

An exploratory study of barriers to child restraint use in New Zealand

Kate Mora¹, Grace Rive¹, Dr Jared Thomas¹

¹Opus Central Laboratories, Opus International Consultants

Kate.Mora@opus.co.nz

Abstract

Despite overall high levels of use and increases in recent years, around seven percent of children in New Zealand still travel without a child restraint, with an average of three deaths per year. A large body of research has examined reasons for non-use, in particular the influence of economic factors on restraint use, however, this research is generally inconclusive. This project uses naturalistic observation and survey methods to determine which factors are seen as barriers to restraint use for New Zealand parents, including those that ultimately prevent some from correctly restraining their children. The pilot study observed and surveyed 94 participants on their use of, and attitudes towards child restraints including their knowledge of legal requirements and use of rental schemes and second hand restraints.

Key words: child restraints; barriers; observational methods; survey; interventions; New Zealand

1. Introduction

New Zealand has one of the highest child road fatality rates in the OECD (Ministry of Transport, 2009). Increasing the rate of child restraint usage is therefore vital for child safety in New Zealand. Despite legislation passed in 1994 which requires the use of child restraints for children under the age of 5, official statistics from the Ministry of Transport (MoT National Survey, 2010) suggest current use of appropriate restraints averages 93% across the country, with some regions as low as 85%. At the local authority level, rates drop as low as 79% (this lowest rate was observed in the Waikato region). While overall trends indicate increased usage over time, some regions of New Zealand have shown a decrease in usage in the last year (e.g. Wellington).

1.1. Safety benefits

Although these rates are relatively high overall, the 7% of children in New Zealand who are not correctly restrained are at a much greater risk of fatality. For example, recent Australian studies have suggested that lack of a child restraint increases fatality risk by a factor of four (Lennon, Siskind & Haworth, 2008) and the ACC website suggests a 71% reduction in fatalities and 67% in serious injuries with restraint use.

Seat-belts and child restraints do not prevent accidents from happening; however, they play a major role in reducing the severity of injury to occupants during a collision. A major reason for this relates to the potential for ejection from a vehicle. Ejection from a vehicle is one of the most injurious events that can happen to a person in an accident, with 75% of all vehicle occupants ejected from a vehicle in a crash dying as a result. Seat-belts and restraints are extremely effective at preventing ejections; ejection rates for fatal accidents are much higher for those who were unrestrained (44%) than those who were restrained (5%) (FIA Foundation for the Automobile and Society, 2009).

For children, it is extremely important that the restraint used is appropriate for their size and weight. Restraints need to adapt and cope with different stages of infant and child development; a three-point lap and diagonal seat-belt designed for adults is inappropriate for this. One reason for this relates to the smaller portion of a child's abdomen that is covered by the pelvis and rib cage. In addition, a child's ribs are more likely to bend than an adult's

(whose are more likely to break); this results in energy from a collision being transferred to a child's heart and lungs when an adult restraint is used. Three-point lap and diagonal seatbelts, when used inappropriately therefore increase abdominal injuries among children compared to appropriate restraints and are not optimally effective at preventing ejection. In contrast, an appropriately sized child restraint restrains a child's movement away from the vehicle interior and distributes the forces of a crash over the strongest parts of the body, minimising damage to soft tissues. Child restraints also reduce injuries from non-accident events (e.g. sudden stops, swerving) (FIA Foundation for the Automobile and Society, 2009).

1.2. Correlates of usage

Previous research has shown that cost is a potential barrier for parents, with the purchase of a new restraint requiring a substantial financial outlay. In New Zealand, the majority of new restraints cost over \$200. Both affordability and socio-economic status have been linked to decreased usage of child restraints (e.g. Wagenaar, Molnar & Margolis, 1988; Louis & Lewis, 1997). However, overall, research exploring the effect of household income and socio-economic status has found mixed results (e.g. Pless & Roghmann, 1978; Gielen, Eriksen, Daltroy & Rost, 1984; Webb, Sanson-Fisher & Bowman, 1988b).

Due to the link found with income, a number of intervention studies aimed at increasing use have explored the effects of providing low cost or free hireage options (e.g. Lindqvist, 1993; Sibley, Hunt & Harper, 2001). However, even with free hireage available, Sibley et al. (2001) found no increase in correct restraint use. In addition, hireage schemes at a reduced cost are currently available in New Zealand, but as mentioned above, children are still travelling unrestrained. This suggests it is not economic factors alone that prevent correct restraint use.

A wide range of alternative explanations for parents not using child restraints have therefore been proposed, including child discomfort or resistance (e.g. Hoadley, Macrina & Peterson, 1981; Weber & Allen, 1982; Inder & Geddis, 1990), inconvenience (e.g. Gielen et al., 1984; Pieterse, Kok & Verbeek, 1992), a belief that restraints provide little safety benefit to children (e.g. Foss, 1985) and lack of seatbelt use by the driver (e.g. Decina, Temple & Dorer, 1994).

One study has previously been conducted in New Zealand exploring perceptions of car seats, where mothers were given new seats and asked to assess their safety, comfort and ease of use (Inder & Geddis, 1990). Almost all of the participants rated the seat as safe and the best way to transport their child, however their perceptions of the comfort and ease of use had a large effect on actual usage; those perceiving the seats as most difficult and uncomfortable showed significantly lower rates of use (Inder & Geddis, 1990). Therefore, there is evidence that perceptions of discomfort and ease of use do have influence in a New Zealand context.

A study conducted in the UK also suggested child restraint usage may vary according to the child's age (Department for Transport, 2003). During a phone survey, parents suggested those aged 0-3 years were appropriately restrained 94% of the time, with usage rates steadily decreasing through higher age groups (e.g. 66% of those aged 4-6 years were reported to be appropriately restrained) (Department for Transport, 2003).

However, evidence also shows that if parents have a restraint, they are likely to use it; those that do not use restraints typically do not own one (Webb et al., 1988b). Louis and Lewis (1997) also found providing education on the importance of using a restraint did not increase usage a year after being given an approved restraint (compared to a group that did not receive such education and were also provided an approved restraint). Therefore, it seems that key to increasing usage may be increasing ownership or availability of restraints.

1.3. Summary

The current work extends the previous research noted above, the majority of which is relatively old, when restraint use was far less common. It is likely that the reasons given by

the remaining 7% of parents that do not use restraints will be different from those who were researched when usage rates were far lower. Interception surveys were previously used by the Ministry of Transport and the LTSA to investigate child restraint use in greater detail than the current Ministry of Transport data counts of use versus non-use. The current study uses a similar method to investigate usage rates and some reasons for parents' choices, including factors previously found to have influence (e.g. perceptions of comfort and ease of use, economic factors). These intercept surveys are then supplemented with more detailed take-home surveys that investigate attitudes and behaviours in greater detail for a subsample of participants, with the goal of identifying barriers to use and interventions to increase usage rates across New Zealand.

2. Method

2.1. Sampling

For the pilot survey, two trained interviewers were onsite at a supermarket car park in Lower Hutt across two study days; one during the school term and the second during the school holidays between the hours of 9am and 3pm. All vehicles that entered the car park over this period were observed and drivers with small children in the car approached to take part in the study. Due to them being reasonably infrequent, interviewers were instructed to prioritise drivers with children that were not restrained, however as many drivers as possible were approached by the interviewers.

2.2. Observations

The interviewers completed a number of observation measures for every vehicle observed with children on board that could have been under 5 years of age, shown in Table 1 below.

Table 1. Observation measures

Variable name	Description	Variable coding
Child restraint status	Type of restraint used for each child observed (up to 5 children in each vehicle recorded)	1 = correct restraint 2 = adult restraint 3 = no restraint
Child approximate age	Observer's estimate of each observed child's age	1 = up to 1 year of age 2 = 1 or 2 years of age 3 = 3 or 4 years of age
Driver restrained	Whether the driver was observed using a restraint	1 = yes 2 = no 3 = not sure
Older passengers restrained	Whether any other passengers over the age of 5 were observed using a restraint	1 = yes 2 = no 3 = some 4 = not sure
Car registration	The vehicle licence plate was recorded to allow database checks of vehicle and demographic information at a later date (if possible)	
Approximate age of car	Observers either recorded the year of the vehicle from the registration card or if not possible, estimated the age of the vehicle	
Type of car	General size of the vehicle was also recorded	1 = small vehicle 2 = medium vehicle 3 = large vehicle

2.3. Intercept surveys

Either once drivers parked their vehicles, or as they returned to their vehicles after leaving the supermarket, one of the interviewers approached the driver to invite them to take part in the short intercept survey. Participants were offered a \$10 voucher for the supermarket in recognition of their time and to improve the response rate. The intercept survey consisted of questions regarding:

- The age of and relationship to the children observed in the vehicle
- Knowledge of and attitudes towards the legal requirements for child restraints
- Regularity of use of child restraints and adult seatbelts
- Where the driver sourced the child restraints used (if applicable)
- What they found difficult about getting a child restraint (even if they used one)
- Reasons for not using if they owned a restraint but were not observed using it
- Demographic information

If participants completed the intercept survey, the number corresponding to the observation measures of this driver was written on the survey when it was returned. If the participant refused, this was noted on the observation form.

2.4. Off-site questionnaire

Once the intercept survey was completed, participants were offered the opportunity to take a longer off-site questionnaire survey pack home with them to return via a freepost address. Each survey pack was numbered and this number linked to the observation sheet for all those participants that took one. The survey pack included a card to enter a prize draw for \$250 MTA vouchers, to be drawn at the conclusion of the study. This procedure follows best practice methodology based on the author's previous research experience (e.g. including freepost envelopes, the use of prize draw incentives) to achieve the highest response rates possible (previously this has achieved response rates of up to 50%).

The off-site questionnaire consisted of more detailed questions regarding:

- Children in the household's ages
- Access to and attitudes towards restraints in general
- Circumstances where they would not use restraints
- Reasons they personally did not or think other parents did not use child restraints
- Use of and attitudes towards rental schemes e.g. Plunket
- Use of and attitudes towards second hand child restraints
- How they chose what restraint to purchase and what they planned to do with them when they were no longer needed (if applicable)
- Purchasing and attitudes to purchasing other child safety products (e.g. baby monitors, child-proof locks)

3. Results

At the time of writing, only the pilot study had been completed for this project (85 of the 300 total intercept surveys required for the full study). Overall, 99 drivers were observed. Five participants who were observed during the school holidays were found to only have children over 5 years of age in their vehicle, therefore this data was removed from the analysis. Of the remaining 94, 85 took part in the intercept survey, a response rate of 90%. All those that participated in the intercept survey also took the off-site questionnaire pack. An overall response rate of 49.4% was achieved for the pilot study; however the preliminary analysis reported below was completed on the first 24 surveys only (28.2%).

3.1. Observation measures

Of the 94 drivers observed in the pilot study, 5 were observed, or self-reported themselves, as not using child restraints for at least one child under 5 years of age. Of these, 4

participated in the intercept survey. Of the total sample, 94.2% were using correct child restraints, 1.7% adult restraints, 3.3% no restraint and the remaining 0.8% were not correctly restrained but their exact status was unsure (e.g. either not in any restraint or in a seat belt).

As it has been shown to be a predictor of restraint use in previous studies, driver and older passenger restraint use was also observed. Overall the majority of drivers (98.2%) and passengers (95.1%) were observed using their seatbelts. Due to the small number of unrestrained children observed, it was not possible to explore statistical differences within the data available.

3.2. Intercept survey

Table 2 below outlines the demographic profile of those observed using restraints and not using restraints. Due to the small sample of non-users, some categories have been collapsed from those used in the intercept survey and no analyses of significance have been conducted.

Table 2. Demographic data of the intercept survey participants

	Drivers using restraints	Drivers not using restraints
Gender		
Male	10 (12%)	1 (25%)
Female	71 (88%)	3 (75%)
Ethnicity		
NZ European	49 (67%)	0 (0%)
Māori	8 (11%)	0 (0%)
Pacific Island	8 (11%)	3 (75%)
Asian	7 (10%)	0 (0%)
Other	1 (1%)	1 (25%)
Age		
Under 25	15 (19%)	0 (0%)
25-34	25 (31%)	2 (50%)
35-44	30 (37%)	2 (51%)
45-54	6 (7%)	0 (0%)
55-64	3 (4%)	0 (0%)
65 or older	2 (3%)	0 (0%)
Income		
Under \$30000	14 (19%)	2 (50%)
\$30-60000	25 (34%)	1 (25%)
\$60-90000	26 (36%)	1 (25%)
\$90000 or more	8 (11%)	0 (0%)
How many vehicles do you have in your household?		
Average number of vehicles	1.9	1.0

Again due to the small sample size, meaningful statistical analyses were limited, however some key highlights of the data include:

- There appears to be no difference in the age of restrained versus unrestrained children, suggesting older children are no more likely to be unrestrained than babies.
- All the children seen unrestrained were the driver's own children.
- Overall, there was not great knowledge of the law regarding compulsory child restraint use (with 34.2% overall selecting the correct legal requirements; however a total of 51.3% suggested either correct or stricter requirements), but this was no worse for those not using child restraints than those using them.
- All those observed not using child restraints suggested that they had them either purchased new, second hand or rented. The majority also suggested they use them all the time, despite being observed not using them. This may signal a social desirability bias

or confusion over what their requirements are (for example, that an adult restraint is enough).

- Even those that did use child restraints suggested that getting them is not easy, with the most frequently cited problems being the expense and knowing what type to get; those who were seen not using them cited all the reasons given (including the expense, knowing what type was required, understanding the process to get one and the time and hassle associated with obtaining one).
- When asked why they were not using a restraint on the day they were surveyed, all those that were observed not using restraints suggested that they were using them, again signalling either a social desirability bias or a misunderstanding of the law. The one participant that self-reported they were not using a restraint (but was not observed doing so) cited child dislike of the restraint.
- Participants also suggested they wore their own seatbelts at higher rates than was observed.

It should be noted that these findings are only indicative at this stage, due to the small sample sizes. Conclusions should therefore be drawn with care. Robust analyses will be conducted once the full data collection has been completed.

3.3. Off-site questionnaire

At the time the preliminary analyses were conducted only a small number of questionnaires had been returned (N=24). Some interesting findings (to be interpreted with caution due to the small sample size) from the questionnaires received include:

- The majority of respondents believed others didn't use restraints due to the expense (87.5%, N=21). The next most commonly cited reason was the hassle (45.8%, N=11), followed by confusion over what type was required (41.7%, N=10), having multiple vehicles (37.5%, N=9), children not liking them (20.8%, N=5) and not believing they made a safety difference (16.7%, N=4). Two participants additionally stated they thought parents were too lazy to use restraints.
- Two people surveyed knew people who do not use child restraints. The reasons they gave for this were the expense, the hassle and their children not liking them.
- Fifty percent (N=12) of those surveyed had used the Plunket child restraint rental service, 16.7% (N=4) had used another rental service, and 33.3% (N=8) had used no rental service before. Overall for the sample, 75% (N=18) of participants were registered with Plunket.
- Of those that had not used rental schemes, the majority said this was because they preferred to buy their own restraints (66.7%, N=6), while 22.2% (N=2 each) said they either didn't need to or felt it was too much hassle. Eleven percent (N=1 each) thought it was either still too expensive or were given seats as gifts.
- 60% (N=14) of participants either currently used or had previously used a second hand child restraint. 57% (N=8) of these second hand restraints were from a family member, 29% (N=4) a stranger and 21% (N=3) a friend.
- Compared to new child restraints, the majority of participants rated second hand restraints safety as about the same (45.8%, N=11) or worse (33.3%, N=8) with a small percentage rating them much worse (8.3%, N=2) or much better (8.3%, N=2).
- 67% (N=16) of those that had purchased a child restraint new relied on information from a baby products store for their purchase, followed by internet sites (25%, N=6), Plunket and friends/family (21%, N=5 each) and past experience (16.7%, N=4). Safety rating (33.3%) and cost (25%) were the most important factors in purchase decisions.
- When they no longer need their restraints, 62.5% of participants said they would be 5-10 years old, with 12.5% being 2-5 years old, 8.3% 10-15 years old and 4.2% 1-2 years old. Thirty-eight percent (N=9) intended to donate their restraints to charity, 33% (N=8) give them to a friend or family member and 25% (N=6 each) throw them away or sell them.

Participants were also asked about their attitudes to various issues around the use of child restraints. Figures 1 to 4 present the average score for each attitude item across all participants (higher scores indicate higher agreement with the item). Scales have not been formed from these items at this stage due to the small sample size.

Figure 1. General restraint attitudes

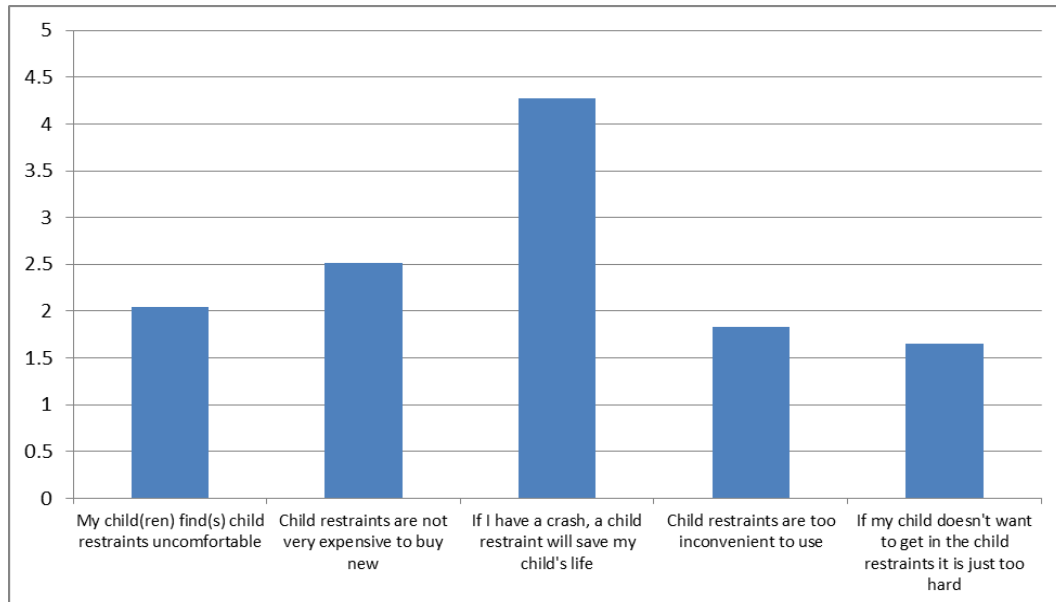


Figure 2. Attitudes to second hand and crash-involved restraints

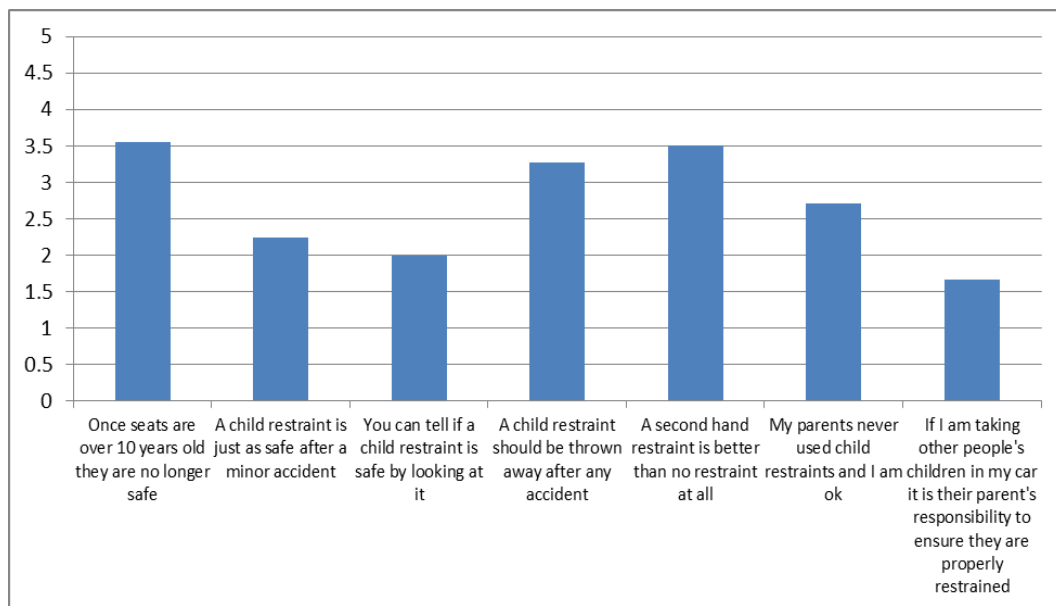


Figure 3. Attitudes to restraint rental schemes

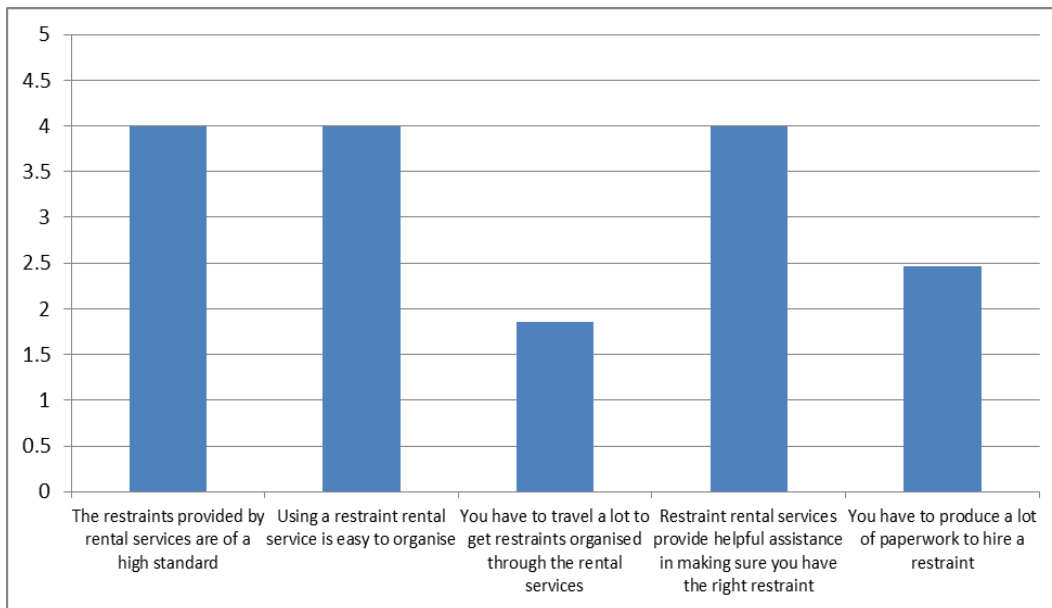
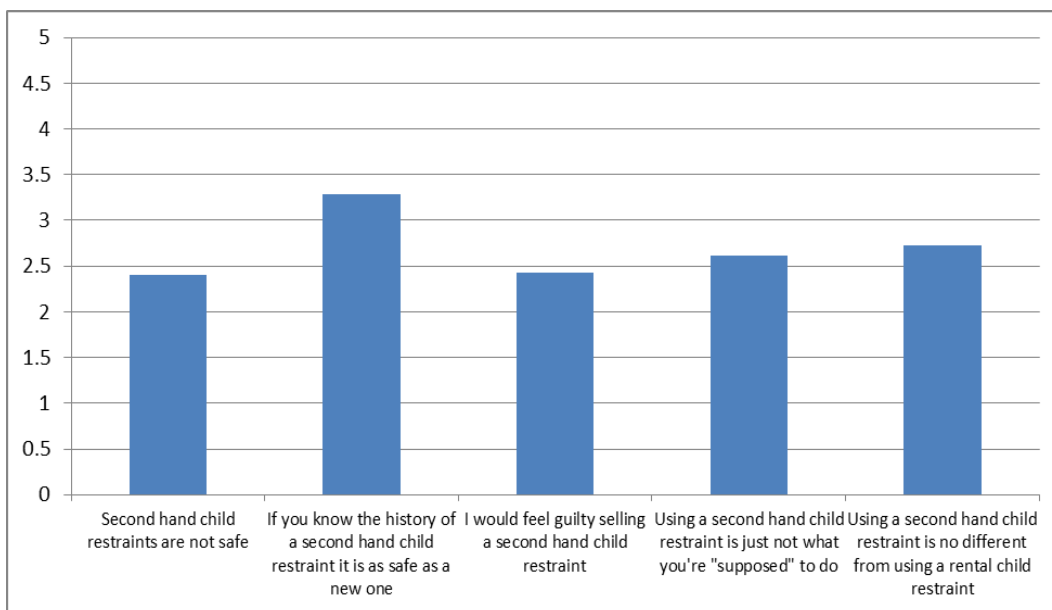


Figure 4. Attitudes to second-hand child restraints



In summary, for parents that use child restraints:

- Participants strongly believe in the safety benefits of child restraints and generally find them easy to use with little resistance from their children
- Participants believe it is their responsibility to use restraints for children in their care and understand that accidents may make restraints unsafe; however there are some beliefs around the length of time seats can be used that don't fit with best practice recommendations. Second hand restraints were judged better than using no restraint.
- Overall, rental schemes were rated positively
- Participants generally disagreed that second hand child restraints were unsafe and that, particularly if their history was known, they were safe to use. However, they were not rated the same as using a rental scheme child restraint.

4. Conclusions

As only the pilot study had been completed at the time of writing, findings reported are only preliminary. However, the methodology used has been shown to be sound and will provide robust findings into what barriers exist for child restraint use and what can be done in the way of interventions in New Zealand.

Importantly, the study has been successful in identifying parents not using child restraints and gaining their participation in the intercept survey. As can be expected in this type of research, there is a possible social desirability bias from these participants, however. The focus of the study therefore remains on the barriers that make restraint use difficult for all parents, even if they do use restraints (including these participants' perceptions of what may be stopping others from using appropriate restraints).

While it is not possible to give strong recommendations based on the pilot survey alone, there are some suggestions from the results that could inform future safety interventions and these will be confirmed with the analysis of the final data. Preliminary conclusions include:

- There is a lot of confusion over the legal requirements relating to child restraint use which suggests either the law needs clarification or there should be greater education for parents about the law as it stands. However, it should also be noted that most of the confusion led to participants believing there were stricter requirements than required by the current New Zealand law.
- The main barriers experienced or perceived for others are the expense and confusion over what restraint they need. Child dislike is less of an issue. Again this suggests further education on child restraint requirements may be useful, as would efforts to decrease costs.
- Second hand restraint use is common, particularly within extended families (e.g. between cousins). Participants acknowledge these seats are not as safe as brand new ones, but they are considered "better than nothing". This finding suggests either interventions to stop second-hand restraint use (if it is deemed unsafe) or the provision of assistance in making sure these restraints are as safe as possible is required.
- The vast majority of parents understand the safety benefits of using child restraints, so the barriers are more practical than attitude-based.

4.1. Acknowledgements

The authors would like to acknowledge the Road Safety Trust for funding this research and Dr Maree Hunt and Mr Bill Frith for their input into the methodology.

5. References

Accident Compensation Corporation. (2010). *Frequently requested facts and stats*. Accessed 12 October 2011 from: <http://www.acc.co.nz/about-acc/statistics/ABA00053>.

Decina, L.E., Temple, M.G., & Dorer, H.S. (1994). Increasing child safety-seat use and proper use among toddlers: Evaluation of an enforcement and education program. *Accident Analysis and Prevention*, 26(5), 667-673.

Department for Transport (2003). *Child car safety restraints: Research Report*.

FIA Foundation for the Automobile and Society. (2009). *Seat-belts and child restraints: A road safety manual for decision-makers and practitioners*. FIA Foundation for the Automobile and Society: London.

Gielen, A.C., Eriksen, M.P., Daltroy, L.H., & Rost, K. (1984). Factors associated with the use of child restraint devices. *Health Education and Behaviour*, 11(2), 195-206.

- Hoadley, M., Macrina, D., & Peterson, F.L. (1981). Child safety programs: implications affecting the use of child restraints. *Journal of School Health*, 51(5), 352-355.
- Inder, T., & Geddis, D.C. (1990). Factors influencing the use of infant car restraints. *Accident Analysis and Prevention*, 22(3), 297-300.
- Lennon, A., Siskind, V., & Haworth, N. (2008). Rear seat safer: Seating position, restraint use and injuries in children in traffic crashes in Victoria, Australia. *Accident Analysis and Prevention*, 40, 829-834.
- Lindqvist, K.S. (1993). Does the use of child safety seats increase as a result of loan schemes? *Accident Analysis and Prevention*, 24(4), 421-429.
- Louis, B., & Lewis, M. (1997). Increasing car seat use for toddlers from inner-city families. *American Journal of Public Health*, 87(6), 1044-1045.
- Ministry of Transport (2009). *Child restraint use by children under 5 years: Results of national survey, 2008*. Wellington: Ministry of Transport
- Ministry of Transport (2011). *Child restraint use by children under 5 years: Results of national survey, 2010*. Wellington: Ministry of Transport
- Pieterse, M.E., Kok, G., & Verbeek, J. (1992). Determinants of the acquisition and utilisation of automobile child restraint devices: A survey among Dutch parents. *Health Education Research: Theory & Practice*, 7(3), 349-358.
- Pless, I.B., & Roghmann, K.J. (1978). Safety restraints for children in automobiles: Who uses them? *Canadian Journal of Public Health*, 69, 289-292.
- Sibley, C.G., Hunt, M., & Harper, D.N. (2001). Identifying crosscultural differences in the effectiveness of an information and free child seat rental program. *Behaviour Change*, 18(4), 224-235.
- Wagenaar, A.C., Molnar, L.J., & Margolis, L.H. (1988). Characteristics of child safety seat users. *Accident Analysis and Prevention*, 20(4), 311-322.
- Webb, G.R., Sanson-Fisher, R.W., & Bowman, J.A. (1988b). Psychosocial factors related to parental restraint of pre-school children in motor vehicles. *Accident Analysis and Prevention*, 20(2), 87-94.
- Weber, K., & Allen, N.P. (1982). Child restraint systems: factors affecting their acceptance and use. *HSRI Research Review*, 12(6), 7-8.