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INFANT BASSINET AND CHILD RESTRAINT USE SURVEY

by

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Infant Bassinet and Child Restraint Use Survey

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Abstract:

This report details an infant and child restraint use survey conducted during December 1987. The survey focussed on restraint use rates for infants and children in different seating positions (although restraint use by drivers was also collected), especially the extent of incorrect wearing and/or fitting of restraints used by children.

Sampling was conducted in the metropolitan area and in four provincial towns. Data were collected at both signalised intersections close to shopping centres and child care centres.

The general conclusions drawn from this study were:

- a sizeable number of infants were incorrectly restrained as a result of incorrect fitting of infant safety bassinets
- the proportion of correctly restrained occupants aged 1 - 7 years was reduced considerably by the incorrect wearing of correctly fitted restraints
- children aged 8 years or older exhibit similar restraint use patterns to adult passengers in that failure to use a restraint at all is the major problem, particularly in the rear seat.

Key Words:
Traffic survey, safety belt, safety, vehicle occupant, age, infant, child, driver, restraint use, Victoria

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EXECUTIVE SUMMARY

This report details an infant and child restraint use survey which was commissioned by the Road Traffic Authority (RTA) and conducted by the Monash University Accident Research Centre during December 1987. The survey focussed on restraint use rates for infants and children in different seating positions (although restraint use by drivers was also collected,) especially the extent of incorrect wearing and/or fitting of restraints used by children.

Sampling was conducted in the metropolitan area and in four provincial towns. Data were collected at both signalised intersections close to shopping centres and child care centres.

The general conclusions drawn from this study were:

- a sizeable number of infants were incorrectly restrained as a result of incorrect fitting of infant safety bassinets (probably due to the greater complexity of the fitting procedure)

- the proportion of correctly restrained occupants aged 1- 7 years was reduced considerably by the incorrect wearing of correctly fitted restraints

- children aged 8 years or older exhibit similar restraint use patterns to adult passengers in that failure to use a restraint at all is the major problem, particularly in the rear seat.

1.0 INTRODUCTION

This report details an infant and child restraint use survey which was commissioned by the Road Traffic Authority (RTA) and conducted by the Monash University Accident Research Centre during December 1987.

An investigation of infant restraint use was undertaken as part of an evaluation of the statewide baby safety bassinet loan scheme which has been in operation since May 1985. A survey of restraint use by children less than 18 years old and by drivers was made in conjunction with the infant survey.

The survey aims were to provide reliable estimates of:

- driver restraint use rates;
- restraint use rates for infants and children in different seating positions;
- the proportion of approved infant restraints in use that have been obtained through the municipal baby safety bassinet loan scheme;
- the ages at which infants and children use different types of restraint;
- the extent of incorrect wearing and/or fitting of restraints

In meeting these aims, approximately 1200 vehicles were sampled at 14 sites, 10 in the Melbourne metropolitan area and 4 in provincial towns in country areas of Victoria. The sampling was conducted on weekdays over a two week period.

1.1 REPORT STRUCTURE AND NOTES

This report first describes the survey method and then presents its results in the following order:

(1) driver restraint use rates;

(2) restraint use by children less than 18 years (including infants);

(3) restraint use by infants (less than 12 months). This includes a sub-section on infants of 6 months or less with detailed reference made to the proportion of baby safety swingers and safety capsules (approved infant restraints) that have been obtained through the baby safety bassinet loan scheme.

The restraint use rates presented in this report have been calculated from the analysis of survey data. The results have not been adjusted for vehicle occupant exposure and the sample should not be perceived to represent a random sample of vehicle occupants in Victoria, since the sampling sites were selected on the basis of birth rate (the areas with highest rates were selected for sampling).

The restraint use information reported in this paper is different to that presented in previous RTA surveys of restraint use. Two points need to be made here;

- previous reporting of restraint use rates has usually referred to wearing/non-wearing rates only. In the present survey, additional data was collected on the

quality of wearing (correct/incorrect wearing) of restraints by child occupants. This should provide more accurate and informative restraint information than simple 'worn'/'not worn' figures.

- Where a restraint was used by a child in the present survey, data were collected referring to the correctness of fitting of that restraint to the vehicle. These data were collected because, unlike adult belts, most restraints used by young child passengers are not provided as standard vehicle fittings. Many of these restraints need to be fitted to existing seat belts and/or to anchorage points. Hence, it is important to consider both the fitting and wearing of child restraints in order to obtain useful and informative restraint use figures.

Accordingly, the current paper presents three major categories of restraint use rather than two:

(1) CORRECTLY RESTRAINED ("CR"):

- Fitting of restraint to vehicle in accordance with manufacturer's specifications ("cf")

AND

- Correct wearing ("cw") of restraint by child occupant

(2) INCORRECTLY RESTRAINED ("IR" - 3 SUB-CATEGORIES):

- Some attempt at restraint of child (other than holding by another vehicle occupant)

AND ONE OF

- (a) Restraint correctly fitted, incorrectly worn

("cf/iw")

- (b) Restraint incorrectly fitted, correctly worn

("if/cw")

- (c) Restraint incorrectly fitted, incorrectly worn

("if/iw")

(3) NOT RESTRAINED ("NR"):

- No restraint worn and apparently no attempt to engage a restraint

Restraint use information has not been reported in this format previously. Nevertheless, some comparison to restraint use rates reported for previous surveys is possible by combining categories (1) and (2) (see section 3.0). This provides a measure of the proportion of restrained vehicle occupants (under the age of 18 years), loosely comparable with '% restraints worn' figures in other surveys. However, it should be noted that this measure includes a percentage of children who are not restrained correctly.

2.0 METHOD

2.1 GENERAL DESCRIPTION

The survey was conducted at two different types of site child care centres and signalised intersections close to the entrances of large shopping centres.

Of fourteen shopping centre sites, ten were in Melbourne, with one each in Shepparton, Bendigo, Ballarat and Morwell. One child care centre was sampled near every shopping centre site.

Cars and car-derivatives carrying child passengers less than 18 years of age were sampled. At shopping centre sites, the vehicles were selected from those stationary during the red phase of the traffic lights. At these sites, sampling was conducted between the hours of 10:00 a.m. and 4:00 p.m. Two interviewers/observers undertook the survey at each site. One interviewed the driver and recorded restraint use of the driver and all child passengers in the front seats, while the second noted restraint use by children in the rear seats and alerted the interviewer of impending traffic light changes.

Sampling was conducted at the child care centre sites between 8:00 and 9:00 a.m. on the same day as the closest shopping centre site was surveyed. The sampling procedure was the same as that at the shopping centres, except that the vehicles sampled were not stationary at traffic lights. Instead, parents/guardians were interviewed immediately after they stopped their vehicles to leave child passengers.

In order to maximise the safety of the data collection process, the survey teams wore blue reflective RTA coats and the interviewers wore reflective sashes while surveying.

2.2 SAMPLING SITES

Ten metropolitan shopping centres in areas of high birth rate were selected by the RTA. Additionally, four provincial towns were named. Specific signalised intersections for sampling near the metropolitan shopping centres were selected from a street directory. At the rural sites, the intersection for sampling was identified by walking through the town and comparing potential sites.

A number of factors influenced the selection of intersection. Firstly, an effort was made to choose sites where traffic flow was moderate to high in order to maximise the number of sampleable vehicles. Further, the safety of the interviewers/observers was of the highest concern. To ensure that the time available for vehicle selection and interviewing was adequate, the length of the red light phase was fixed to a period longer than 35 seconds at most of the signalised intersections. The adjustments to the traffic signal phase times were made via computer controller using the RTA 'SCRAM' system. Due to the speed and ease with which changes to phase times can be made using this system, computer controlled intersections were given preference in the selection of sites in the metropolitan area. In the country areas, phase times were measured by stopwatch over a number of cycles so that the interviewers were aware of the approximate length of the red light phase.

The child care centres were selected from a list of those registered with Community Services (Victoria). Of a number of centres close to anyone shopping centre site, the centre chosen for inclusion in the survey was the one with the highest numbers of registered

children and infants. This procedure was followed in an attempt to maximise the collection of data at the child care centre.

Centre owners were notified of the survey and its aims in advance of the data collection phase, and the Victoria Police were also informed of the time frame and details of the survey.

At the shopping centre sites, an 'RTA SURVEY TEAM AHEAD' sign was placed at some distance back from the signalised intersection wherever possible to help to prepare drivers for interviewing.

A complete list of the child care centres and specific intersections included in the survey is given in Appendix 1.

2.3 SURVEY SIZE

One day was allocated for sampling at each of the fourteen sites. A day of sampling was defined as follows:

Child care centre	8:00 a.m. to 9:00 a.m.
Signalised intersection near shopping centre	10:00 a.m. to 12:00 noon 12:15 p.m. to 1:15 p.m. 2:00 p.m. to 4:00 p.m.

Hence, a minimum of 5 hours of sampling was conducted at each intersection. No surveying took place outside the time boundaries defined above.

With 6 hours of data collection at each of fourteen locations, the total number of hours of sampling would have been 84 hours. In fact, the number of hours of sampling was slightly more than this. This resulted from a team of observers being forced to abandon sampling at one of the urban shopping centre sites after 2.5 hours due to extreme weather conditions (heavy rain). After consultation with the RTA, the decision was made to re-sample all the hours at the shopping centre site in this area at a later date. This increased the total number of hours of surveying from 84 to 86.5.

2.4 THE SAMPLING UNIT AND THE SAMPLING PROCEDURE

Cars, station-wagons, utilities and panel-vans with at least one child passenger less than 18 years, were the only vehicle types sampled. Buses of 12 seats or more, commercial vehicles and vehicles with dual rear wheels were not included in the sample.

At child care centres, the first available vehicle arriving at the centre (that satisfied the criteria listed above) was sampled. The survey team approached the driver immediately after the vehicle became stationary to commence the interviewing/observing process.

At the shopping centre sites, the two members of the survey team were positioned on the footpath or median strip close to the traffic lights. This allowed quick movement to the vehicle being sampled.

Upon the commencement of the red light phase, a vehicle was quickly selected for inclusion in the survey. To ensure that a representative cross-section of drivers in the area were sampled, the following method was used for vehicle selection:

- where only one vehicle stopped at the lights had a child passenger, that vehicle was selected;

- where the site had two or more approach lanes then, where safe, vehicles were selected from alternate lanes in successive vehicle selections if there were child passengers in more than one lane;

- where safe, the second vehicle in a lane queue containing a child occupant was selected if it contained a child occupant

In practice, some of the sites had such long red phases that it was possible to sample more than one vehicle during the one cycle. However, at the majority of the sites, it was usual that only one vehicle was stationary at the lights with a child passenger during a sampleable portion of the red light phase.

The requirement to sample only vehicles with child occupants restricted the size of the sample, leading to a proportionately smaller total number of cases than has been obtained in previous on-road surveys.

2.5 THE DATA AND ITS COLLECTION

The first member of the survey team interviewed the driver of the selected vehicle through the driver's side window. His/her role was to ask and record:

- the driver's age;
- the age of all child occupants in the car;

and to observe and record:

- the driver's sex;
- whether the driver was wearing a seat belt;
- the type of restraints and seating positions used by child occupants in the front seats;
- the correctness of wearing and fitting of these child restraints;

In addition to this, if an infant bassinet was observed in the car, the interviewer asked whether this restraint was obtained from a loan scheme.

The other member of the survey team observed and recorded:

- the number of vehicle occupants;
- the types of restraints and seating positions used by children in the rear seats;
- the correctness of wearing and fitting of the restraints used by these passengers.

Both members of the survey team recorded the availability of restraints to any child passengers who were unrestrained.

Also recorded on the data collection forms was a site identifier, the date, the day of the week, and a count indicating the sequential number of the vehicle currently being recorded.

Two data collection forms were developed for use in the survey, one for each member of the survey team. Copies of the forms were forwarded to the RTA for approval before sampling commenced. Examples of the data collection forms can be found in Appendix 2 (Appendix 3 includes definitions of the codes used).

In designing the forms, particular attention was paid to maximising the efficiency of the data recording process and to reducing the number of recording errors made. Towards this aim, an attempt was made to reduce the need for recoding of information by the observers during the process of recording. Additionally, elements were ordered in corresponding sequence with the elements of the interviewing and observation process wherever possible. Further, the forms were designed to keep the amount of paper handled by the survey teams to a minimum.

The teams were fully briefed regarding the precise method of data collection and recording prior to the commencement of the survey. This brief included a thorough discussion of the conditions defining correct and incorrect fitting and wearing of the various types of restraints. These definitions of correct fitting and wearing were based on the restraint manufacturers' recommendations. A list of the definitions for operational use were provided to individual members of the two survey teams in the form of a handout. A copy of this handout is shown in Appendix 3.

2.6 OPERATIONAL DIFFICULTIES

There were few problems encountered during the conduct of the survey. With few exceptions, drivers were co-operative.

However, a number of operational difficulties are listed below.

(1) Use of the RTA sign and the RTA coats may have caused some drivers and child occupants to engage restraints that were apparently not worn before approaching the intersection or child care centre. A small number of drivers and children were observed in the process of engaging restraints (these occupants were considered to be unrestrained). Failure to notice other instances of this type would be likely to lead to the results reflecting an overestimate of the proportion of correctly restrained vehicle occupants.

(2) Many of the infants in safety capsules were covered with blankets. This made it difficult to observe the wearing (or non-wearing) of body bands by the infant. This problem may become more serious if sampling is conducted during the cooler winter months.

(3) It is difficult in many cases to make decisions about correct/incorrect wearing of restraints when a very young child is restrained by a lap/sash belt. The sash sometimes passes in front of the child's head or pulls hard against his/her neck. It was necessary for observers to exercise their discretion in deciding upon the status of restraint wearing in these cases.

2.7 DATA ANALYSIS

The collected data was entered onto the RTA VAX computer for analysis. Analyses were carried out using the SPSS-X statistical package (SPSS Inc., 1983).

3.0 RESTRAINT USE BY VEHICLE OCCUPANT GROUPS

3.1 RESTRAINT USE BY DRIVERS

Inspection of Table 1 indicates that driver restraint wearing has remained at a high level, 93.9 percent. The percentage is 0.9 percent higher than that quoted by Cave (1986) in a recent survey of restraint use.

Table 1: Driver Restraint Use Rates by Age-Group and Sex

	No. of cases	% of all drivers	% restraints worn	% restraints not worn
Age of Driver				
18-25 years	120	9.9	87.5	12.5
26-29 years	893	73.9	94.3	5.7
40-59 years	169	14.0	95.8	4.2
60 plus years	27	2.2	96.3	3.7
All drivers	1209	100.0	93.9	6.1
Sex of driver				
Male	272	22.5	91.9	8.1
Female	935	77.5	94.4	5.6

NOTE: Missing values have been excluded from the calculation of percentages.

An analysis of driver restraint use by age suggests that there is a trend for the proportion of drivers wearing seat belts to increase with age (Table 1). It is worth noting that the restraint wearing rate for drivers of 18 to 25 years is around 5 percent less in the present survey than that reported in the 1986 survey. By contrast, restraint use by drivers of other ages is marginally better in the present study. However, attention should be drawn to the much reduced sample sizes in the present survey, the fact that sample sites were not selected at random and that drivers were only observed if they had a child passenger.

Over 77 percent of interviewed drivers were female, and their restraint wearing rate was marginally higher than that for male drivers.

3.2 RESTRAINT USE BY CHILD OCCUPANTS

3.2.1 Some preliminary comments

Since adult belts are standard fittings to almost all motor vehicles used in the state of Victoria, these restraints were assumed to be correctly fitted to vehicles unless some obvious visible sign was observed indicating otherwise. In practice, no such signs were ever observed, so adult belts were considered to be correctly fitted in 100 percent of cases.

Most booster seats and booster cushions either cannot be fitted to vehicles or fitting (of an upper tether strap) is only considered essential in cases where the booster is used with a lap only seat belt. For this reason, fitting was considered to be not applicable for this type of restraint during data collection. However, since booster seats are held to the vehicle by the adult belt or harness used to hold the child onto the restraint, and to enable the placement of cases of restraint/non-restraint by boosters into one of the categories defined earlier,

fitting and wearing of boosters were considered to be one and the same during calculations of the values displayed in the tables that follow.

That is, correct fitting was defined by correct wearing of the restraint. This means that booster cushions and booster seats could only be placed in the "cf/cw" or " if/iw" categories.

Unapproved restraints (of which there was only a small number) were considered to be both incorrectly fitted and incorrectly worn, since their unapproved status implied that it was not possible to fit or wear them in such a way as to provide a correct method of occupant restraint.

As adult belts account for a very large proportion of occupant restraints (particularly for vehicle occupants older than 5 years), and an argument could be made that fitting information is meaningless for boosters, some fitting data has been presented both with and without these two types of restraint.

3.2.2 The Data

Of 1766 child passengers (less than 18 years) included in the survey, 14.2 percent were unrestrained (Table 2). This percentage is close to that reported for unrestrained child occupants in recent surveys (e.g. Cave, 1986). However, many **restrained** child occupants were not wearing their restraint correctly, were in a restraint that was incorrectly fitted to the vehicle, or both. These cases increase the proportion of children at higher injury risk to 33.0 percent of the sample. In all seating positions where the sample size was reasonable, the total proportion of child occupants at higher injury risk in accidents was approximately double the percentage of unrestrained vehicle occupants. These results suggest that children are at a greater risk in motor vehicle accidents than suggested by the simple wearing/non-wearing rates usually reported in restraint use surveys.

Table 2: Restraint Use Rates for Child Occupants by Position in the Vehicle

		% <- CR ->	% <---------- IR ---------->			% <- NR ->
	No. of cases	cf/cw	cf/iw	if/cw	if/iw	
Position in vehicle						
Left front. pass.	292	75.0	9.2	0.3	1.4	14.0
Centre front pass.	14	57.1	7.1	7.1	-	28.6
Left rear. pass	642	66.2	12.8	3.0	7.0	11.1
Centre rear. pass	349	66.8	6.9	4.3	4.9	17.2
Right rear pass.	450	64.2	14.4	1.8	4.2	15.3
All front seat pass.	306	74.2	9.2	0.7	1.3	14.7
All rear seat pass.	1441	65.7	11.9	2.9	5.6	13.9
Other passengers	19	47.4	10.5	-	10.5	31.6
All child occupants	**1766**	**67.0**	**11.4**	**2.5**	**4.9**	**14.2**

NOTE: Missing values have been excluded from the table and the calculation of percentages.

It was possible to determine restraint availability for unrestrained child occupants in 242 of 251 cases. Only 12.4 percent of these children did not have a restraint available to use, an effective percentage of 1.7 percent of all child occupants included in the survey. This suggests that, in most cases, failure to restrain a child in some manner other than by holding him/her is not a result of the absence of a suitable restraint.

Overall, children in front seat positions were correctly restrained in a considerably greater percentage of cases than children in rear seats (Table 2). This finding is consistent with restraint use data reported in previous on-road surveys.

Table 3: Child Occupants - Percentages of Restraint Types by Position in the Vehicle and Age-Group

Restraint type	% Adult Belt	% Child seat	% Booster seat / cushion	% Harness	% Unapproved	% Baby safety capsule	% Baby safety swinger
Position							
Front seats	86.6	1.9	11.1	-	-	0.4	-
Rear seats	29.6	42.3	21.8	0.3	1.3	4.6	0.2
Total	39.3	35.4	19.9	0.3	1.0	3.8	0.1
Age							
0-7 years	26.4	43.0	24.2	0.3	1.3	4.7	0.2
8-13 years	98.9	1.1	-	-	-	-	-
14-17 years	100.0	-	-	-	-	-	-

NOTE: Missing values and unrestrained child occupants have been excluded from the calculation of percentages.

3.2.3 Front Seat Child Occupants

Of restrained children in front seat positions, 86.6 percent used adult belts (Table 3). The only other restraint type used frequently in the front seat of vehicles were boosters (11.1 percent). Therefore, incorrect fitting of restraints contributed to a very small proportion of cases of incorrect restraint of children in front seats (Table 2).

The proportion of correctly restrained child occupants was highest for children in the left front seat (75.0 percent - Table 2). By contrast, children in the centre front seat of vehicles were correctly restrained in only 57.1 percent of cases, and a relatively high percentage of children in this position were not restrained at all (28.6 percent). However, the total number of centre front child passengers was very small, so this figure may not be reliable.

Table 4: Restraint Use Rates for Child Occupants in Front and Rear Seats by Age

		% <- CR ->	% <---------- IR ---------->			% <- NR ->
	No. of cases	cf/cw	cf/iw	if/cw	if/iw	
Front seat child occupants						
0-7 years	140	59.3	17.1	1.4	2.9	19.3
8-13 years	97	86.6	3.1	-	-	10.3
14-17 years	69	87.0	1.4	-	-	11.6
Rear seat child occupants						
0-7 years	1252	66.9	12.7	3.4	6.5	10.5
8-13 years	149	57.1	6.7	-	-	36.2
14-17 years	40	60.0	5.0	-	-	35.0
All child occupants						
0-7 years	1409	66.0	13.1	3.1	6.2	11.6
8-13 years	247	68.4	5.3	-	-	26.3
14-17 years	110	76.4	3.6	-	-	20.0

NOTE: Missing values have been excluded from the table and from the calculation of percentages. The figures for all child occupants include nineteen passengers in positions other than front and rear seats (e.g. on the floor of the vehicle).

Of front seat child occupants, less than 60 percent of children aged 7 years and under were restrained correctly, while older children were correctly restrained in a high proportion of cases (around 87 percent - Table 4). Correspondingly, for front seat occupants of 0 to 7 years, the proportion of unrestrained children was considerably higher (by 8-9 percent) than that for older age-groups. The proportion of unrestrained child occupants within each of the three age-groups are remarkably close to corresponding data reported by Cave (1986) for left front seat passengers in a previous on-road survey of restraint use.

Further inspection of Table 4 indicates that 17.1 percent of all children of 7 years or less were incorrectly restrained solely as a result of incorrect wearing. In contrast, incorrect wearing of correctly fitted restraints in front seats was observed in only 3.1 percent and 1.4 percent of cases for children in the two older age-groups.

3.2.4 Rear Seat Child Occupants

In contrast to the pattern of results for front seat child occupants, the proportion of children of 7 years or less who were not occupying a restraint ('NR') in rear seats was less than one-third of the corresponding figures for older children (Table 4). Furthermore, the percentage of correctly restrained passengers in this age group increased to 66.9 percent.

Although incorrect fitting is a problem specific to this age-group, incorrect wearing of restraints constituted the major cause of incorrect restraint. Table 4 indicates that incorrect wearing contributed to incorrect restraint in 19.2 percent of cases. By itself, incorrect wearing of restraints that were correctly fitted to the vehicle reduced the percentage of correctly restrained children of 0 to 7 years by 12.7 percent (Table 4). For older children, incorrect wearing alone occurred in a much smaller proportion of cases (around 5-7 percent).

The pattern differed markedly for older children. The proportion of unrestrained children in rear seat positions in both the 8 to 13 and the 14 to 17 years age-groups more than tripled compared to the corresponding values for the front seat, to around 35 percent. The percentage of these children that were using restraints correctly reduced to around 60 percent in both cases.

Table 5: Restraint Fitting Rates for All Restrained Child Occupants by Restraint Type

	No of cases	% Correct Fitting	% Incorrect Fitting
Restraint Type			
Adult belts	609	100.0	-
Child seats	548	91.6	8.4
Booster cushions /seats	305	81.0	19.0
Capsules / safety swingers	58	79.3	20.7
Unapproved restraints	17	-	100.0
Child harness	4	100.0	-
Total	1541	91.4	8.6
Total excluding adult belts and boosters (fitting not relevant for these restraint types)	627	88.0	12.0

Note: The percentages displayed for boosters are in fact wearing rates, as most of these restraints cannot be fitted to vehicles.

3.2.5 Metropolitan versus rural restraint use

In order to investigate differences in the restraint use rates in metropolitan and rural areas, the pooled data for the ten Melbourne metropolitan sites were compared with that for the four provincial towns. The data are presented in Table 6 below.

A consistent trend is evident. Correct use of restraints was more prevalent at the metropolitan sites for all age-groups of children, with the reduction in correct restraint use from metropolitan to rural site being greater for the oldest age-group. The difference in the restraint use rates of rural and metropolitan passengers appears to be almost entirely due to differences in the proportions of children not occupying a restraint, rather than to a disparity in the percentage of children who wear restraints incorrectly.

Table 6: Restraint Use Rates for Metropolitan and Rural Sites by **Age**

		% <- CR ->	% <---------- IR ---------->			% <- NR ->
	No. of cases	cf/cw	cf/iw	if/cw	if/iw	
Metropolitan Sites						
0 – 7 years	1023	67.6	12.8	3.3	6.0	10.3
8 – 13 years	161	72.0	5.6	-	-	22.4
14 – 17 years	64	84.4	3.1	-	-	12.5
Total	1248	69.1	11.4	2.7	4.9	11.9
Rural Sites						
0 – 7 years	385	61.8	13.8	2.6	6.8	15.1
8 – 13 years	86	61.6	4.7	-	-	33.7
14 – 17 years	47	63.8	4.3	-	-	31.9
Total	518	62.0	11.4	1.9	5.0	19.7

NOTE: Missing values have been excluded from the table and the calculation of percentages.

3.3 Restraint Use by Infants (less than 12 months)

Infant passengers occupied restraints in a higher proportion of instances than did older children - less than 6 percent were unrestrained (Table 7). However, a large number of infants occupying restraints were restrained incorrectly. Inspection of Table 7 indicates that the high proportion of incorrectly restrained infant occupants (a total of 17.4 percent) mostly resulted from incorrect fitting alone (9 percent of cases). Examination of Tables 5 and 8 shows that the proportion of infant bassinets incorrectly fitted to vehicles was higher than that for any other approved restraint type one in five were fitted incorrectly. Incorrect wearing alone was only responsible for the incorrect restraint of less than 2 percent of infant occupants.

It is interesting to note that the major factor restricting the proportion of correctly restrained infants (i.e. incorrect fitting of restraints) seems to differ markedly from the major contributor for the 0 to 7 years age-group of which infants are a subset. Incorrect wearing of correctly fitted restraints contributes to a very small percentage of cases of incorrect restraint of infants (1.9 percent), yet it results in the incorrect restraint of some 12.7 percent of all rear seat occupants of 7 years or less.

Table 7: Infant Occupants (Less Than 12 Months) Restraint Use Rates

		% <- CR ->	% <---------- IR ---------->			% <- NR ->
	No. of cases	cf/cw	cf/iw	if/cw	if/iw	
Infants 0 –11 months	155	76.8	1.9	9.0	6.5	5.8

NOTE: Missing values have been excluded from the table and the calculation of percentages. All infants except five were in rear seat positions.

Table 8: Restraint Fitting Rates for Infants (Less Than 12 Months) by Restraint Type

	No of cases	% Correct Fitting	% Incorrect Fitting
Child seats	87	93.1	8.4
Infant Bassinets	55	80.0	20.0
Unapproved restraints	8	-	100.0

NOTE: All but two of the infant bassinets were baby safety capsules. In addition to the data shown above, there were also two infants restrained by adult belts and four restrained by boosters. Missing values have been excluded from the table and the calculation of percentages.

3.3.1 Use of Child Restraints and Loan Scheme Bassinets by Infants (6 months or less)

Infant safety bassinets (baby safety capsules and safety swingers) are designed to protect infants of 6 months or less. These specially designed restraints are required because of the small size and lack of postural control of children in this age group, meaning that the infants are not safely restrained by other forms of occupant restraint. However, the bassinets are relatively expensive to purchase and the child will usually outgrow it in 6 months or less. The statewide safety bassinet loan scheme is directed at parents of infants in this age group in an attempt to encourage safe restraint of these children.

Table 9: Restrained Infant Occupants of 6 Months or Less Percentages of Restraint Types Used

	No. of Cases	% Child Seat	% Baby Safety Capsule	% Unapproved Restraint
Infants 0 – 6 months	85	24.7	64.7	5.9

NOTE: Missing values and cases of unrestrained infant occupants have been excluded from the table and the calculation of percentages.

Table 10: Infants 6 Months or Less - Percentages of Bassinets Obtained Through Municipal Loan Schemes

	No. of cases	% Loan Scheme	% Not Loan Scheme
Infant Bassinet (Baby safety capsule or safety swinger)	57	56.1	43.9

NOTE: Missing values have been excluded from the table and the calculation of percentages.

Inspection of Table 9 shows that nearly two-thirds (64.7 percent) of all restrained infants in this age group were in infant bassinets. Of these, 56.9 percent were obtained on hire from municipal loan schemes (Table 10). While the sample size is relatively small, the data

indicate that 37.7 percent of all infants of 6 months or younger are restrained by infant bassinets provided by the municipal loan scheme.

The data presented in Table 11 indicate that, while the proportion of unrestrained infant occupants of 6 months or less was around 5 percent, only 71.8 percent were actually restrained correctly. As mentioned earlier, incorrect fitting of the infant bassinets is at a high level, constituting a large part of the problem. Incorrect restraint fitting alone was responsible for the incorrect restraint of 12.8 percent of all infants in this age-group, while by itself, incorrect wearing of restraints contributed to incorrect infant restraint in only 1.3 percent of cases.

Table 11: Infant Occupants 6 Months or Less Restraint Use Rates

		% <- CR ->	% <---------- IR ---------->			% <- NR ->
	No. of cases	cf/cw	cf/iw	if/cw	if/iw	
Infants 0 – 6 months	78	71.8	1.3	12.8	9.0	5.1

NOTE: Missing values have been excluded from the table and from the calculation of percentages. All infants except three were in rear seat positions.

4.0 SUMMARY AND CONCLUSIONS

A summary of important findings of the restraint use survey is presented below:

- Driver restraint wearing has remained at a high level (93.9 percent), similar to that found in previous on-road surveys;

- One in three child occupants were found to be at a higher risk of injury in road accidents, with 14.2 percent of children unrestrained and a further 18.8 percent restrained incorrectly;

- Only 1.7 percent of all child passengers did not have a restraint available for use;

- Children in the left front seat were correctly restrained in a greater proportion of cases (75.0 percent) than children in any other seating position;

- Overall, a higher percentage of children were correctly restrained in front seat positions than rear;

- Consistent with the previous point, the proportion of unrestrained child passengers in rear seats was more than three times the figure for front seats for children of the 8 to 13 and the 14 to 17 year age-groups. In rear seat positions, unrestrained child occupants accounted for more than one-third of all children in these two age groups;

- By contrast, within the 0 to 7 years occupant group, the proportion of unrestrained children was actually greater for front seat passengers than rear;

- Of children in front seat positions, approximately one-in-five of 7 years or younger were not restrained at all, 8-9 percent more unrestrained child occupants than for older groups of children;

- Less than 60 percent of front seat occupants aged 0 to 7 years were restrained correctly, a much lower proportion than for children of 8 to 13 years and 14 to 17 years, who were restrained correctly in around 87 percent of cases;

- By itself, incorrect wearing of restraints constituted a major cause of incorrect restraint of children in the 0 to 7 year age group, with 17.1 percent of front seat passengers in this age-group of children being incorrectly restrained as a sole result of incorrect restraint wearing, and 12.7 percent of the corresponding group of rear seat passengers;

- Correct wearing of restraints was more prevalent at metropolitan than at rural sites, and the difference was almost solely attributable to a higher proportion of unrestrained child occupants at rural sites;

- Restraint use figures for infants (less than 12 months) differed markedly from those for the 0 to 7 year age-group as a whole, the former having a less than 6 percent rate of non-use of restraints, with incorrect fitting of restraints being a far more serious contributor to incorrect restraint of these passengers than incorrect wearing;

- Infant bassinets were used by 64.7 percent of infants aged 6 months or less;

- 37.7 percent of all infants of 6 months or less were restrained by infant bassinets provided by the municipal loan scheme.

For this sample of vehicle occupants, three major points can be made concerning the failure to restrain child vehicle occupants correctly. Firstly, a sizeable number of infants were incorrectly restrained as a result of incorrect fitting of infant safety bassinets. In terms of reducing accident injury risk amongst this group of vehicle occupants, it would seem necessary to investigate and identify the reasons for the relatively high level of incorrect fitting of these restraints. It is probable that the problem lies in the greater complexity of the fitting procedure for infant restraints.

Secondly, amongst child occupants aged one to seven years, the proportion of correctly restrained occupants was reduced considerably by the incorrect wearing of correctly fitted restraints. During data collection, many parents complained of the ease with which young children can work their own way out of restraints by disengaging buckles. It is likely that restraint use rates for young children would be increased by better 'childproofing' of restraints.

Finally, children of 8 years of age and older exhibit similar restraint use patterns to adult passengers in that failure to use a restraint at all is the major problem, particularly in the rear of vehicles.

Early in this report, reference was made to the fact that the collected sample of child passengers was not random in nature, since the sampling procedure was designed to maximise the number of child occupants included in the sample and particularly, to maximise the number of infants sampled. In view of this, it is difficult to make reliable generalizations about the vehicle occupant population as a whole on the basis of the data presented here. Notwithstanding, a number of the restraint use figures obtained in this survey were similar to those reported by Cave (1986) in a previous survey of occupant restraint use. Therefore, despite the sampling procedure employed, and the reservations outlined above, there is some evidence that the data presented in this paper provide an accurate representation of restraint use rates for the larger population of child occupants during weekday times.

In addition, the current survey has demonstrated the usefulness (particularly in assessing restraint use by child passengers) of a restraint use taxonomy that takes account of both the extent of wearing and the correctness of fitting of restraints to the vehicle.

REFERENCES

Cave, T. (1986). *Restraint use by vehicle occupants adjusted for distance travelled*. Report 1/86 (GR), Road Traffic Authority, Victoria.

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APPENDIX 1

SPECIFIC LOCATIONS OF SAMPLING SITES

CHILD CARE CENTRES (8 a.m.-9 a.m.) LISTED FIRST,
SIGNALISED INTERSECTIONS (10 a.m.-4 p.m.) LISTED SECOND:

AREA	DATE	SITE
Broadmeadows (near Broadmeadows Shopping Square)	07/12/87	Joybelle Child Care Centre (C.C.C) 1346 Sydney Rd, Fawkner.
	07/12/87	Pascoe Vale Rd and Dimboola Rd (on Pascoe Vale Rd)
Doncaster (near Doncaster Shoppingtown)	07/12/87	Deep Creek C.C.C. 510-518 Blackburn Rd, Doncaster.
	07/12/87	Doncaster Rd and Entry to Shoppingtown (on Doncaster Rd)
Frankston (near Bayside)	08/12/87	Jubilee Park Nursery School 20 Reservoir Rd, Frankston.
	08/12/87	Nepean Hwy and Beach St (on Nepean Hwy)
Keilor (near Airport West)	08/12/87	Tullamarine C.C.C. 84-86 Mickleham Rd, Tullamarine.
	08/12/87	Melrose Dve and Matthews Ave/Mascoma St (on Melrose Dve)
Knox (near Knox City)	09/12/87	Commercial C.C.C. 65 Dorset Rd, Ferntree Gully.
	09/12/87	Burwood Hwy and Entry to Knox City [opposite Lynne Ave] (on Burwood Hwy)
Moorabbin (near Southland)	09/12/87	Young C.C.C. 39 Isabella St, Moorabbin.
	09/12/87 and 16/12/87	Nepean Hwy and Bay Rd (on Nepean Hwy)
Preston (near Northland)	10/12/87	City of Heidelberg C.D.C.C. Cnr. Morobe St and Oriel Rd, Heidelberg.

	10/12/87	Wood St and Albert St (on Wood St)
Ringwood (near Eastland)	10/12/87	Knaith Rd C.C.C. Knaith Rd, Ringwood East.
	10/12/87	Ringwood St and Bond St (on Ringwood St)
Springvale (near Waverley Gardens)	11/12/87	Kinderworld Day Care Centre 20 Dunblane Rd, Noble Park.
	11/12/87	Police Rd and Jacksons Rd (on Jacksons Rd)
Sunshine (Highpoint West)	11/12/87	Orama St C.C.C. Orama St, Deer Park.
	11/12/87	Rosamond Rd and Williamson Rd (on Rosamond Rd)
Shepparton	14/12/87	The Arthur Dickman C.C.C. 102-104 Maude St, Shepparton.
	14/12/87	High St and Maude St (on High St)
Bendigo	15/12/87	Annie Galvin C.C.C. Cnr.Mitchell and Gladstone Sts, Bendigo.
	16/12/87	Mitchell St and High St (on Mitchell St)
Ballarat	17/12/87	Ballarat C.C. Co-op. Armstrong St, Ballarat.
	17/12/87	Sturt St and Doveton St (on Sturt St)
Morwell (near Mid Valley)	18/12/87	Morwell Children's Centre Rintoull St, Morwell.
	18/12/87	Princes Hwy and Bridle Rd (on Princes Hwy)

OBSERVER 1 (Interviewer)
- Front Seats

SITE:

Date: /12/87
M/T/W/T/F

Page No.

No./ Hour	DRIVER Age (Years)	Sex (M/F)	Seat Belt? (Y/N)	Posn. (FL/FC/) RL/RC/RR)	Age	RESTRAINT TYPE Infant Restraint (Circle)	Loan Scheme (Y/N)	Child Restraint (Circle)	Correctly Fitted (Y/N/U)	Correctly Worn (Y/N/U)	(If unrestrained) Restraint available? (Y/N)
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			
						Sw Ca		CS AB b H NA U			

OBSERVER 2 (Rear Seats)

SITE:

Date: /12/87
M/T/W/T/F

Page No.

No./ Hour	Total No. Occupants	Posn. (L/C/R)	RESTRAINT TYPE: Infant Restraint (Circle)	Loan Scheme (Y/N)	Child Restraint (Circle)	Correctly Fitted (Y/N/U)	Correctly Worn (Y/N/U)	(If unrestrained) Restraint available? (Y/N)
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			
			Sw Ca		CS AB b H NA U			

APPENDIX 3

DEFINITIONS OF CORRECT FITTING AND WEARING OF RESTRAINTS (including assumptions)

INFANT RESTRAINTS

*** BABY SAFETY CAPSULES (coded 'Ca' on data collection forms)**

Correct Fitting

- rear seat use only
- capsule (and baby) rearward facing
- boss retention rings in position (assume both sides correct if only one side visible and correct)
- upper restraint strap fitted to parcel shelf
- seat belt fed through base and fastened (assume correct on both sides if only one side visible and correct)

Correct Wearing

- - body band fastened

*** SAFETY SWINGERS ('Sw')**

Correct Fitting

- rear seat use only
- 2 lower anchor straps connected (assume both sides correct if only one side is visible and correct)
- 2 upper restraint straps fitted to anchor bolt
- no twisted straps

Correct Wearing

- - cocoon fitted to child

CHILD RESTRAINTS

* CHILD SEATS ('CS')

Correct Fitting

- rear seat use only (except when utility or other 2-3 passenger vehicle where upper restraint strap can be anchored)
- if **CENTRE** position:
  lap seat belt AND upper restraint strap
- if OUTBOARD position:
  at least lap/sash only

Correct Wearing

- buckle fastened
- straps worn snugly and without twists
- child's arms behind harness

* ADULT BELT ('AB')

Correct Fitting

- assume correct unless some obvious visible sign to the contrary

Correct Wearing

- buckle fastened
- no twisted straps
- child's head not behind sash if lap/sash
- snugly fitted
- child sitting in normal seating position (e.g. not lying down)

* BOOSTER SEATS AND BOOSTER CUSHIONS ('b')

Correct Fitting

- not applicable

Correct Wearing

- lap/sash or harness worn correctly (sash not around head; no twists; snugly fitted)
- cannot be used with lap belt only

*** HARNESS ('H')**

Correct Fitting

- rear seat use only (except when utility or other 2-3 passenger vehicle where upper restraint strap can be anchored)
- top restraint strap attached to anchor bolt
- assume lap belt fitted to car correctly
- lap belt through harness

Correct Wearing

- snug
- buckle fastened
- no twisted strap
- child's arms behind harness

OTHER CATEGORIES OF RESTRAINT

*** NOT APPROVED ('NA')**

- Assume that correctness of fitting and wearing not applicable

*** UNSEEN ('U')**

*** UNRESTRAINED (designated by no entry in the restraint column and an entry in the data collection form column marked "(if unrestrained) restraint available?")**