regions represent restraint usage on high speed rural roads. One possible way of investigating rates of restraint use on higher speed rural roads would be to conduct observational surveys at T-junctions on 80-100 km/h roads, but this might require many hours of surveying in order to get enough data. Another option would be to video record intersections, and review the footage later.

For similar reasons, a restraint survey could be conducted at night although difficulties arising from poor visibility would need to be overcome. Conceivably, sites could be chosen that are serviced by street lighting or some form of night vision could be considered. A substantial pilot study would be necessary before undertaking an observational restraint use survey at night.

### CRASH LOCATIONS

The latest restraint survey results suggest around 2 to 4% of vehicle occupants do not wear restraints but crash data indicates that around 30% of fatally injured vehicle occupants in South Australia are recorded as not wearing restraints (e.g. Wundersitz & Baldock, 2008). The discrepancy between these two rates is only partly explained by the increased likelihood of injury for non-restrained vehicle occupants in crashes. The crude ratio of the odds of dying between unrestrained and restrained occupants in crashes is around 3.5 to 4 (Crandall et al, 2001). If the non-wearing rate amongst the population at risk was indeed 3% and the odds ratio of being killed is indeed 4 for unrestrained occupants compared to restrained occupants, then we would expect to see  $(3\% \times 4)/(97\% \times 1 + 3\% \times$

4) = 11% of occupant fatalities unrestrained. Affecting this relationship will be uncertainties in all of the related quantities, however it is probable, as mentioned above, that the times and places at which the survey was taken do not capture the wearing rates of the population at risk of being killed in a crash.

In conclusion, the present survey has presented useful results on the general compliance with restraint use laws in South Australia, and in particular has shown a positive trend in wearing rates compared with previous surveys. Less clear are trends in, and levels of, restraint use for the population at risk of being killed in a crash. To elucidate restraint use amongst this population would require a different, logistically difficult survey design, possibly at the locations and times at which serious crashes have occurred.

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## Appendix A – Observational survey method (Preece et al., 1993)

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The following document is an excerpt from the paper published by the New South Wales Roads and Traffic Authority titled “Seat belt and child restraint use: A guide for conducting observational surveys” (Preece, Johansen and Norrish, 1993).

**SEATBELT AND CHILD RESTRAINT USE: A GUIDE FOR CONDUCTING  
OBSERVATION SURVEYS**

(pg 1-12)

R Preece  
P Johansen  
J Norrish

Roads and Traffic Authority  
Road Safety Bureau

August 1993

## SECTION 1. INTRODUCTION

Each year people are killed or seriously injured on NSW roads because they did not use a seat belt or child restraint which was there to be used. In order to understand by whom, when and where occupant restraints are and are not being used, the Roads and Traffic Authority (RTA) conducts observational surveys of occupant restraint use. The survey method has been developed over many years so that it provides accurate and detailed information on restraint use.

This document is designed to be a simple guide to the research method used by the RTA to collect observational restraint use data. (For more detail on the development of research method see the references in Appendix G).

The information from properly conducted surveys of occupant restraint use can be used to develop appropriate and efficient measures to increase usage.

### BACKGROUND

Seat belt use has been compulsory in NSW since 1971 for adults, and 1977 for children. Even though a small number of occupant groups remain exempt, most vehicle occupants in NSW are required to use an available restraint.

Not only does the law require that a restraint be used, but it also requires that the restraint be appropriate to the age and size of the occupant (e.g. it is illegal for a child under 12 months old to use a seat belt), and it must be used correctly.

Occupant restraint use surveys first began in NSW during the 1970s, some methodological problems were identified with the observation method used at that time. As a result, a more methodologically sound way of collecting the information required was developed.

### INFORMATION PROVIDED BY THIS RESEARCH

The observational method outlined in this document is designed to ensure that the information collected gives an accurate indication of the occupant restraint use of NSW road users. For this reason it is extremely important that the method outlined in the following pages is followed exactly as specified.

This research method provides detailed information on: 1. Type of vehicle used; 2. seating position; 3. sex of adult; 4. age of child; 5. type of restraint being used; 6. quality of use of restraint; and 7. what unrestrained children are doing.

For the safety of observers, this research method does not collect data at night or in heavy rain. While this is a shortcoming in the method, it should be remembered that the data from observational surveys should not be used in isolation. Fatality data (which provides information on restraint use at night, in various weather, and other road safety behaviours such as drink driving and speeding) and attitude and knowledge surveys, must also be used to develop an accurate picture of restraint use practices.



## SECTION 2: OBSERVATION METHOD

### THE OBSERVER

The NSW Seat Belt and Child Restraint Survey collects restraint use information from specified locations, and at specific times, in both Sydney and other locations across the State.

Observers work in pairs at each location on 2 hour shifts. Each observer stands at a different position and observes different vehicles. After one hour they swap positions with each other.

### LOCATIONS

The locations and times of observations must be specified for observers, as well as the position at which he/she will stand (see appendices for sites and times of NSW surveys). The use of the same sites and times in consecutive surveys will mean that the usage rates across surveys will be able to be compared.

Locations should be selected to represent a range of occupant types (for example, local traffic, people travelling to and from work, and so on).

The times of day should also reflect a range of road users, such as school traffic, weekend vehicle users, and peak hour traffic.

Only the median and curb lanes are observed (not the middle lane of three lanes). This is because the detailed information these surveys collect can only be obtained from vehicles which the observer can look right into.

If observers find that the specified standing position is not appropriate (for example, the nature of the intersection has changed since it was selected, and vehicles no longer stop next to where the observer is to stand), the observer should move to the nearest appropriate position at that intersection. The observer must make sure, however, that he/she is observing different vehicles to his/her partner, and that he/she is only observing stationary vehicles in the lane closest them. If observers need to change their standing position from the specified position, they must document the change and record exactly where they stood for the observations (so that the same position will be used in future surveys).

## SAMPLING OF VEHICLES

### Traffic Lights

Vehicles are to be recorded in a set order so that no selection of easier vehicles will occur. When traffic is stopped at a red light, the observer must start by recording the relevant details of the second car back from the lights in the lane he/she is recording, unless the first car was more than 50 metres from the lights when they turned red. This is so that the survey does not have too few drivers who go through red and amber lights, compared to the number of drivers who are cautious at traffic lights.

Only stationary vehicles are to be recorded. After the first vehicle the observer should work back along the lane and collect the data from each vehicle in order, regardless of the difficulty of collecting the data. Even though a difficult vehicle may take one phase of the lights, if it is the appropriate vehicle it must be recorded.

### Other Locations

Vehicles surveyed at locations where they slow but don't stop (e.g. Give Way signs, Toll Gates) should be recorded so that no selection of easier vehicles happens. The vehicle nearest the observer should be selected and all relevant details recorded regardless of the difficulty of collecting the data. Another vehicle should be selected only when all data has been recorded for the previous vehicle. This new vehicle will again be the one nearest the observer.

## TYPE OF OCCUPANT TO BE OBSERVED

All (human) occupants in the vehicle are to be recorded. Children 13 years old and under are coded by their age. Adults 14 years old and older are coded by their sex.

## TYPE OF VEHICLE TO BE OBSERVED

There are three basic types of vehicles observed. They are:

Car and car derivatives: Vehicles which fall into this category include all passenger cars, station wagons, panel vans and some utilities. Utilities which were derived from a passenger car (e.g. Datsun 1200 utilities, Holden and Falcon utilities, but not the Holden one tonne utility) are car derivatives.

Vans and Trucks Under 2 Tonne: Included in this category is any vehicle under 2 tonnes which is not a car or car derivative. These include forward control vans such as the Volkswagon Kombi, Toyota Hi-ace and Ford Econo Van. It also includes Toyota Landcruisers, Landrovers and Ford F100 Trucks.

Taxis: Taxis are always to be coded "Taxi" on the recording sheet, even if they are in the form of a van.

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**NOTE:** Do not include any service vehicle such as Police cars, ambulances, or fire service vehicles of any category.

(See Appendices for example of vehicle types)

# Appendix B – Data collection sheet

Figure B1  
Site details recorded in data collection book

Site No: .....

Location: .....

City/town: .....

Observer: .....

Time: 7:00am – 10:00am  
3:00pm – 6:00pm  
Other: .....

Date: .....

Figure B2  
Data collection sheet for each vehicle

Number Plate				Taxi		Plates			Occupants		
				Y	N	None	P	L			

Sex	Child Restraint Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Sex	Child Restraint Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Sex	Child Restraint Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Sex	Child Restraint Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Sex	Child Restraint Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Using Mobile Phone

Location:

Sex	Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Location:

Sex	Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	

Location:

Sex	Type	Worn
M	→	Yes
F	→	Yes
Child Age 0-4	Baby Capsule	No
	Child Seat	
	Harness/booster	
Child Age 5-12	Lap	Unknown
	Lap-Sash	
	Unknown	