MONASH University
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VEHICLE SAFETY RATINGS ESTIMATED FROM POLICE REPORTED CRASH DATA: 2006 UPDATE

AUSTRALIAN AND NEW ZEALAND CRASHES DURING 1987-2004

by

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Abstract:
Crashworthiness ratings measure the relative safety of vehicles in preventing severe injury to their own drivers in crashes whilst aggressivity ratings measure the serious injury risk vehicles pose to drivers of other vehicles and unprotected road users such as pedestrians, cyclists and motorcyclists. Updated crashworthiness ratings and aggressivity ratings for 1982-2004 model vehicles were estimated based on data on crashes in Victoria and New South Wales during 1987-2004 and in Queensland, Western Australia and New Zealand during 1991-2004. Both crashworthiness and aggressivity were measured by a combination of injury severity (the risk of death or serious injury given an injury was sustained) and injury risk (the risk of injury given crash involvement). The ratings were adjusted for the sex and age of the person whose injury outcome was being measured, speed limit at the crash location, the number of vehicles involved where relevant, the jurisdiction in which the crash occurred and the year in which the crash occurred. These factors were strongly related to injury risk and/or severity. In addition to the above factors the aggressivity rating was also adjusted for the type of other road user impacted as this factor was strongly related to injury severity and varied between vehicle models. The ratings estimate the risk of being killed or admitted to hospital when involved in a crash, to a degree of accuracy represented by the confidence limits of the rating in each case.

Crashworthiness estimates and their associated confidence limits were obtained for 305 vehicle models classified into 12 market groups. They were sufficiently sensitive that they were able to identify 159 models of passenger cars, four wheel drive vehicles, passenger vans and light commercial vehicles that have superior or inferior crashworthiness characteristics compared with the average vehicle. Aggressivity rating estimates and their associated confidence limits were obtained for 284 vehicle models and were sufficiently sensitive that they were able to identify 129 models of passenger cars, four wheel drive vehicles, passenger vans and light commercial vehicles that have superior or inferior aggressivity characteristics compared with the average vehicle.

The relationship between vehicle crashworthiness and the year of manufacture of Australian passenger and light commercial vehicles manufactured from 1964 to 2004 was also investigated. Trends were examined by year of manufacture both for the fleet as a whole and by market group for vehicles manufactured from 1982 to 2004. Also investigated was the relationship between vehicle crashworthiness and both the year of manufacture and the year of first registration in New Zealand light passenger vehicles manufactured from 1964 to 2004 and crashing during 1991 to 2004. The latter analysis was aimed at assessing crashworthiness trends in the fleet of used imported vehicles in New Zealand whilst the former examined trends in the fleet as a whole.

The results of this report are based on a number of assumptions and warrant a number of qualifications that should be noted.

Key Words: (IRRD except when marked*)
Injury, Vehicle Occupant, Collision, Passenger Car Unit, Passive Safety System, Statistics

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EXECUTIVE SUMMARY

This report describes the development of further updated vehicle safety ratings for 1982-2004 model vehicles. The ratings produced cover both vehicle crashworthiness and aggressivity. Crashworthiness ratings measure the relative safety of vehicles in preventing severe injury to their own drivers in crashes whilst aggressivity ratings measure the serious injury risk vehicles pose to other road users with which they collide. The aggressivity rating measure is based on collisions between the vehicle being rated and both other vehicles and unprotected road users. It was first developed and successfully applied in Newstead et al (2005b) and has been updated here. Both measures are estimated from data on real crashes reported to police. The update is based on crash data from Victoria and New South Wales during 1987-2004 and from Queensland, Western Australia and New Zealand during 1991-2004. The rating of vehicle crashworthiness through analysis of real crash data, as carried out here, and through crash tests carried out by consumer groups such as the Australian New Car Assessment Program is likely to have encouraged manufacturers to improve vehicle safety.

Crashworthiness ratings were measured by a combination of injury severity (of injured drivers) and injury risk (of drivers involved in crashes). Crashworthiness injury severity was based on 237,069 drivers injured in crashes in Victoria during 1987-2004, in New South Wales during 1987-1998 and in Queensland, Western Australia and New Zealand during 1991-2004. Crashworthiness injury risk was based on 1,144,092 drivers involved in crashes in New South Wales during 1987-2004 and Western Australia and Queensland during 1991-2004 where a vehicle was towed away. The crashworthiness ratings were adjusted for the driver sex and age, the speed limit at the crash location, the year in which the crash occurred, the jurisdiction in which the crash occurred and the number of vehicles involved in the crash. These factors were found to be strongly associated with injury risk and injury severity. Adjustments were made with the aim of measuring the effects of vehicle factors alone, uncontaminated by other factors available in the data that affected crash severity and injury susceptibility.

The crashworthiness ratings estimate the risk of a driver of the focus vehicle being killed or admitted to hospital when involved in a tow-away crash, to a degree of accuracy represented by the confidence limits of the rating in each case. Statistically reliable crashworthiness ratings were calculated for 305 individual vehicle models manufactured between the years 1982-2004. The estimates and their associated confidence limits were sufficiently sensitive that they were able to identify 159 models of passenger cars, four wheel drive vehicles, passenger vans and light commercial vehicles that have superior or inferior crashworthiness characteristics compared with the average crashworthiness across all vehicles in the data. Vehicles were classified into one of 12 market groups for presentation of the ratings with average crashworthiness of vehicles in each market group estimated.

The measure of aggressivity was calculated for 284 models of Australian and New Zealand passenger vehicles manufactured between the years 1982-2004. The aggressivity ratings estimate the risk of a vehicle driver or unprotected road user impacting with the focus vehicle model being killed or admitted to hospital when involved in a crash. The degree of accuracy of the aggressivity ratings is represented by the confidence limits of the rating in each case. The estimates and their associated confidence limits were sufficiently sensitive

that they were able to identify 129 vehicle models that have superior or inferior aggressivity characteristics compared with the average aggressivity across all vehicle models in the data. Average aggressivity for vehicles in each of the 12 defined market groups was also estimated. Estimated vehicle aggressivity towards drivers of other vehicles or unprotected road users was found to have little or no relationship with ratings of vehicle crashworthiness, demonstrating the independence of the two complementary measures.

For both crashworthiness and aggressivity, the expanded data set has been able to produce more up-to-date and reliable estimates of the crashworthiness of individual car models than those published previously.

The crashworthiness of passenger vehicles in the Australian vehicle fleet (cars, station wagons, four wheel drives and vans), has been estimated by year of manufacture for the years 1964 to 2004. This study further updates the original one by Cameron et al (1994a) for years of manufacture 1964 to 1992. New Zealand data are analysed separately because of fundamental differences in the mix of vehicles in the New Zealand fleet along with the large numbers of used vehicles imported into New Zealand and a fundamentally different system of vehicle safety regulation. This has been shown in a previous study (Newstead and Watson, 2005a) to give rise to different trends in crashworthiness by year of manufacture.

Updated trends in Australian crashworthiness by year of manufacture show similar patterns as previously obtained with the greatest gains over the years 1970 to 1979 in which a number of new Australian Design Rules aimed at occupant protection took effect. Further significant gains in crashworthiness have also been observed over the years 1986 to 2004, with notable steady gains from 1985 to 1995 and since 2000. Trends in crashworthiness by year of vehicle manufacture from 1982 to 2004 for each of the 12 vehicle market groups were also estimated showing differential improvement in crashworthiness by market group by year of manufacture. Of particular note was a trend towards worsening crashworthiness of the light vehicle fleet in recent years.

The study of Newstead and Watson (2005a) which examined the trends in crashworthiness by year of manufacture of the New Zealand vehicle fleet for the years of manufacture 1964 to 2002 was updated to include 2003 and 2004 data. The relationship was investigated between vehicle crashworthiness and both the year of manufacture and the year of first registration of New Zealand light passenger vehicles manufactured from 1964 to 2004 and crashing during 1991 to 2004. The latter analysis was aimed at assessing crashworthiness trends in the fleet of used imported vehicles in New Zealand whilst the former examined trends in the fleet as a whole. Analysis of trends by year of vehicle manufacture showed statistically significant improvement in the crashworthiness of New Zealand light passenger vehicles over the years of manufacture studied. Most of the measured improvement occurred over the years of manufacture from 1983 to 2004. Over this period, the risk of death or serious injury to drivers reduced by around 67% for the fleet as a whole. During this period vehicle safety in New Zealand was affected by several competing effects: a general increase in both active and passive safety features in vehicles; increasing proportions of used imported vehicles entering the New Zealand fleet; and increases in the regulation of vehicle safety standards by the New Zealand Government.

Estimates of crashworthiness trends in the used import vehicle fleet by year of first registration in New Zealand from 1986 to 2004 showed an improvement in crashworthiness over the years of first registration analysed.

The results and conclusions are based on a number of assumptions and warrant a number of qualifications that should be noted.

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CONTENTS

Page No.

1. INTRODUCTION AND PROJECT HISTORY 2

1.1 CRASHWORTHINESS RATINGS 2
1.2 AGGRESSIVITY RATINGS 3
1.3 RATINGS FOR NEW ZEALAND VEHICLES 6
1.4 TRENDS IN VEHICLE SAFETY BY YEAR OF MANUFACTURE AND MARKET GROUP 8
1.5 PROJECT AIMS 10

2. CRASH DATA 11

2.1 VICTORIAN CRASHES 11
2.2 NEW SOUTH WALES CRASHES 13
2.3 QUEENSLAND CRASHES 15
2.4 WESTERN AUSTRALIA CRASHES 16
2.5 CRASH AND REGISTRATION DATA FROM NEW ZEALAND 16
2.5.1 Crash Data 16
2.5.2 Registration Data 17
2.5.3 Merging the Crash and Registration Data 19
2.6 COMBINED DATA FROM THE FIVE JURISDICTIONS 20

3. MODELS AND MARKET GROUPS OF VEHICLES 22

3.1 VEHICLE MODEL IDENTIFICATION 22
3.1.1 Australian Vehicles 22
3.1.2 New Zealand Vehicles 23
3.2 POOLED CAR MODELS 26
3.3 VEHICLE MARKET GROUPS 27

4. ANALYSIS 29

4.1 OVERVIEW OF ANALYSIS METHODS: CRASHWORTHINESS 29
4.1.1 Logistic Models for Each Component 32
4.1.2 Combining the Injury Risk and Injury Severity Components 35
4.1.3 Market Group Analyses 36
4.1.4 Trends in the Rating Criteria 36
4.2 OVERVIEW OF THE ANALYSIS METHODS: AGGRESSIVITY 40
4.2.1 Aggressivity Method 40
4.2.2 Logistic Models, Confidence Limits and Assessment of Aggressivity of Specific Vehicle Models and Market Groups 41

5. RESULTS 44

5.1 VEHICLE CRASHWORTHINESS RATINGS 44
5.1.1 Injury Risk 44
5.1.2 Injury Severity 45
5.1.3 Crashworthiness Ratings 46
5.1.4 Comparisons with the All Model Average Rating 47
5.2 AGGRESSIVITY 52
5.2.1 Aggressivity towards Other Car Drivers and Unprotected Road Users 52
5.2.2 Aggressivity Rating Statistically Significant Makes and Models 54
5.2.5 Relationship between Aggressivity and Crashworthiness 58

5.3 PRESENTATION OF CRASHWORTHINESS AND AGGRESSIVITY RATINGS FOR CONSUMER INFORMATION 59
5.4 CRASHWORTHINESS BY YEAR OF MANUFACTURE OF THE AUSTRALIAN VEHICLE FLEET 61
5.4.1 Injury Risk 61
5.4.2 Injury Severity 61
5.4.3 Crashworthiness by Year of Manufacture 62
5.4.4 Discussion on the Analysis of Crashworthiness by Year of Manufacture 65
5.5 CRASHWORTHINESS BY YEAR OF MANUFACTURE AND MARKET GROUP FOR THE AUSTRALIAN VEHICLE FLEET 68
5.5.1 Injury Risk 68
5.5.2 Injury Severity 70
5.5.3 Crashworthiness by Year of Manufacture and Market Group 71
5.6 CRASHWORTHINESS BY YEAR OF MANUFACTURE OF THE NEW ZEALAND VEHICLE FLEET 74
5.6.1 Injury Risk 74
5.6.2 Injury Severity 75
5.6.3 Crashworthiness by Year of Manufacture 76
5.6.4 Discussion on the analysis of Crashworthiness by Year of Manufacture of the New Zealand Vehicle Fleet 77
5.7 CRASHWORTHINESS BY YEAR OF FIRST REGISTRATION IN NEW ZEALAND FOR USED IMPORTS 79
5.7.1 Injury Risk by Year of first Registration in New Zealand for Used Imports 79
5.7.2 Injury Severity by Year of first Registration in New Zealand 80
5.7.3 Crashworthiness by Year of First Registration in New Zealand 81
5.7.4 Discusssion on the analysis of Crashworthiness by Year of First Registration in New Zealand for Used Imports 82
5.8 COMPARISON OF CRASHWORTHINESS BY YEAR OF MANUFACTURE FOR THE AUSTRALIAN AND NEW ZEALAND VEHICLE FLEETS 83

6. CONCLUSIONS 85

7. ASSUMPTIONS AND QUALIFICATIONS 87

7.1 ASSUMPTIONS 87
7.2 QUALIFICATIONS 87

REFERENCES 88

APPENDICES

APPENDIX 1. Makes and models of cars involved in Victorian and NSW crashes during 1987-2004 and Western Australia, Queensland and New Zealand Crashes during 1991-2004
APPENDIX 2. Logistic regression estimates of injury risk by model and market group
APPENDIX 3. Logistic regression estimates of injury severity by model and market group
APPENDIX 4. Crashworthiness ratings of 1982-2004 models of cars involved in crashes during 1987-2004

APPENDIX 5. New aggressivity injury risk aggressivity injury severity and ratings of vehicle aggressivity (with 95% and 90% confidence limits), towards other vehicle drivers
APPENDIX 6 Presentation of crashworthiness and aggressivity ratings for consumer information
APPENDIX 7. Crashworthiness, injury risk and injury severity estimates by year of vehicle manufacture for the Australian vehicle fleet
APPENDIX 8. Crashworthiness, injury risk and injury severity estimates by year of vehicle manufacture by market group for the Australian vehicle fleet
APPENDIX 9. Crashworthiness, injury risk and injury severity estimates by year of vehicle manufacture for the New Zealand vehicle fleet
APPENDIX 10. Crashworthiness, injury risk and injury severity estimates by year of first registration for imported used vehicles in the New Zealand vehicle fleet

VEHICLE SAFETY RATINGS ESTIMATED FROM POLICE REPORTED CRASH DATA: 2006 UPDATE

AUSTRALIAN AND NEW ZEALAND CRASHES DURING 1987-2004

1. INTRODUCTION AND PROJECT HISTORY

For nearly 15 years the Monash University Accident Research Centre (MUARC) has been involved in a program of research examining issues relating to vehicle safety in both Australia and New Zealand through the analysis of mass data records on crashes reported to police. Data on which the research to date is based has come from reports compiled by police in various States across Australia and in New Zealand. In Victoria, the police reported crash data has been augmented by data on injury compensation claims resulting from transportation crashes compiled by the Victorian Transport Accident Commission (TAC).

Work in the area initially commenced as two separate projects undertaken independently by different research groups. In response to recommendations in a report by the Victorian Parliamentary Social Development Committee (SDC, 1990) on its inquiry into vehicle occupant protection, MUARC commenced a project in 1990 to develop consumer advice on vehicle safety performance from mass accident data. Independently in 1990, the NSW Roads and Traffic Authority (RTA) and the NRMA set out on a joint project to develop a 'car safety rating' system based on Police records of crash and injury involvement. The objective was to use vehicle crash records and injury data to develop ratings for the relative safety of vehicles. The NRMA and RTA entered into discussions with the CSIRO to conduct the necessary analysis, and by early 1991 had produced a relative ranking of vehicles.

In mid 1991, the NSW and Victorian groups became aware of each others activities and, following discussions, agreed to proceed jointly rather than have two competing vehicle safety rating systems: one based on Victorian data and the other on NSW data. Later, the NSW RTA and NRMA agreed that MUARC should undertake the analysis of the joint NSW and Victorian data sets. The NSW RTA and NRMA performed preliminary work on the NSW database to provide a clean set of data with accurately inscribed models for each vehicle as far as possible. The data were then handed over to MUARC for analysis.

1.1 Crashworthiness Ratings

Initially, development of vehicle safety ratings focussed on vehicle crashworthiness. Crashworthiness ratings rate the relative safety of vehicles by examining injury outcomes to drivers in real crashes. The crashworthiness rating of a vehicle is a measure of the risk of serious injury to a driver of that vehicle when it is involved in a crash. This risk is estimated from large numbers of records of injury to drivers of that vehicle type involved in real crashes on the road.

In 1994, MUARC produced vehicle crashworthiness ratings based on crash data from Victoria and New South Wales during 1987-92 (Cameron et al, 1994a, b). These ratings updated an earlier MUARC set produced by Cameron et al (1992b). Crashworthiness was measured in two components:

1. Rate of injury for drivers involved in crashes where a vehicle is towed away or someone is injured (injury risk)
2. Rate of serious injury (death or hospital admission) for injured drivers (injury severity).

Multiplying these two rates together formed the crashworthiness rating. This is a measure of the risk of serious injury for drivers involved in crashes where a vehicle is towed away or someone

is injured. Measuring crashworthiness as a product of two components, reflecting risk and severity of injury respectively, was first developed by Folksam Insurance, which publishes the well-known Swedish ratings (Gustafsson et al 1989).

The results of these ratings are summarised in Cameron et al (1994a) with a full technical description of the analysis methods appearing in Cameron et al (1994b). These ratings use an analysis method that was developed to maximise the reliability and sensitivity of the results from the available data whilst adjusting for the effects on injury outcome of non-vehicle factors that differ between vehicles. In addition to the speed zone and driver sex, the method of analysis adjusts for the effects of driver age and the number of vehicles involved, producing results with all those factors taken into account.

Subsequent to the ratings of Cameron et al (1994a, b), eight further updated sets of crashworthiness ratings were produced during 1996, 1997, 1998, 1999, 2000, 2003, 2004 and 2005 (Newstead et al 1996, Newstead et al 1997, Newstead et al 1998, Newstead et al 1999, Newstead et al 2000, Newstead et al 2003a, Newstead et al 2004b, Newstead et al 2005b). These reports covered vehicles manufactured over the period 1982-94, 1982-95, 1982-96, 1982-97, 1982-98, 1982-2000, 1982-2002 and 1982-2003 respectively, and crashing during 1987-94, 1987-95, 1987-96, 1987-97, 1987-98, 1987-2000, 1987-2002 and 1987-2003 respectively. Progressive enhancement of the methods of statistical analysis has been incorporated through the ratings updates. The 1999 to 2005 ratings incorporated police-reported crash data from Queensland whereas previously only crash data from New South Wales and Victoria had been used. To this, the 2003 to 2005 ratings also added police-reported crash data from Western Australia. The 2004 and 2005 ratings included police-reported crash data from New Zealand. The crashworthiness ratings covered individual models of sedans, station wagons, four wheel drives, passenger vans and light commercial vehicles and were given as estimates of risk of severe injury for each model along with 90% and 95% confidence limits on each estimate. For each update, the rating figures were widely distributed in the form of a "Used Car Safety Ratings" brochure.

1.2 Aggressivity Ratings

When crashworthiness ratings were first presented internationally, at the 1992 Conference of the International Research Council On the Biomechanics of Injury (IRCOBI) in Italy (Cameron et al 1992a), the authors were encouraged to expand the analysis to measure the risk of injury that each individual model represents to other road users, in addition to the occupants of the subject model. It was suggested that MUARC were in a unique position to consider this issue since its ratings were based on tow-away crashes.

A reviewer's comments on the paper presenting the first update of the ratings, to the 1995 IRCOBI Conference in Switzerland, emphasised the same issue. The reviewer wrote, "partner-protection and collision compatibility are very important for overall road safety and they can no longer be omitted in the discussion about 'car safety'". They recommended that this "shortcoming" should be addressed in the introduction and conclusion of the paper, and this was done in the published version (Cameron et al 1995).

Together, these international reactions to MUARC's work in this area indicated that the crashworthiness ratings should be extended to add a measure of the "aggressivity" of individual car models when they crash. Broadly speaking, aggressivity ratings measure the risk of injury that a vehicle poses to occupants of other vehicles it impacts, and also to other unprotected road

users such as pedestrians, bicyclists and motorcyclists. The addition of aggressivity ratings provides further consumer advice, which purchasers of cars could take into account when choosing a specific model.

Cameron, Newstead and Le (1998) completed an initial study that reviewed methods of rating vehicle aggressivity developed internationally, such as those by Broughton (1994, 1996) and Hollowell and Gabler (1996). Concepts from this review were then taken to develop a methodology for rating the aggressivity of Australian passenger vehicles making appropriate uses of the real crash data available in Australia. The methods developed were then successfully applied to estimate aggressivity ratings for a selection of Australian passenger vehicles that had accumulated sufficient real crash history.

The original study of Cameron et al (1998) investigated the feasibility and methods of providing aggressivity ratings for Australian passenger vehicles in terms of the threat that each subject model represented to:

1. Occupants of other cars colliding with the subject model cars, and
2. Pedestrians, bicyclists and motorcyclists impacted by the subject model cars.

Although the second type of aggressivity rating was considered by Cameron et al (1998), ratings of this type were problematic. In general, crashes involving pedestrians, bicyclists and motorcyclists are seldom reported to the Police unless someone is killed or injured which is usually the unprotected road user. This means that an estimate of the risk of injury cannot be calculated for the unprotected road users for inclusion in the second type of aggressivity rating. Consequently, the measure of aggressivity towards unprotected road users, described by Cameron et al (1998), is a measure of injury severity only (i.e. the risk of serious injury given some injury was sustained). Because of this, as well as the limited quantities of data available at the time, this aggressivity measure was less able to discriminate between the performances of individual vehicle models. At the time of conception, these problems made the measurement of aggressivity towards unprotected road users in its own right of limited practical value.

Aggressivity ratings by passenger vehicle market group have been estimated for collisions with unprotected road users in Newstead et al (2004c). These ratings updated those estimated by Cameron et al (1998) and consider only the relative injury severity of unprotected road users in collisions with the light vehicle fleet. The motivation for this recent update was not to produce the ratings for their own sake but as part of a process for considering the broader implications of the overall safety of the light vehicle fleet in all crash types.

This problem described in estimating aggressivity for unprotected road users did not occur for measuring aggressivity towards drivers of other cars, for whom the available data allowed estimates of both the risk of injury and of their injury severity in a manner analogous to the crashworthiness rating described above. As in Europe and the United States, the aggressivity rating towards drivers of other vehicles defined by Cameron et al (1998) was based on two-car crashes between light vehicles (i.e. heavy vehicle collisions have been excluded). The measure of the aggressivity risk of injury (RO) of the other drivers colliding with the subject model, unadjusted for any other factors, is defined as:

RO = proportion of drivers involved in crashes of tow away or greater severity who were injured

The injury severity of other drivers could be measured in a number of ways from the information on injury recorded on NSW, Victoria, Western Australia and Queensland Police reports and TAC claims (viz. killed; admitted to hospital; or injury requiring medical treatment). The measure of aggressivity injury severity (SO), used here is:

SO = proportion of injured drivers who were killed or admitted to hospital.

Based on the definition of RO and SO above, an aggressivity measure for each subject car model was then calculated as:

Aggressivity to other driver = AO = RO x SO.

This measures the risk of the driver of other cars being killed or admitted to hospital when involved in collisions with the subject model car.

Like the crashworthiness ratings, the aggressivity measure was adjusted for the effects of non-vehicle factors differing between the subject car models which may have affected injury outcome to the driver of the other vehicle. Non-vehicle factors available in the data included:

- speed limit at the crash location
- subject vehicle driver age (younger drivers may be driving at relatively fast speeds not fully represented by the speed limit)
- subject vehicle driver sex (male drivers may be driving at relatively fast speeds or more aggressively)
- other car occupant age (older occupants are more susceptible to injury)
- other car occupant sex (female occupants are more susceptible to injury, but males appear to be associated with relatively high injury severities)

One aspect the research of Cameron et al (1998) did not consider was estimation of an aggressivity rating reflecting the injury outcome to drivers of other vehicles as well as to unprotected road users in an integrated measure. A specific aim of the most recent used car safety ratings update of Newstead et al (2005b) was to review the aggressivity measure estimated. Aggressivity ratings regularly updated previously focused on the injury outcome to drivers of other vehicles colliding with the focus vehicle. A new aggressivity rating measure was successfully investigated with an aim to reflect the injury outcome to both other vehicle drivers and unprotected road user crashes in a single integrated measure.

Because an estimate of the risk of injury cannot be calculated for unprotected road users as explained above the measure of aggressivity injury risk used was based only on the injury risk to the other driver (ROU). This is equivalent to RO above. It is defined as:

Aggressivity Injury Risk = ROU = proportion of other vehicle drivers involved in crashes who were injured

In contrast, complete records of both other drivers and unprotected road users injured in crashes are available and can be used to examine injury severity outcomes in the aggressivity measure. The aggressivity injury severity measure (SOU) is defined as:

Aggressivity Injury Severity = SOU = proportion of other vehicle drivers or unprotected road users who were killed or admitted to hospital.

Based on the definition of ROU and SOU above, an aggressivity measure for each subject car model was then calculated as before:

Aggressivity to other driver or unprotected road user = AOU = ROU x SOU.

The aggressivity measure estimates the risk of the driver of another car or an unprotected road user being killed or admitted to hospital when involved in a collision with the subject model vehicle. As such, it is more representative of the total aggressivity performance of the vehicles being rated across all potential vulnerable collision partners.

Consideration was given to taking into account likely differences between the crash circumstances of the subject car models, which may result in a distorted view of its aggressivity only partly related to the characteristics of the subject cars. Factors available in the data to consider such differences were as above for the aggressivity measure based on other driver injury. In addition, a further critical factor that is likely to vary between vehicle models is the mix of collisions between other vehicles and unprotected road users.

The injury severity component of the new aggressivity measure (SOU) is an average of injury severity outcomes between drivers of other vehicles and unprotected road users involved in collisions with the focus vehicle. Since injury outcomes for unprotected road users are typically more severe than for drivers of other vehicles, it is necessary to adjust the new aggressivity injury severity measure to account for differences in the proportion of unprotected road user crashes between vehicle models. Furthermore, it is also likely that there are differences in the injury outcomes between different types of unprotected road users in crashes with vehicles. Hence the severity measure also needed to be adjusted for differences in the mix of unprotected road user types impacted between different vehicles. To adjust for potential differences between aggressivity rated vehicles in the type of collision partner, a further factor was included in the logistic regression models for aggressivity injury severity. The factor used was:

- collision partner type (vehicle, pedestrian, bicyclist or motorcyclist)

By incorporating unprotected road users, including pedestrians, bicyclists and motorcyclists, the aim was to produce an aggressivity rating that was more representative of the threat of subject model cars to all road users and not just vehicle drivers. In addition, by expanding the range of crash types and hence data on which the aggressivity rating was based the aggressivity ratings covered a wider range of vehicle models with more accuracy. The first ratings to include estimates of the new aggressivity were those of Newstead et al (2005b) including crash data up to the end of 2003.

1.3 Ratings for New Zealand Vehicles

In order to assess the viability of producing vehicle safety ratings for New Zealand (NZ), Land Transport New Zealand (formerly the New Zealand Land Transport Safety Authority - LTSA) undertook a feasibility study that examined all aspects necessary to produce the ratings relevant to New Zealand motorists and ideally including New Zealand crash data in the analysis. Two

preliminary study stages were carried out to assess the suitability of the New Zealand crash and registration data for producing vehicle safety ratings. The studies also examined the make and model composition of the New Zealand passenger and light commercial vehicle fleet (Voyce, 2000; Robinson, 2000a, 2000b). MUARC completed a review of the LTSA feasibility study (Newstead, 2000b) that made recommendations on the future directions of the project to produce crashworthiness ratings for New Zealand vehicles based on analysis of real crash data.

One of the key recommendations from the feasibility study was that a pilot study should be undertaken of the processes required to produce crashworthiness ratings for NZ passenger vehicles based on combined Australian and NZ crash data. The recommendation was based on the fact that it is not mandatory in New Zealand to report non-injury crashes, so only injury crash data was available in sufficient detail to reliably identify the make and model of the vehicles involved. This meant it would not be feasible to obtain an estimate of injury risk from the New Zealand data comparable with that obtained from Australian crash data. Furthermore, the breakdown of the ratings by vehicle make and model in a country as small as New Zealand would be of limited value for consumer information on safety. Based on the finding that the New Zealand and Australian vehicle fleets had a high proportion of common vehicle models although the fleet composition was different (Robinson, 2000b), the MUARC review recommended that the best way to produce accurate vehicle safety ratings for New Zealand consumer use covering a wide range of vehicle models would be to base the ratings on combined Australian and New Zealand data.

Subsequent to MUARC's review of its initial work, the LTSA engaged MUARC to undertake a 5-stage feasibility study into actually producing vehicle safety ratings based on combined Australian and New Zealand data. The first four stages of the pilot study further verified the suitability of the New Zealand crash and registration data for its practical application in producing the ratings. They also established methods for initial and ongoing identification and grouping of vehicle models in the New Zealand data in a way consistent with the model definitions defined for the Australian analysis. Outcomes of the first four pilot study stages are reported in detail in Newstead (2002).

The fifth and final stage of the pilot study was successful in developing and implementing analysis methodology to compute the initial set of crashworthiness ratings for New Zealand passenger vehicles based on combined Australian and New Zealand real crash data. The outcome of the final stage, reported in Newstead et al (2003b), produce a set of ratings for New Zealand passenger vehicles suitable for publication as consumer information. Preparation of the crash and registration data for the final stage, along with model identification and clustering, utilised the techniques developed in Stages 1 to 4 of the pilot study. Addition of the New Zealand crash data to the existing Australian data enabled a greater number of vehicles to be rated for safety as well as improving the accuracy of the ratings of the vehicles previously rated using only Australian data. Stage 5 of the pilot study was also able to demonstrate the consistency of ratings estimated from combined Australian and New Zealand data with those estimated from Australian data only through rigorous checking and comparison of ratings estimated with and without New Zealand data.

The final conclusion from stage 5 of the pilot study was that New Zealand crash and registration data was entirely suitable for estimating vehicle safety ratings when combined with Australian crash data sources. The high degree of similarity between the Australian and New Zealand vehicle fleet meant that the resulting ratings provide highly relevant consumer information on relative vehicle safety for a wide range of vehicles in both Australia and New Zealand. The only

slight drawback for New Zealand vehicle consumers in estimating ratings from combined data is that a small number of popular vehicle models in New Zealand not sold in Australia cannot be rated. Data from New Zealand was successfully included in the crashworthiness ratings updates produced in 2004 (Newstead et al 2004b) and 2005 (Newstead et al 2005b) the results of which were published in a brochure for consumer information in both Australia and New Zealand.

1.4 Trends in Vehicle Safety by Year of Manufacture and Market Group

Another focus of the vehicle crashworthiness ratings study has been to track historical improvements in the average crashworthiness of the Australian vehicle fleet since 1964. In 1994, the Royal Automobile Club of Victoria (RACV) commissioned a study to investigate the effects of the year of manufacture of vehicles (vehicle year) on their road safety (Cameron et al 1994c). This project focused on investigating the relationship between crashworthiness and vehicle year of manufacture for the years 1964 to 1992. The aim of the original study of Cameron et al (1994c) was, to the extent possible, to measure the crashworthiness of vehicles of different years of manufacture. The method employed was designed to eliminate the influence of other key factors affecting the risk of injury that might also be associated with vehicle year (e.g. driver age and sex, use on high speed roads, etc.).

The original study of Cameron et al (1994c) showed that the crashworthiness of passenger vehicles in Australia has improved over the years of manufacture 1964 to 1992 with rapid improvement over the years from about 1970 to 1979. Drivers of vehicles manufactured during 1970 to 1979 could be expected to have benefited from the implementation of a number of Australian Design Rules (ADRs) for motor vehicle safety which previous research has shown to be effective in providing occupant protection. The study has been updated with each vehicle crashworthiness ratings update. The most recent analysis included vehicles with years of manufacture from 1964 to 2003 (Newstead et al 2005b).

Extending the basic analysis, Newstead and Cameron (2001) examined trends in vehicle crashworthiness by year of manufacture from 1982 to 1998 within specific vehicle market groups. Vehicles were grouped into 4 market categories: small cars (<1100kg), medium cars (1100-1400kg), large cars (>1400kg) and four wheel drive vehicles (Sports Utility Vehicles). Results of analysis found statistically significant differences in the trends in crashworthiness by year of manufacture between different market groups in both the injury risk and injury severity components of the crashworthiness measure. This analysis was updated for vehicles manufactured over the years 1982-2003 and grouped into 12 market classifications and is reported in Newstead et al (2004b).

Using similar methods to those used for investigating trends in crashworthiness by year of manufacture, Newstead et al (2004a) has investigated trends in aggressivity by year of vehicle manufacture for the Australian fleet as a whole as well as by 8 broad market group classifications. Although differential trends in aggressivity were found between the various market groups of vehicle analysed, for the Australian vehicle fleet as a whole there has been no significant trend to improving or worsening aggressivity over the years of manufacture studied from 1964 to 2000.

The New Zealand and Australian vehicle fleets differ significantly in their mix of vehicle makes and models as well as the standards they were manufactured to meet. This is partly a result of the program of importing used vehicles into New Zealand (mainly from Japan) which began to have

effect in 1987 when the percentage of used imports in new registrations in New Zealand rose from about 5% to about 13%. The levels of used imports rose again to about 50% over the next three years and at present about two-thirds of the newly registered light vehicles are used imports. Since most newly registered vehicles in Australia are new, estimation of combined trends for the two countries by year of manufacture would not be particularly meaningful. There is also the problem that innovations and new safety standards potentially flow more slowly into a fleet such as that in New Zealand which allows the import of large numbers of second-hand (used) vehicles from other countries.

The regulatory framework governing vehicle safety in New Zealand is also quite different to that in place in Australia. Australia has a very active vehicle manufacturing industry and requires that all vehicles must be manufactured in compliance with the Australian Design Rules (ADRs), so the quality is controlled at manufacture. By contrast New Zealand imports all its light vehicles and their quality is controlled at import. The various Land Transport Rules require that vehicles must have been manufactured in accordance with approved standards but they also provide a choice of equivalent standards, not just the ADRs, because the vehicles are sourced from other markets. Although both countries mandate the same standards, the timing of their implementation is quite different, which would be expected to lead to differences in crashworthiness by year of vehicle manufacture. For example, compliance with a frontal impact standard for occupant protection was implemented for cars manufactured after 1996 in Australia. A similar rule was only mandated for cars entering New Zealand after April 2002.

Newstead and Watson (2005a) examined trends in crashworthiness by year of manufacture and year of first registration for the New Zealand light vehicle fleet. Reflecting differences in the mix of specific vehicle models in the New Zealand light vehicle fleet, crashworthiness trends by year of vehicle manufacture in New Zealand were shown to be substantially different to those observed in Australia. Whilst the largest gains in crashworthiness in Australia were measured during the 1970s years of manufacture, the bulk of the gains in crashworthiness of the New Zealand vehicle fleet have occurred since the mid 1980s. The difference in observed trends is likely due to different patterns in the implementation of regulation governing vehicle safety performance between the two countries.

Analysis of trends by year of vehicle manufacture showed statistically significant improvement in the crashworthiness of New Zealand light passenger vehicles over the years of manufacture studied. Most of the measured improvement occurred over the years of manufacture from 1983 to 2002. Over this period, the risk of death or serious injury to drivers in a crash reduced by around 55% for the fleet as a whole. This period corresponded largely with the period over which significant increases in vehicle safety regulation took place in New Zealand. Both levels of absolute crashworthiness and trends on a year of manufacture basis were similar for used imports and for vehicles sold new in New Zealand.

Estimates of crashworthiness trends in the used import subset of the vehicle fleet by year of first registration in New Zealand from 1986 to 1998 showed statistically significant improvements in crashworthiness with time, over the years of first registration analysed. Absolute levels of crashworthiness and improvements by year of first registration paralleled those seen in the analysis by year of manufacture but occurred some 6 years later, a lag equivalent to the average age of the used imported vehicles over the study period.

As was the case with the original study of crashworthiness by year of vehicle manufacture in Australia, this study set the basis for ongoing monitoring of crashworthiness trends by year of

manufacture and first registration in the New Zealand vehicle fleet. Addition of further crash data from years after 2002 was recommended in the study to obtain estimates for years of manufacture and registration beyond 2002 and also to improve the statistical confidence on the estimates for the years previously covered. Updates also held the promise of providing a mechanism to evaluate the effect of vehicle safety rules and other interventions by the New Zealand Government.

1.5 Project Aims

The aim of this project was to update the previously published crashworthiness and aggressivity ratings of Newstead et al (2005b) including additional crash data from the year 2004 for Victoria, NSW, Queensland, Western Australia and New Zealand. The updated ratings aimed to cover the drivers of light passenger vehicles including cars, station wagons, four wheel drive vehicles, passenger vans, and light commercial vehicles manufactured during 1982-2004 and crashing in Victoria or NSW during 1987-2004 or Queensland, Western Australia and New Zealand during 1991-2004.

This project also aimed to update the estimates of crashworthiness by vehicle year of manufacture for the Australian vehicle fleet to include vehicles manufactured over the years 1964 to 2004. For vehicle models from 1982 to 2004 that could be classified into a market grouping, the project also aimed to further investigate trends in crashworthiness of the Australian vehicle fleet by year of vehicle manufacture within each specific market group.

The study also aimed to further asses the relationships between vehicle crashworthiness and both the year of manufacture for all vehicles and the year of first registration for used vehicle imports in New Zealand. The study focused on light passenger vehicles manufactured from 1964 to 2004 and crashing in New Zealand during 1991 to 2004.

2. CRASH DATA

Data from Victoria, NSW, Queensland, Western Australia and New Zealand used to produce the crashworthiness ratings of Newstead et al (2005b) covering vehicles manufactured over the period 1982-2003 and crashing during the years 1987-2003 was again used here. In addition, data for 2004 from each of the four Australian states and New Zealand was obtained and integrated bringing the total period of crash data covered to 1987-2004. Subsets of these data were taken in order to estimate the aggressivity measures. Similarly, data from Victoria, NSW, Queensland and Western Australia used to produce the crashworthiness by year of manufacture estimates of Newstead et al (2005b) covering vehicles manufactured over the period 1964-2003 and crashing during the years 1987-2003 was again used here. As for the crashworthiness ratings, data from 2004 from the four Australian states were also integrated for this analysis. The methods of selecting appropriate cases from each data source will be detailed here.

2.1 Victorian Crashes

The Transport Accident Commission (TAC) and its predecessor, the Motor Accidents Board, as part of their responsibilities to provide road transport injury compensation, have collected detailed injury data. For each claimant, a description of the injuries was recorded, as well as whether the person was admitted to hospital. TAC obtained some details of the occupied vehicle (but not its model) from the VicRoads registration system. When the TAC was established in 1987, it introduced a requirement that the crashes resulting in an injury claim should be reported to the Police, and started adding Police accident numbers (if and when available) to the claims records.

TAC injury claims from all types of road users who were involved in crashes in the period 1987 to 1998 had been merged with Police crash reports for the previous crashworthiness ratings. The Police reports were for all persons involved in crashes regardless of the Police officer recording the person as injured or uninjured. This procedure was followed because it was possible for an injury claim to be made in circumstances where injury was not apparent at the time of the crash. Crashes are reported to the Police in Victoria if a person is killed or injured, if property is damaged but names and addresses are not exchanged, or if a possible breach of the Road Traffic Regulations has occurred (Green 1990).

The levels of matching of TAC claims with persons recorded on Police reports for each year during 1987-2000, achieved by Newstead et al (2003a) are shown in Table 1. The methods of matching for the data are detailed in Cameron et al (1994b). Table 1 showed that the rate of matching between the TAC claims data and police reported crash data for 1999 and 2000 was less than for most of the previous years. Closer investigation of the reasons for the poor match rate for these two years showed it was due to inconsistencies in the accident numbers attached to crashes in each file. Accident number is a key field used in matching the two data sources and is intended to be consistent for the same crash documented in each data system. In both 1999 and 2000, 30% and 35% respectively of the accident numbers in the TAC claims data were outside the range of accident numbers found in the police report data. Discussion with the TAC revealed that if a crash report is not available at the time of the claim, a TAC generated accident number is assigned to the crash. In the past, police accident numbers were assigned to the claims database retrospectively once they became available. However this practice was reported to have

ceased during 1999 leading to the large number of TAC generated accident numbers remaining in the claims data supplied.

Due to the poor match rate between the 1999 and 2000 police data and TAC claims, Newstead et al (2003a) decided to use the 1999 and 2000 police crash data unmatched with TAC claims, although matched data prior to 1999 was still used. This decision was further necessitated because of problems in the 1999 and 2000 New South Wales crash data concerning injury severity coding that are described below. Victorian police reported crash data had been matched with the TAC claims data for use in the crashworthiness ratings project in the past in an attempt to improve the accuracy of the injury severity recorded by the police. The decision not to use matched data for 1999 and 2000 in Newstead et al (2003a) was not thought to compromise the study greatly, bearing in mind that only the injury severity level coded by police is considered in the data from any of the other jurisdictions contributing data to the study. Any inconsistencies in injury severity coding introduced by changing from matched to unmatched data were controlled for in the analysis methodology through compensating for year of crash differences.

As with the previous update presented in Newstead et al (2005b) and based on the experience and arguments presented in Newstead et al (2003a), matching of the 2004 Police reported crash data with TAC claims information has not been carried out in this update of the vehicle safety ratings. The unmatched Victorian crash data for 2004 represented 11,711 injured drivers of 1982-2004 model vehicles involved in a crash in Victoria. These records were combined with the merged files of TAC claims with Police reports for 1987-1998 and police reported data only from 1999-2003, which represented 90,848 injured drivers of 1982-2003 model vehicles crashing during 1987-2003. The resulting file covered 102,559 injured drivers of 1982-2004 model cars. The information on these drivers was combined with data on drivers injured in the other four jurisdictions (see Section 2.6) to produce the updated crashworthiness ratings.

Table 1: *TAC claims for injury compensation from crashes during 1987-2000*

Year	TAC claims (all types of injured road users)	TAC claims matched with Police reports	Match rate (%)
1987	30,892	17,509	56.7
1988	28,427	16,672	58.6
1989	25,399	17,494	66.3
1990	19,633	13,886	70.7
1991	19,538	12,774	65.4
1992	19,251	13,118	68.1
1993	18,590	12,618	67.8
1994	19,341	11,927	61.6
1995	20,189	12,452	61.7
1996	19,954	14,034	70.3
1997	18,754	13,036	69.5
1998	18,561	12,395	66.8
1999	18,936	11,206	59.2
2000	18,881	10,525	55.7
Total	296,346	189,646	

For the study of crashworthiness by year of vehicle manufacture the merged TAC claims for injury during 1987-98 and police crash records during 1999-2004 covered 147,762 injured drivers of cars, station wagons or taxis manufactured over the years 1964-2004. Again, the information on these drivers was combined with data on drivers injured in NSW, Queensland and Western Australia for analysis (see Section 2.6).

Calculation of aggressivity ratings required selecting vehicles involved in two car crashes followed by matching of the vehicle and occupant injury details for the two cars involved in the crash. For those vehicles manufactured over the period 1982 to 2004 injury details for the driver of the other vehicle in the crash were matched by returning to the full Victorian Police reported crash data files for 1987-2004. The data matching process identified 57,936 vehicles manufactured between 1982 and 2004 that had been involved in a crash with one other vehicle where the other vehicle had no restriction on its year of manufacture. Of the drivers of these other vehicles, 32,246 were injured and 25,690 were uninjured. It was not possible to use the uninjured records from the Victorian data, as they are incomplete due to the fact that only crashes involving injury are reliably reported in Victoria. Hence only the 32,246 records of other driver injury were used for calculation of the injury severity component of the vehicle aggressivity ratings. Of the 32,246 injured drivers, 7,020 were severely injured.

Collisions between a single vehicle and an unprotected road user where the vehicles were restricted to those manufactured between 1982 and 2004 were also identified for calculation of the aggressivity ratings using a variable identifying accident type from records for the years 1987 to 2004. Vehicles were matched with the unprotected road user casualty records to obtain the unprotected road user injury level. For the period 1987 to 2004, 11,585 unprotected road users were matched with vehicle records with an identified make and model and manufactured between 1982 and 2004. Of these 11,585 unprotected road users, 6,926 were injured, 4,659 seriously.

2.2 New South Wales Crashes

The Roads and Traffic Authority (RTA) in New South Wales supplied files covering 1,047,272 light passenger vehicles manufactured from 1982 to 2004 involved in Police reported crashes during 1987-2004 that resulted in death or injury or a vehicle being towed away. Model and year of manufacture have been added to each vehicle after matching with the NSW vehicle register via registration number and vehicle make. This was achieved using a procedure developed by the NRMA. The total crash files covered four wheel drive vehicles, passenger vans, and light commercial vehicles as well as cars and station wagons of all years of manufacture crashing in 1987 to 2004. The method of assembly of this data is given in Cameron et al (1994b).

NSW crash data files from 1987 to 1998 had injury severity of people involved in crashes coded using a four level scale. Levels used were: fatality, hospital admission, other injury and not injured. From 1998 onwards, the RTA identified inaccuracies by the Police in reporting injury severity that could not be rectified. In response, the RTA changed the injury severity coding in the NSW crash data to give only three levels: fatality; injury; and not injured. For the purpose of computing crashworthiness ratings, this meant the NSW data for 1999-2004 could not be used to estimate the injury severity measure in the same manner as previous rating updates.

Preparation of the NSW data for final analysis involved merging the files with vehicle information, including driver age and gender, with files supplied by NSW RTA covering details of the person casualties (killed and injured persons) and the reported crashes for the same years. Each vehicle/driver matched uniquely with the corresponding crash information, but only injured drivers could match with persons in the casualty files. A driver who did not match was considered to be uninjured. Of the 1,047,272 drivers involved in tow-away crashes, 172,935 were injured. Of the injured drivers, 72,678 were injured in crashes from 1987 to 1998 and had a valid injury severity level coded (serious or other injury).

Of the 1,047,272 1982-2004 model year vehicles involved in crashes in NSW, 611,753 were coded as being involved in crashes with one other traffic unit (i.e. the crash involved a total of two traffic units). In order to compare occupant injury levels in crashes involving two vehicles, it was necessary to match the crash and occupant injury information for each of the two vehicles involved in the crash.

The data used for calculation of the crashworthiness ratings covered only vehicles manufactured from 1982 to 2004. Consequently, initial matching of only the crashworthiness data to determine pairs of vehicles involved in a crash identified both the vehicles in the crash when both vehicles were manufactured from 1982 to 2004. A second matching stage was then required to identify the details of drivers of vehicles manufactured before 1982 that had collided with the unmatched 1982-2004 model year vehicles in the crashworthiness file. This required retrieval of the remaining crash records in the 1987-2004 NSW crash files not used for crashworthiness ratings in order to match vehicles manufactured prior to 1982. The two-stage data matching process identified 304,510 matched records of vehicles manufactured between 1982 and 2004 that had been involved in a crash with one other vehicle where the other vehicle had no restriction on its year of manufacture. Of the drivers of these other vehicles, 41,968 were injured. Of the injured drivers, 19,922 were injured in crashes from 1987 to 1998 and had a valid injury severity level coded (serious or other injury).

Calculation of the aggressivity rating also required the identification of crashes between a single light vehicle and an unprotected road user where the vehicles were restricted to those manufactured between 1982 and 2004. The required crashes were identified using a variable identifying accident type. Casualty records for the crash years 1987 to 2004 were used to identify unprotected road users injured in a collision with one vehicle. The vehicles were then matched with the unprotected road user casualty records to obtain the pedestrian, bicyclist or motorcyclist injury level. For the period 1987 to 2004, 43,879 unprotected road users were matched with vehicle records. Of these 43,879 unprotected road users, 26,869 were injured in crashes from 1987 to 1998 and had a valid injury severity level coded. Of these, 8,486 were seriously injured.

For the study of crashworthiness by vehicle year of manufacture, the NSW data represented 1,309,184 drivers of cars, station wagons or taxis manufactured from 1964 to 2004 who were involved in tow-away crashes. Of these drivers, 213,230 were injured, 119,503 of these during 1987-1998 and with a valid injury severity code.

The presence of uninjured drivers in the merged data file meant that it was suitable for measuring the risk of driver injury (in cars sufficiently damaged to require towing). This contrasted with the Victorian and New Zealand data files, which could not be used to measure injury risk directly because not all uninjured drivers were included.

2.3 Queensland Crashes

Queensland Transport supplied files covering 306,485 light passenger vehicles involved in Police reported crashes during 1991-2004 that resulted in death or injury or a vehicle being towed away. The files supplied covered years of vehicle manufacture from 1982-2004 including models of four wheel drive vehicles, passenger vans, and light commercial vehicles as well as cars and station wagons for which a model could be identified.

The vehicle files, which also contained links to separate files with driver age and sex, were merged with files supplied by Queensland Transport covering details of the person casualties (killed and injured persons) and the reported crashes for the same years. Each vehicle/driver matched uniquely with the corresponding crash information, but only injured drivers could match with persons in the casualty files. As for NSW, a driver who did not match was considered to be uninjured. Out of the 306,485 drivers involved in tow-away crashes, 77,496 were injured.

Of the 306,485 vehicles reported as crashed in Queensland and used in estimation of crashworthiness ratings, 205,450 were coded as being involved in crashes with one other traffic unit (i.e. the crash involved a total of two traffic units). In order to compare occupant injury levels between two vehicles involved in a crash, it was necessary to match the crash and occupant injury information for each of the two vehicles involved in the crash in the same manner as for NSW. Using the same two stage data matching process as used for NSW and described above, the process identified 107,401 vehicles manufactured between 1982 and 2004 that had been involved in a crash with one other vehicle where the other vehicle had no restriction on its year of manufacture. Of the drivers of these other vehicles, 27,969 were injured, 6,123 seriously. These records were used for calculation of vehicle aggressivity ratings toward drivers of other vehicles.

Records on unprotected road users involved in a crash with one light vehicle unit were retrieved and identified using variables classifying unit type and number of units in the crash. Single vehicle collisions were identified using a variable identifying unit type and number of vehicles in the crash. These vehicles were then matched with the unprotected road user casualty records to obtain the injury level. A total of 16,687 unprotected road users were matched with records on 1982-2004 year passenger vehicles with model details identified. Of these 16,687 unprotected road users, 16,284 were injured, 6,781 seriously.

For the study of crashworthiness by vehicle year of manufacture, the Queensland data represented 287,089 drivers of cars, station wagons or taxis manufactured from 1964 to 2004 who were involved in tow-away crashes. Of these drivers, 74,010 were injured. The number of vehicles crashing in Queensland and available for the year of manufacture analysis was less than expected. This is because a large proportion of the vehicles in the Queensland data from 1997 and 1998 had year of manufacture missing due to difficulties in accessing the vehicle register to determine vehicle details at the time of assembling the data from these two years. Some of the vehicles with missing year of manufacture could, however, be assigned an accurate model code though the VIN decoding process described below despite the missing field.

As with the data from NSW, the presence of uninjured drivers in the data file meant that it was also suitable for measuring the risk of driver injury (in cars sufficiently damaged to require towing).

2.4 Western Australia Crashes

The Western Australian Department of Main Roads maintains a database of all crashes in Western Australia reported to the police. Crashes in Western Australia must be reported to police if anyone involved is killed or injured or the crash results in property damage greater than $1,000 (Road Safety Council of Western Australia, 2001). This means that, like NSW and Queensland, both injury and non-injury crashes are reported making the data suitable for inclusion in estimating both the injury risk and injury severity components of the vehicle safety ratings. Although the WA crash data is held as a relational database, WA Department of Main Roads supplied the data in a single flat file with a record for each person involved in a reported crash. Data covered the period 1991 to 2004. The data was re-issued in 2005 for the period 1991 to 2003 due to a change in database structure and variable definitions in 1995 that may have caused some inconsistency in the data over the entire time period.

The files supplied covered 752,699 light passenger vehicles manufactured between 1982 and 2004 involved in Police reported crashes during 1991-2004 that resulted in death or injury or a vehicle being towed away. The files supplied covered models of four wheel drive vehicles, passenger vans, and light commercial vehicles as well as cars and station wagons. Out of the 752,699 drivers involved in tow-away crashes, 69,203 were injured.

Of the 752,699 vehicles reported as crashed in WA and used in estimation of crashworthiness ratings, 569,918 were involved in crashes with one other traffic unit. Of the drivers of the matched vehicles, 69,203 were injured. These records were used for calculation of vehicle aggressivity ratings toward drivers of other vehicles.

Records on unprotected road users involved in a crash with one vehicle unit for the period 1991 to 2004 were retrieved and identified using variables classifying unit type and number of units in the crash. 16,343 unprotected road users in the Western Australia crash records were identified as colliding with a 1982-2004 year of manufacture passenger vehicle with model details identified. Of the 10,985 unprotected road users who were injured, 4,220 were severely injured.

For the study of crashworthiness by vehicle year of manufacture, the WA data represented 677,970 drivers of cars, station wagons or taxis manufactured from 1964 to 2004 who were involved in tow-away crashes. Of these drivers, 90,132 were injured.

2.5 Crash and Registration Data from New Zealand

Two sources of data from New Zealand were used in the calculation of vehicle crashworthiness and aggressivity ratings. The first data source provided was a crash file showing the registration, vehicle, driver and various crash characteristics for all police reported crashes in New Zealand for the years 1991 to 2004. The second data source was registration data giving details of all crash involved vehicles on the NZ register in each year from 1991 to 2004. Extracts from both data sources supplied for estimation of vehicle safety ratings are described below.

2.5.1 Crash Data

NZ has an established database of reported injury crashes covering crashes over many years. Amongst many other things, this data is used to produce the annual publication summarising injury crashes in NZ (LTSA, 1998, for example). The crash data are stored in the Crash Analysis System (CAS) database managed by the Land Transport New Zealand (formerly the Land

Transport Safety Authority, LTSA) and covers both injury and non-injury crashes. Whilst non-injury crashes are available from CAS, the reporting coverage of non-injury crashes in NZ is not as clear. The problem is that it is not mandatory for a non-injury crash to be reported to the Police so the number, nature and degree of vehicle damage, if any, are not known. Because of this, and because of problems with vehicle model identification documented by Voyce (2000), only injury crash data from New Zealand were useful for estimating vehicle safety ratings.

To facilitate the use of NZ crash data in computing vehicle crashworthiness ratings, it was necessary to include a number of key variables in the crash data supplied. Because the NZ data was integrated with the Australian data for analysis, it was important to match the data fields and levels within the data fields from the NZ data as closely as possible to those in the Australian data used to compute crashworthiness ratings. Extensive assessment of the content and compatibility of the New Zealand crash data in relation to that available from Australia is given in Newstead (2003b). That study found the New Zealand injury crash data to be suitable for estimation of vehicle safety ratings in combination with the Australian data. The minimum key variables required in the New Zealand data to ensure compatibility with the Australian data, along with their coding levels were as follows.

- Year of crash (1991, 1992,…, 2004)
- Speed limit at crash location (<80km/h, >=80km/h)
- Number of vehicles involved (1, more than 1)
- Level of urbanisation of crash location (urban, rural)
- Driver age (<=25 years, 26-59 years, >=60 years)
- Driver gender (male, female)
- Injury level of driver (killed, hospitalised, other injury, not injured)

Data in CAS are stored as a relational database, comprising a series of linked tables with each covering a different theme related to a crash. Land Transport NZ supplied details of the data fields available in the CAS system through a data dictionary of the database. Data from three tables, crash, person and vehicle, covered all the required data filed listed above. Linking data in the tables together was achieved using the crash identification number (crash_id), traffic unit identifier (ltsa_role) and person identifier (pers_id) fields.

Complete extracts of each data table for the years 1991 to 2004, without personal identifier information, were supplied for analysis. From these, it was possible to select the required data for analysis from the supplied tables. In total, 143,855 crashes involving 253,426 units were recorded in the crash file during this period. It is noted that each unit in the file did not necessarily represent a vehicle that could be rated. A unit also included a motorcycle, bicyclist, pedestrian or heavy vehicle.

2.5.2 Registration Data

Information from the vehicle register on vehicle make, model and year of manufacture were vital to enhance the crash data for estimation of vehicle crashworthiness ratings. The New Zealand Transport Registry Centre (TRC) held the required data. Data was requested covering all vehicles appearing in the 1991-2004 New Zealand crash data with current or archived historical registration records. Registration records for vehicles appearing in the crash data were selected based on registration plate number.

Variables required from the registration database were selected based on information from the Pre-registration Procedures Manual supplied by TRC with reference to information required for accurate vehicle model decoding. Variables requested were as follows with reference to the Pre-Registration Procedures Manual section where available.

- Vehicle registration number (plate number)
- Vehicle Identification Number (VIN) (4-A-1)
- Vehicle Type (4-A-3)
- Registration Indicator (4-A-5)
- Date of Registration
- Date of First NZ Registration (4-A-6)
- Country of Previous Registration (4-A-7)
- Make (4-A-8)
- Model (4-A-8)
- Sub-model Name (4-A-8)
- Industry Model Code (4-A-8)
- Year of manufacture (4-A-8)
- Body Type (4-A-9)
- Country of Origin (4-A-10)
- Assembly Type (4-A-10)
- CC Rating (4-A-10)

Of the variables requested, a number were vital for identifying and clustering model details for vehicles appearing in the New Zealand crash data. These were vehicle type, VIN, year of manufacture, registration number, the date of registration, the date of first New Zealand registration and whether the vehicle was sold new in New Zealand, was a used import or re-registered.

One difficulty in retrieving vehicle registration information details for crashed vehicles based on only the registration plate number arose for registration plates that had been used on more than one vehicle model over time. It was not possible for the TRC to find the registration record that was current for a plate number just before the time the vehicle crashed. Instead, all records for the plate number of a crashed vehicle, both current and historical, were retrieved from the registration system and archive. Where multiple records for a single plate number were provided, the most appropriate match based on the date of the crash, the date of registration and the date of first registration of the vehicle in New Zealand needed to be established. The process for doing so is described below. In some cases a registration record could not be found for a crashed vehicle. This was most likely because either the registration plate details had been recorded incorrectly in the crash data or the vehicle was not registered.

For the 253,426 units involved in crashes in the data supplied for 1991 to 2004, 219,396 registration records were extracted by the TRC from the New Zealand vehicle register. The total number of registration records is less than the number of units because registration records for some vehicles could not be identified. In addition, some units were not required to be registered including pedestrians and bicycles.

2.5.3 Merging the Crash and Registration Data

In order to merge the Australian and New Zealand data for use in the analysis, the New Zealand registration and crash files had to be matched to provide full vehicle and crash information for each crash involved unit. This required the vehicle details obtained from the registration files to be matched with the crash files based on the registration number. This process raises some unique difficulties. First, in some instances the same vehicle may have crashed more than once between 1991 and 2004 causing multiple records for the same vehicle to appear in the registration file. Selecting those cases where the date of registration, the date of first NZ registration, vehicle make, model and registration details were identical identified these cases. Multiple entries were then deleted from the registration file.

Second, it was possible that the same registration number may be associated with more than one vehicle over time and with multiple registrations of the same vehicle due to re-registration. If any of these vehicles were involved in a crash during the relevant period, all vehicles on the NZ register between 1991 and 2004 with the relevant registration numbers appeared as unique entries in the registration data file. In cases of multiple entries with the same registration number, it was necessary to identify which of the vehicles on the registration file best matched the vehicle involved in the crash as shown in the crash file. Registration details were matched to crashes by selecting the most recently registered vehicle prior to the accident date using both the date of the first New Zealand registration and the registration date of the vehicle.

Finally, in cases where the registration number was unknown or incomplete the crash and registration data could not be matched. At the completion of the matching process, 203,130 entries remained in the merged file containing the relevant variables from both the crash and registration files. This process of matching used here is an enhancement of that described in Newstead (2003b) for matching New Zealand crash and registration data.

After merging of the crash and registration data, vehicle model details were decoded using the process described below following which two final selection criteria were imposed. Only vehicles manufactured after 1981 and only entries coded as cars, station wagons, vans, utilities or taxis were relevant to the analysis. This reduced the number of entries to 167,849. Of the drivers of these vehicles 80,842 were not injured or had unknown injury status, whilst the remaining 87,007 were injured to some degree. The injury details of the 87,007 injured drivers were used for estimation of the crashworthiness injury severity measure in conjunction with the Australian data. Records on the uninjured drivers in the New Zealand injury crash data could not be used in the calculation of the injury risk component of the crashworthiness ratings. This was because non-injury crashes in New Zealand, and hence uninjured drivers involved in these crashes, were not suitable for use in the analysis and therefore records on all uninjured drivers in all crashes in New Zealand were incomplete.

A subset of the New Zealand data described above and used for estimation of crashworthiness injury severity formed the basis of the data used in the calculation of the aggressivity ratings. For calculation of aggressivity ratings, vehicles involved in two vehicle crashes were identified. Within the New Zealand data this included 50,186 vehicles. Of the drivers of vehicles colliding with the 50,186 vehicles identified, 27,964 were injured whilst 22,222 were uninjured. Information on the injury level of the 27,964 injured drivers, 4,629 of whom were seriously injured, was used in conjunction with the Australian data to estimate the injury severity component of the aggressivity ratings.

Records on unprotected road users involved in a crash with one light vehicle unit for the period 1991 to 2004 were retrieved and identified using variables classifying unit type and number of units in the crash. 18,444 unprotected road users were identified as impacting with a 1982-2004 year of manufacture passenger vehicle with model details identified. Of the 18,272 unprotected road users who were injured, 5,306 were severely injured.

Because only injury crashes are reported in New Zealand a new injury risk estimator was used for the study of crashworthiness by vehicle year of manufacture and by year of first New Zealand registration for used imports. This injury risk estimator is referred to in Section 1.4 and explained in detail in Section 4.1. The nature of the new injury risk estimator means it only analyses two-car crashes in which the partner vehicle's driver has been injured, a subset of the total available data. Hence injury risk was estimated from the data on 76,520 drivers involved in a two-vehicle collision during 1991 to 2004 where the other driver was injured. This data set is referred to as the "involved drivers". The data on "injured drivers" covered 91,523 drivers who were injured in crashes in New Zealand during 1991-2004.

2.6 Combined Data from the Five Jurisdictions

When the data on the injured drivers was combined for analysis, it covered 543,541 drivers of 1982-2004 model vehicles who were injured in crashes in Victoria or NSW during 1987-2004 or in Western Australia, Queensland or New Zealand during 1991-2004. Of these 443,284 had a valid injury severity code, with 100,257 drivers injured in crashes in NSW during 1999-2004 excluded because of missing injury severity. Information on the 443,284 injured drivers was used to assess the injury severity of the injured drivers of the different makes and models when computing crashworthiness ratings. The information on the 2,106,456 drivers involved in tow-away crashes in NSW during 1987-2004 or Western Australia and Queensland during 1991-2004 was used to assess the injury rate of drivers of the different makes and models for computing crashworthiness ratings.

The combined data on drivers injured in crashes between two light vehicles used for estimation of vehicle aggressivity ratings covered 184,887 drivers of vehicles colliding with 1982-2004 model vehicles. These drivers were injured in two car crashes in Victoria during 1987-2004 or NSW during 1987-1998 or in Western Australia, Queensland and New Zealand during 1991-2004. Excluding the 22,406 injured drivers from NSW during 1999-2004 without a valid injury severity code left 162,481 cases for analysis. This information was used to assess the injury severity of the injured drivers colliding with the different makes and models when computing aggressivity ratings. The aggressivity injury risk component was estimated from data including information on the 878,732 drivers involved in two-car tow-away crashes in NSW during 1987-2004 or Western Australia and Queensland during 1991-2004.

The combined data on unprotected road users used for estimation of aggressivity covered 83,995 injured unprotected road users, of whom 29,452 were seriously injured. These unprotected road users were involved in a collision with a 1982-2004 model vehicle in Victoria or NSW during 1987-2004, or in Western Australia or Queensland or New Zealand during 1991-2004.

For the study of crashworthiness by year of vehicle manufacture, the combined data covered 431,407 drivers of vehicles manufactured between 1964 and 2004 who were injured in crashes, 99,500 severely, in Victoria during 1987-2004, NSW during 1987-1998 and Western Australia and Queensland during 1991-2004. For the assessment of injury risk by year of vehicle

manufacture, the combined data covered 2,274,243 drivers involved in tow-away crashes in NSW during 1987-2004 or Western Australia and Queensland during 1991-2004.

3. MODELS AND MARKET GROUPS OF VEHICLES

3.1 Vehicle Model Identification

3.1.1 Australian Vehicles

A procedure initially developed by the NRMA based on decoding Vehicle Identification Numbers (VIN) or chassis numbers was extended and used as the primary means to determine the models of light passenger vehicles. The decoding identified some light truck and unusual commercial models that were not considered further. Of the vehicles manufactured during 1982-2003 and crashing in NSW, all but around 4% had their model identified. Further details of the VIN decoding process are given by Pappas (1993). The same VIN decoding procedure was used to identify vehicle models in the Queensland data, achieving a similar level of decoding accuracy to NSW.

The Victorian vehicle register provided the make and year of manufacture of the crashed vehicle but not the model. Models were initially derived for cars manufactured during 1982-88 using logic developed and supplied by the Royal Automobile Club of Victoria (RACV) based on the make, year and power-mass units. Power-mass units (PMU) are the sum of RAC horsepower units (PU) ("RAC" horsepower units essentially reflect engine capacity rather than real power output) and the vehicle mass in units of 50kg (MU). Refined logic was developed by MUARC based on make, year, PMU, PU, MU and body type, and extended to cover 1989-93 models. The MUARC logic was applied to the combined Victorian data in conjunction with the RACV logic to derive passenger car models for the model years 1982-93 for crash data up to 1993.

For vehicles crashing in the years 1994 to 2004 the Victorian vehicle register provided the VIN of each crashed vehicle where it was available along with the information described above. VINs are recorded on the Victorian vehicle register for most vehicles from 1989 year of manufacture onwards. Where a VIN was available for a vehicle appearing in the 1994 to 2004 crash data, the model information was decoded from the VIN using the methods of Pappas (1993). For limited quantities of the 1994-1998 data, where the VIN was not available, the RACV and MUARC logic, described above, was used to obtain model details.

Unsuccessful attempts were made to obtain VINs from the Western Australian vehicle register, managed by the WA Department of Transport, for vehicles appearing in the Western Australian crash data. This meant the VIN decoding system used on data from the other three states to identify vehicle model details could not be used for WA. Detailed vehicle make and model information along with year of manufacture have been merged onto the WA crash data by Main Roads WA as part of a regular interrogation of the WA vehicle register. The make and model codes proved to be of sufficient detail to be used, along with the year of manufacture, to assign vehicle model groupings to vehicles crashed in WA consistent with the vehicle model groupings that are derived from the VIN decoding system. Only a small number of vehicles, typically in model change-over years, could not be accurately assigned a sufficiently accurate model code for use in the study. The process of decoding vehicle model information in WA was similar to that used for new vehicles in the New Zealand data without a valid VIN available, described below.

RACV, NRMA and the Australian Transport Safety Bureau (ATSB, formerly FORS) provided advice on the particular models that had experienced substantial changes in design (and hence potential crashworthiness) during model years 1982-2003 and in which years the design was relatively constant. This resulted in certain models being split into ranges of years of manufacture. Where the new model was introduced near the beginning or end of a year (up to two months either way), this process was relatively straightforward (accepting a small mis-classification in some circumstances). However, when the model changed near the middle of the year, the model for that year was kept separate and potentially treated as a "mixed" model (e.g. the Daihatsu Charade 1987 models). Where exact model decoding was possible from the VIN, without using year of vehicle manufacture, this was used.

VicRoads previously provided advice on vehicle models that could be combined with each other (sometimes only for specific years) because they were essentially the same design or construction but registered as having different manufacturers. This information was used in the analysis to combine some models, otherwise one or both members of each such pair of models would have been excluded and a crashworthiness rating figure would not have been produced (Section 3.2). Model sharing in the automotive industry has declined in recent years alleviating this as an ongoing problem to some degree.

As in previous crashworthiness ratings, models were excluded with fewer than 20 injured drivers and/or fewer than 100 involved drivers appearing in the crash data. The same selection criteria were also used for aggressivity ratings except exclusion was based on the number of road users colliding with the focus vehicle model. These selection criteria were used to ensure stability in fitting the logistic regression models along with suitably small confidence limits on the estimated crashworthiness ratings.

3.1.2 New Zealand Vehicles

In order to integrate the New Zealand crash data with the Australian data for analysis, it was necessary to identify and classify the make and model type of each crash-involved vehicle in a way consistent with that carried out for the Australian data. A process of decoding vehicle model information in the New Zealand crash data was established and applied in Newstead (2003b). The procedure developed is described here but broadly follows the principles outlined above for the Australian data.

Identifying vehicle models and establishing appropriate clustering relied on the use of external resources giving details of vehicle model release dates and specifications. A summary of the key resources used for the New Zealand model decoding process is as follows.

- **IDENTICAR.** The principal resource on vehicle model specifications and release dates has been Identicar published by GCL in NZ. Identicar has model run dates and limited information on specifications for all new and used imported passenger vehicles and light commercial vehicles available for sale in NZ. It has either photographs or sketches of each vehicle model covered along with details on the manufacturers' chassis code that are broadly consistent with the industry model codes and chassis codes held on the NZ vehicle register. Information in the publication covers the period of vehicle manufacture from 1982 onwards which is the focus of the ratings system. It is recognised that the information presented in Identicar is not always completely accurate, particularly with respect to items of detail such as the manufacturer's chassis code and detailed specifications of the vehicle.

However, despite the noted problems, it was considered that the information presented is of sufficient detail and accuracy for the publication to be used as a primary resource for vehicle model identification and clustering in the production of NZ crashworthiness ratings.

- **POLK AUTOSPEC.** Polk AutoSpec has proved a valuable resource in identifying new vehicle releases in the Australian market for use in producing the Australian vehicle crashworthiness ratings. It has highly detailed information on vehicle release dates, original specifications and specification changes. It also has detailed photographs of each vehicle model released. For a number of years, Polk also published an AutoSpec covering the NZ new vehicle market that represented a valuable source of information on NZ new vehicle releases. In the NZ crashworthiness feasibility study, the AutoSpec publication was a valuable source of information on new vehicle releases in NZ with the photographs and specifications allowing accurate comparison of vehicle model lines with those from Australia thought to be similar. It was hoped AutoSpec could continue to be used as a primary resource for identification and clustering of new NZ vehicles in the process of producing crashworthiness ratings. Unfortunately, Polk no longer produce the AutoSpec publication for NZ, consequently, this resource was only useful for this research for the historical coverage of the publication whilst it was being produced.

- **REDBOOK.** A valuable source of on-line information on vehicle specifications and release dates is Red Book. The Red Book web site for Australia (www.redbook.com.au) covers an extremely wide range of vehicles currently existing in the Australian fleet. Detail is given on each model variant including a sketch of the vehicle for visual identification and a brief summary of specifications. Information in Red Book is useful in the safety ratings projects for determining build dates of vehicle model series, and broad specification of different model variants. It is the most valuable source of information available for vehicles manufactured pre 1990. Red Book also has a web site specific to the NZ vehicle market (www.redbook.co.nz). It includes most of the range information on the Australian Red Book site apart from the sketches of vehicle models useful for visual identification. Importantly, it covers not only vehicles sold new in NZ but also a wide range of second hand imported vehicles, particularly the most popular models. The lack of pictures or sketches of vehicle models on the NZ Red Book site was offset through the use of other NZ automotive web sites such as Auto (www.auto.co.nz) to access pictures of vehicles. On line sources such as Red Book NZ provided the next most important source of ongoing vehicle identification and clustering information after Identicar.

The New Zealand vehicle fleet is comprised fundamentally of two different types of vehicles. They are those sold new in New Zealand and used vehicles imported into New Zealand primarily from Japan. Because of differences in availability and quality of information in the registration data between new and used import vehicles, a different strategy for decoding model information for new and used import vehicles was used.

As in the Australian data, the final aim of the model decoding process is to assign a model grouping to each crashed vehicle in the New Zealand data code dependent on the make, model and year of manufacture of the vehicle. A vehicle safety rating is then calculated for each model grouping with sufficient real crash experience. A full list of the model grouping (modelh) codes and associated vehicle details is provided in Appendix 1. The process for assigning the ‘modelh’ code for both new and used import vehicles in the New Zealand crash data follows.

New Vehicle Model Decoding and Clustering

The model decoding and clustering procedure used for passenger vehicles sold new in NZ is as follows.

1) Vehicles with a valid ISO standard 17 character VIN number were identified in the merged crash and registration data. The make, year of manufacture and VIN for these vehicles was then run through the VIN decoder developed for decoding vehicle model information in the Australian crashworthiness system. VINs beginning with a 7 (the world manufacturer code character for NZ) were identified and excluded from this process as the Australian VIN decoder does not contain the necessary data to be able to identify vehicle model details for vehicles with a NZ assigned VIN. The result of the VIN decoding process, where successful, was a direct clustering of each vehicle into one of the clusters defined for the Australian crashworthiness ratings study. Vehicles that had no cluster assigned after the VIN decoding process were identified for further processing and were added back to the remaining un-decoded data.

2) Vehicles without an ISO standard VIN, those with ISO standard VINs issued in NZ (beginning with a 7) and those that failed the VIN decoding process were identified for the next processing phase. A total of 93,493 crashed vehicles that were sold new in New Zealand had vehicle model details identified in this way.

    a) Basic vehicle make and model details were identified from the vehicle make and model codes held on the vehicle register. These are equivalent to the make and model information contained in the NZ assigned ISO VIN where applicable and has been found to be consistent with that in the crash data in comparisons made in Newstead (2002).

    b) Using "Identicar" and Polk "AutoSpec" to identify vehicle specifications and major model series changes, a process of clustering was developed. Definition of clusters used the vehicle make and model codes along with the vehicle year of manufacture. A translation table was developed that converted the vehicle make, model and year of manufacture combinations present in the crash data to the Australian equivalent model clusters. Development of the translation table was essentially carried out manually through necessity. One of the key difficulties encountered that necessitated manual development of the translation table was the numerous variations of the vehicle model codes in the registration data for the same vehicle. For example "Applause L" and "Applause X" for two different trim variants of the same Daihatsu vehicle (ideally the suffixes X and L should have been in the sub-model code field with only Applause in the model code). The model cluster translation table was updated for this study from the version used in Newstead et al (2004b) to reflect new model releases as well as new make and model code combinations appearing in the registration information of the crashed vehicles.

    c) In some cases, a broader range of body types and specifications of some NZ vehicle models was available than in Australia. Some of the different body types and specifications were likely to have differences significant enough to alter the crashworthiness of the vehicle. Identification of variants within a model range with body types and specification dissimilar enough to have likely different crashworthiness to the equivalent Australian model was made using the body type, industry model code and chassis number data fields. Vehicle model variants identified with incompatible

specifications or body types were excluded from the defined comparable Australian data clusters.

Used Imported Vehicle Model Decoding and Clustering

Identification of vehicle make and model details and appropriate clusters for the used imported NZ vehicles, was carried out using an identical process to that in section 2 of the process used for new vehicles above. This process was also used for vehicles identified in the registration records as re-registered or unknown. New car process (1) was not available for the used imports as almost none of these vehicles had a valid ISO VIN assigned in any country apart from NZ. The available source of information on vehicle model specifications were the "Identicar" publication that has a whole section devoted to the used Japanese imported vehicles, including great detail on the associated industry model codes for each vehicle, and the on-line sources “Redbook” and “Auto”. Use of the industry model code and or chassis number (which generally contains the industry model code) proved useful for the second-hand imported vehicles in some instances.

Final Decoded Data

The three sources of decoded data (VIN decoded, new and used decoded entries) were then merged together to enable the final selection of vehicles for use in the analysis. Where insufficient information was available for the ‘modelh’ code to be determined from any of the processes described above, the ‘modelh’ code was assigned a value of ‘Z’, indicating unknown model. Two final selection criteria were imposed. First, only vehicles manufactured after 1981 were to be included in the analysis. Second, where no ‘modelh’ code had been assigned or a modelh code of ‘Z’ was assigned, it was necessary to exclude all entries not coded as cars, station wagons, vans, utilities or taxis.

3.2 Pooled Car Models

Vehicle model sharing amongst manufacturers retailing in the Australian market has been relatively common. Because shared models are generally identical, particularly with respect to safety performance, it is possible to pool such models for safety rating, allowing a more precise estimate of the safety of models for which data is pooled rather than considering each separately. There are also some models of Ford Falcon that expert advice has indicated did not change significantly from one series to the next that can also be pooled for the same reasons as the shared models. Both the pooled models and Falcon models combined are indicated in Table 2.

Table 2: *Pooled Models of Cars*

Ford Laser 82-89	with	Mazda 323 / Familia 82-88
Ford Laser 99-03	with	Mazda 323 99-03
Ford Telstar 83-87	with	Mazda 626 / MX6 / Capella 83-86
Ford Telstar 88-91	with	Mazda 626 / MX6 / Capella 88-91
Ford Telstar 92-97	with	Mazda 626 / MX6 / Capella / Cronos 92-97
Ford Falcon EA	with	Ford Falcon EB Series I
Ford Falcon ED	with	Ford Falcon EB Series II
Ford Corsair 89-92	with	Nissan Pintara / Bluebird 89-92
Holden Commodore VR/VS	with	Toyota Lexcen 93-97
Holden Commodore VN-VP	with	Toyota Lexcen 89-93

Holden Nova 89-92	with	Toyota Corolla 88-92
Holden Nova 93-96	with	Toyota Corolla 93-97
Holden Astra 84-86	with	Nissan Pulsar / Langley 83-86
Holden Astra 88-90	with	Nissan Pulsar / Sentra 87-91
Holden Barina 85-88	with	Suzuki Swift / Cultus 86-88
Holden Barina 89-93	with	Suzuki Swift / Cultus 89-00
Holden Apollo JK/JL 89-92	with	Toyota Camry / Vista 90-93
Holden Apollo JM/JP 93-97	with	Toyota Camry / Sceptor 94-97
Ford Maverick 88-97	with	Nissan Patrol 88-97
Suzuki Scurry 85-87	with	Holden Carry 85-90
Suzuki Samurai / SJ410 / SJ413 82-00	with	Holden Drover 85-87
Nissan XFN Utility	with	Ford Falcon Utility 82-95
Ford Festiva WA 91-93	with	Mazda 121 87-90
Ford Courier 98-02	with	Mazda B-Series 98-02
Ford Courier 03-04	with	Mazda Bravo 03-04
Ford Escape 01-04	with	Mazda Tribute 01-04

It should be noted that some of the vehicle models identified in the Victorian, NSW, Western Australia, Queensland and New Zealand crash data have optional safety equipment, such as air bags, which could significantly alter the crashworthiness rating of the vehicle model when fitted. Notable examples in local Australian manufacture include the Holden Commodore VR/VS, Toyota Camry 1993-97 and Mitsubishi Magna TR/TS, and TE/TF/TH, all of which have optional air bag fitment. It is, however, generally not possible to identify which particular vehicles of a model series do and do not have such optional safety equipment installed using the model decoding procedures described above. Consequently, for those vehicle models with optional safety equipment, the estimated crashworthiness rating represents an average of the safety performance for vehicles with and without the optional safety equipment weighted by the number of each in the crash data.

As the ratings only measure the outcome of drivers involved in a crash, the effect of fitment of active or crash avoidance safety features such as anti-lock braking systems on crash avoidance was not measured by these ratings. As only drivers were considered, optional or standard safety features for the front or rear seat passengers, such as passenger frontal or side airbag systems, would also not have affected the ratings.

3.3 Vehicle Market Groups

Previous updates of the vehicle safety ratings have classified vehicle models, for the purpose of publication, into one of a number of market groups (Newstead et al, 2003a). The market groups defined are based heavily on those used by the Federal Chamber of Automotive Industries (FCAI) for reporting Australian vehicle sales as part of their VFACTS publication (see www.fcai.com.au for further details). In the most recent update of the vehicle safety ratings (Newstead et al, 2004b) rated vehicles were classified into one of 13 market group classifications, comprising 8 classes of regular passenger car, 3 classes of four wheel drive (4WD) vehicle (also known as Sports Utility Vehicles) and 2 classes of light commercial vehicle. For this update the previously defined prestige and luxury market groups were combined into one group, labelled luxury, reducing the number of market groups to 12. The resulting 12 market groups were defined as follows.

Passenger Cars

Light	Passenger car, hatch or sedan 3 or 4 cylinder engine, up to 1,500 cc.
Small	Passenger car, hatch, sedan or wagon, 4 cylinder engine, 1,501 cc - 1,900 cc.
Medium	Passenger car, hatch, sedan or wagon, 4 cylinder engine, 1,901 cc upward.
Large	Passenger car, hatch, sedan or wagon, 6 or 8 cylinder engine.
People Movers	Passenger usage seating capacity > 5 people.
Sports	Coupe or convertible
Luxury	Highly specified passenger cars, coupe, convertible, hatch, sedan or wagon.

Four Wheel Drive Vehicles (high ground clearance, off road wagon)

4WD Compact	Index rating < 550 (typically less than 1700kg tare mass)
4WD Medium	Index rating 550 - 700 (typically between 1700kg and 2000kg tare mass)
4WD Large	Index rating > 700 (typically greater than 2000kg tare mass)

Light Commercial Vehicles

Van	Blind & window vans.
Utility	Two and four wheel drive, normal control (bonnet), utility, cab chassis and crew-cabs.

The classification of 4WD vehicles is based on an index developed by VFACTS that considers gross vehicle mass, maximum engine torque and the availability of a dual range transmission. The index typically classifies the vehicles roughly by tare mass as indicated on the classifications above. Some departures from the VFACTS classification have been made in presenting the ratings in this study. VFACTS defines a luxury 4WD category based on vehicle price as well as classifying sports cars priced above the luxury car tax threshold as luxury vehicles. Here, the luxury 4WDs have been distributed amongst the 3 defined 4WD categories based on tare mass, as the information for computing the classification index used by VFACTS was not available at the time of the study. All sports cars have been classified as such, regardless of price.

There have also been some departures from the classification principles defined above for certain vehicle models that have a range of engine sizes and hence fall across two different defined categories. These are typically passenger vehicles and include, for example, cars like the Toyota Camry that come fitted with a large 4 cylinder engine in some variants and a 6 cylinder engine in other variants. In these cases, a value judgement has been made for each vehicle model individually based on the other vehicle models with which each typically competes in the market place.

4. ANALYSIS

4.1 Overview of Analysis Methods: Crashworthiness

The crashworthiness rating (C) is a measure of the risk of serious injury (hospitalisation or death) to a driver of a car when it is involved in a crash. It is defined to be the product of two probabilities (Cameron et al, 1992):

i) the probability that a driver involved in a crash is injured (injury risk), denoted by R; and
ii) the probability that an injured driver is hospitalised or killed (injury severity), denoted by S.

That is

$$C = R \times S.$$

Folksam Insurance, who publishes the well-known Swedish ratings, first measured crashworthiness in this way (Gustafsson et al, 1989).

In the present report, each of the two components of the crashworthiness rating was obtained by logistic regression modelling techniques. Such techniques are able to simultaneously adjust for the effect of a number of factors (such as driver age and sex, number of vehicles involved, etc.) on probabilities such as the injury risk and injury severity.

This method has previously been used to produce the Australian and New Zealand vehicle fleet crashworthiness ratings (Newstead et al, 2005b).

For the analysis of both crashworthiness by year of manufacture and year of first registration for used imports (in New Zealand) of New Zealand light passenger vehicles another method is required. Because non-injury crashes are not reliably reported in the New Zealand crash data, injury risk cannot be measured directly from the data (as a simple ratio of injured drivers over total involved drivers) as it is in calculating the vehicle specific ratings of Newstead et al (2005b). The alternative of calculating the proportion of injured drivers amongst those involved in injury crashes results in a biased estimate of injury risk. To overcome these problems, an alternative measure of injury risk has been used here which is based on the paired comparison approach but leads to unbiased estimates. A description of the derivation of the injury risk estimator follows. It is further described in Cameron et al (2001) where it is also compared to more traditional estimators of injury risk that are also derived using the paired comparison approach but which have the problem of being biased.

Consider N observed two-car crashes involving vehicle model (or year of manufacture) k. Let p_{1k} be the average injury probability to the driver of the focus vehicle model (or year of manufacture) k, and p_{2k} be the average injury probability to the drivers of all vehicles colliding with vehicle model (or year of manufacture) k. Categorising the N observed crashes into a 2x2 table defined by injury or non injury to the focus and other vehicle drivers, the following table of expected crash frequencies arises, assuming p_{1k} and p_{2k} to be independent.

Table 3: *Expected number of two-car crashes between vehicle model (or year of manufacture) k and other vehicles*

Drivers of vehicle model or year of manufacture *k*	**Drivers of other vehicles**		
	INJURED	NOT INJURED	
INJURED	$N\, p_{1k}\, p_{2k}$	$N\, p_{1k}\, (1-p_{2k})$	$N\, p_{1k}$
NOT INJURED	$N(1-\, p_{1k}\,)p_{2k}$	$N(1-\, p_{1k}\,)(1-p_{2k})$	$N\,(1-p_{1k}\,)$
	$N\, p_{2k}$	$N\,(1-p_{2k})$	N

The observed categorised crash frequencies corresponding to the expected values under the conceptual framework in Table 3 for vehicle model or year of manufacture *k* are shown in Table 4.

Table 4: *Observed number of two-car crashes between vehicle model (or year of manufacture) k and other vehicles*

Drivers of vehicle model *k*	**Drivers of other vehicles**		
	INJURED	NOT INJURED	
INJURED	n_{iik}	n_{ink}	$n_{iik} + n_{ink}$
NOT INJURED	n_{nik}	n_{nnk}	$n_{nik} + n_{nnk}$
	$n_{iik} + n_{nik}$	$n_{ink} + n_{nnk}$	N

The traditional MUARC measure of injury risk can be derived from the margin of Table 4 and is given by the following.

$$R_{Mk} = \frac{n_{iik} + n_{ink}}{N}$$

The corresponding expected value is given by

$$E(R_{Mk}) = p_{1k}$$

R_{Nk} is an unbiased estimator of p_{1k} and, as is ideal, is not confounded with the aggressivity parameter for vehicle model k, p_{2k} which can be estimated independently. The empirical independence of p_{1k} and p_{2k} is demonstrated in Newstead et al (2004).

For data systems such as New Zealand that do not report all non-injury crashes, n_{nnk} and N will be unknown in Table 4. For this reason, the MUARC estimator of injury risk cannot be calculated, hence the reason for using the alternative estimator.

The alternative measure of driver injury risk in vehicle model or year of manufacture k is defined as follows:

$$R_{Nk} = \frac{n_{iik}}{n_{iik} + n_{nik}}$$

The corresponding expected value is given by

$$E(R_{Nk}) = p_{1k}$$

As evident, R_{Nk} is also an unbiased estimator of p_{1k} and as such has the desired property of not being confounded with the aggressivity parameter for vehicle model k, p_{2k}. Conceptually, the new injury risk estimator measures the risk of injury in vehicle model *k* given the driver of the vehicle colliding with vehicle model *k* is injured.

Although not used in this study, the corresponding estimator of vehicle aggressivity injury risk of vehicle model k is given by

$$A_{Nk} = \frac{n_{iik}}{n_{iik} + n_{ink}}$$

Its expected value given by

$$E(A_{Nk}) = p_{2k}$$

This is an unbiased estimator of p_{2k}, the aggressivity injury risk of vehicle model *k*.

The injury risk measure used here has been combined with an injury severity measure identical to that used in the MUARC crashworthiness rating systems. This produces a crashworthiness measure identical in construction and concept to the MUARC measure but based on injury crashes only. The only key difference between the MUARC measure of injury risk and the new measure used here is the scaling of the estimates. The new measure of injury risk is conditional on the driver of the other vehicle in a two-vehicle crash being injured and hence the average injury risk will be higher than when all crashes are considered, as is the case for the MUARC method. Consequently, the absolute estimates of crashworthiness by year of manufacture estimated in this study for New Zealand are not comparable with those estimated for Australia. However, the relative trends in crashworthiness by year of vehicle manufacture estimated for each country are consistent and comparable.

The Logistic Model

The logistic model of a probability, P, is of the form:

$$\log it(P) = \ln\left(\frac{P}{1-P}\right) = \beta_o + \beta_1 X_1 + \ldots + \beta_k X_k = f(X).$$

That is, the log of the odds ratio is expressed as a linear function of k associated variables or their interactions, $X_i, i = 1, \ldots, k$. Estimates of the parameter coefficients of the logit function, i.e. the $\hat{\beta}_i$ can be obtained by maximum likelihood estimation (Hosmer & Lemeshow, 1989). For estimation of the crashworthiness ratings, factors in the logistic model included the available non-vehicle factors influencing injury outcome, such as driver age and gender, year of crash and number of vehicles available, as well as the variable indicating vehicle model, market group or year of manufacture.

Logistic Confidence Limits for the Vehicle Models or Year of Manufacture

Whilst it is possible to calculate the variance of $\hat{f}(X)$, the estimated value of the logistic regression linear form, in the context of crashworthiness ratings only the component of variance due to one factor in $\hat{f}(X)$ is of interest. In practice, the component of variance due to the factor representing the vehicle model or year of manufacture is of interest, whilst the variance due to the remaining factors such as driver age and sex is common to all vehicle models or years of manufacture and hence of no interest.

To isolate the component of variance in the logistic model due to only one factor, say factor X_i, the remaining factors were fixed at a predetermined level, in this case their mean value. The variance of $\hat{f}(X)$, considering all factors apart from X_i to be fixed, is then given by

$$Var\left(\hat{f}(X_i)\right) = X_i^2 Var\left(\hat{\beta}_i\right)$$

In the logistic models of injury risk or injury severity, X_i was a [0,1] indicator function of either a particular vehicle model or market group or year of manufacture, depending on the analysis being performed. Hence the variance function given above equalled the variance of the coefficient $\hat{\beta}_i$.

A 95% confidence interval for the logit function with respect to component X_i is given by

$$\hat{f}(X) \pm 1.96\sqrt{Var\left(\hat{f}(X_i)\right)}\ .$$

Point estimates and confidence limits in the logistic space were transformed into probability estimates using the inverse logistic transform given by

$$\hat{P} = \frac{e^{\hat{f}(X)}}{1+e^{\hat{f}(X)}}.$$

4.1.1 Logistic Models for Each Component

Obtaining the Covariate Models

Before adjusted crashworthiness ratings could be obtained it was necessary to consider logistic models of each of the crashworthiness components separately to identify possible factors, other than vehicle design, that might have influenced the crash outcomes in terms of driver injury severity. A stepwise procedure was used to identify which factors had an important influence. This was done without considering the type of car or year of manufacture in the model, as the aim was to determine which other factors were most likely to have had an influence across a broad spectrum of crashes. Furthermore, the car model variable had to be excluded from the logistic modelling process at this stage because of analysis convergence problems when the car model was competing against the other factors in the stepwise procedure. It was also not considered appropriate to allow interaction between vehicle model and other factors in the logistic model as this would give relative vehicle crashworthiness between models that were dependent on the crash circumstance and occupant characteristics. Only the average

crashworthiness across a standardised set of crash circumstances and occupant characteristics was of interest.

Logistic models were obtained separately for injury risk and injury severity because it was likely that the various factors would have different levels of influence on these two probabilities.

The factors considered during this stage of the analysis for both injury risk and injury severity were

- **sex:** driver sex (male, female)
- **age:** driver age (≤25 years; 26-59 years; ≥60 years)
- **speedzone:** speed limit at the crash location (≤75 km/h; ≥80 km/h)
- **nveh:** the number of vehicles involved (one vehicle; >1 vehicle)
- **state:** jurisdiction of crash (Victoria, NSW, QLD, WA, NZ)
- **year:** year of crash (1987, 1988, … ,2004)

These variables were chosen for consideration because they were part of the Victorian, Queensland, New South Wales, Western Australia and New Zealand databases. Other variables were only available from one source and their inclusion would have drastically reduced the number of cases that could have been included in the analysis.

Jurisdiction of crash was a necessary inclusion in the logistic model because each jurisdiction has its own level of general road safety performance that affects injury outcome. Including the jurisdiction factor in the covariate model is necessary to adjust for rating bias towards those vehicle models that are sold and driven more in one jurisdiction than another. There is also some indication of reporting bias by crash severity in some jurisdictions that is also controlled by including the state variable in the regression models. Inclusion of a year of crash indicator in the model is necessary to adjust for the different trends in crash severity noted between each of the jurisdictions contributing data (see section 4.1.4 below).

For the analysis of crashworthiness by year of manufacture and by year of first registration for used imports for New Zealand the factors considered during this stage of the analysis for both crashworthiness injury risk and crashworthiness injury severity were as follows.

- **sex:** driver sex (male, female)
- **age:** driver age (≤25 years; 26-59 years; ≥60 years)
- **speedzone:** speed limit at the crash location (<80 km/h; ≥80 km/h)
- **year:** year of crash (1987, 1988, … ,2004)

For crashworthiness injury severity the following factor was also considered.

- **nveh:** the number of vehicles involved (one vehicle; >1 vehicle)

These variables were chosen for consideration because they were part of the New Zealand database and are variables that have been shown to have significant relationship to injury outcome in the Australian and New Zealand combined vehicle safety ratings. Inclusion of the year of the crash in the logistic model was necessary to account for different long-term trends.

All data were analysed using the Logistic Regression procedure of the SAS statistical package (SAS, 1989). Estimates of the coefficients of the logit function, $\hat{\beta}_i, i = 1,\ldots,k$, together with their associated standard errors, were obtained by maximum likelihood estimation. In the modelling process, design variables for the various factors were chosen in such a way that the estimated coefficients represented deviations of each of the variable levels from the mean. Each factor in the model, including year of crash, was treated as categorical to allow maximum flexibility in the relationship between each factor and the outcome measure.

For both injury risk and injury severity, a stepwise procedure was used to identify which factors and their interactions made a significant contribution to these probabilities. All possible first and higher order interactions were considered between all factors in the model. A hierarchical structure was imposed so that interaction between two variables was included in the model only when the corresponding main effects were also included. The resultant logistic regression models were referred to as the "covariate" models or equations.

The average value of the injury risk or injury severity was obtained directly from the outcome variable of interest averaging across all cases in the analysis.

Assessing Car Model or Year of Manufacture Differences

Injury risk and injury severity for individual cars were estimated after adding a variable representing car model or year of manufacture to the respective logistic "covariate" models. That is, car model or year of manufacture variable was included in the logistic model along with those factors and their interactions that were found to be statistically significantly related to the outcome variable in the stepwise modelling procedure and the model re-estimated in a single step process. Coefficients for individual car models or years of manufacture were computed to represent deviations of that car or year from the average.

It was important to ensure that the logistic model adequately described the data and did not yield individual car model coefficients that were imprecise or unstable. For this reason, individual car models with small frequencies were pooled with similar car models in the rare cases where this was appropriate (see Section 3.2) or, more typically, they were excluded from the analysis. Car models were excluded if, after pooling models, there were either:

i) less than 100 involved drivers; or
ii) less than 20 injured drivers.

Some further model exclusions were made for vehicle model classifications that had no practical interpretation. This included models in a particular year where there was a change from one series to the next and year of manufacture was necessary to determine the series break (such as Mitsubishi Pajero 1991). It also included some groups of highly aggregated models that would be of no intrinsic interest to consumers using the ratings (such as Jeep Others or Mazda Commercials).

After exclusion, the regression analyses were performed on 339 individual car models (or pooled similar models). A list of all vehicle models considered, with those with sufficient data for analysis indicated, is given in Appendix 1. The variable representing car model was therefore categorical with 339 nominal levels. The choice of the design for the logistic model allowed the injury risk and injury severity estimates for each individual car model to be compared with the

overall (average) rating for all cars. No such criteria were necessary for the year of manufacture analysis.

For each car model or year of manufacture, a 95% confidence interval for the logit functions of injury risk and injury severity was obtained after first adjusting for the average value in the data and then allowing for the deviation from average for that particular car model.

Estimates of injury risk and injury severity were obtained by de-transforming the logit functions as described above. A 95% confidence interval was determined after adjusting for the average values of the significant factors and their interactions. The precision of the estimates of injury risk and injury severity is measured by the width of these 95% confidence intervals.

Assessing Market Group Averages

A similar approach to that for individual car models was used to assess car market group averages. A variable with 12 nominal levels representing the different market groups (see Section 3.3) was added to each of the "covariate" models. Deviations of each market group from the average were also assessed. Ninety-five percent confidence intervals for the estimates of both injury severity and injury risk were also obtained for each of the market groups.

Assessing Market Group by Year of Manufacture Differences

Assessing year of manufacture by market group effects was carried out in the same was as for assessing year of manufacture effects alone. Instead of using a variable representing year of manufacture alone, however, a variable representing the interaction between year of manufacture and market group was used. This variable had 276 levels representing the 12 market groups by the 23 years of manufacture from 1982 to 2004 inclusive. Unlike the original study of Newstead and Cameron (2001) that only considered trends in crashworthiness by year of manufacture for four market groups and the study of Newstead et al (2004b) which considered 13 market groups the most recent update (Newstead et al 2005b) and this study considered 12 market groups as defined in the main crashworthiness ratings analysis.

4.1.2 Combining the Injury Risk and Injury Severity Components

The final combined ratings of vehicle crashworthiness are given by:

Crashworthiness Rating = Injury Risk x Injury Severity.

For a given model of car or year of manufacture, j, the crashworthiness rating, C_j, was therefore calculated as:

$$C_j = R_j \times S_j$$

where

R_j denotes the injury risk for car model or year of manufacture j, and
S_j denotes the injury severity for car model or year of manufacture j.

Noting the form of the logistic inverse transformation in section 4.1 above, we have

$$R_j = \frac{e^{\alpha_j}}{1+e^{\alpha_j}}, \qquad S_j = \frac{e^{\beta_j}}{1+e^{\beta_j}}$$

where α_j and β_j are the values of the logistic regression function $\hat{f}(X)$ for injury risk and injury severity respectively for vehicle model or year of manufacture *j*.

Taking the natural log of the crashworthiness rating and using asymptotic statistical theory, the asymptotic variance of the log of the crashworthiness rating is

$$Var(\log_e C_j) \approx \frac{Var(\alpha_j)}{(1+e^{\alpha_j})^2} + \frac{Var(\beta_j)}{(1+e^{\beta_j})^2}$$

where the variances of α_j and β_j are as given in section 4.1 and the estimates of α_j and β_j are considered independent.

The 95% confidence interval for the natural log of the crashworthiness rating is then

$$\log_e(C_j) \pm 1.96 \cdot \sqrt{Var\left(\log_e(C_j)\right)}.$$

The 95% confidence limit for the crashworthiness rating is obtained by taking the exponent of the confidence limit of the logged crashworthiness rating shown above. 90% confidence limits were calculated in a similar way.

Because each of the two estimated crashworthiness components has been adjusted for the effect of other factors by logistic regression prior to their incorporation into the combined ratings, the resultant crashworthiness rating is also adjusted for the influence of these factors. It should be noted that the confidence interval for the combined rate reflects the variability in the car model only and not the variability in the other factors included in the logistic models.

The same procedure was used to obtain crashworthiness ratings of each distinct market group and for each year of vehicle manufacture.

4.1.3 Market Group Analyses

In addition to the individual car model analyses, logistic regression analyses were performed based on broad market groups as defined in Section 3.3. The market group analyses provided reference ratings for models in each group.

4.1.4 Trends in the Rating Criteria

In each of the five jurisdictions contributing crash data for analysis in this project, there have been changes in road safety during the period of data collection that may have produced a change in the risk of serious injury in crashes, the measure being used to assess vehicle safety in this study. Furthermore, trends in road safety have not been the same in each jurisdiction. There was therefore some concern that there may have been a bias in the crashworthiness ratings related to the time period over which a vehicle model was able to crash. If, for example, there

had been a general reduction in crash severity over time, the crashworthiness rating of the later model cars would tend to be lower on average, irrespective of design improvements, than would be expected if the general improvements in road safety had not occurred. Sales profile of vehicle models also differs significantly between jurisdictions. Consequently, if a vehicle model is crashed more in a jurisdiction with poor safety record it may appear to be less crashworthy if jurisdiction effects are not adjusted for in the analysis.

This concern led to a need to investigate whether there were in fact, different trends in the risk of driver injury and/or driver injury severity between jurisdictions and over time. If changes were found these would need to be taken into account in calculating the ratings.

The file of drivers involved in crashes in NSW, Queensland and Western Australia used to measure the driver injury rate, the first component of the crashworthiness rating, was analysed by the year and state in which the crash occurred to assess any trends. The difference in the Western Australia data in comparison to previous rating updates is a reflection of the re-issue of the data for the period 1991 to 2004. This was a result of a change in database structure and variable definitions that may have caused some inconsistency in the data. For example, a change in unit definition occurred during 1995 to 1996. Prior to this trailers were included as a separate unit. So for example, previously, a car and trailer contributed 2 units to an accident unit count. Results are shown in Table 5.

Table 5 shows clear evidence of differential trends in injury rate between each of the three states from which data is used in this analysis component. It is also evident that the trends in injury rate are non-linear in each of the three states. These observations made it necessary to adjust the injury risk component of the crashworthiness ratings by both state of crash and year of crash as well as the interaction between the two to reflect differential trends across states. The non-linear nature of the trend also made it necessary to treat year as a categorical variable rather than a continuous measure.

Table 5: *Numbers of drivers of light passenger vehicles manufactured in 1982-2004 and involved and injured in tow-away crashes in NSW during each of the years 1987-2004 and in Queensland and Western Australia during each of the years 1991-2004.*

YEAR	NSW			QLD			WA		
	Total Injured	Total Involved	Injury rate (%)	Total Injured	Total Involved	Injury rate (%)	Total Injured	Total Involved	Injury rate (%)
1987	4212	32980	**12.8**						
1988	4788	32584	**14.7**						
1989	5310	37018	**14.3**						
1990	5596	40125	**13.9**						
1991	5402	39231	**13.8**	1184	7069	**16.7**	5919	43923	**13.5**
1992	5819	40033	**14.5**	2171	12076	**18.0**	6087	42552	**14.3**
1993	5843	40859	**14.3**	2688	14011	**19.2**	6352	45555	**13.9**
1994	6135	42433	**14.5**	3464	16592	**20.9**	6684	48355	**13.8**
1995	6490	45477	**14.3**	4087	17884	**22.9**	5912	49215	**12.0**
1996	6971	51931	**13.4**	4329	18770	**23.1**	6512	52477	**12.4**
1997	7535	54550	**13.8**	6052	20830	**29.1**	6894	52534	**13.1**
1998	8577	60603	**14.2**	7131	23773	**30.0**	7441	57551	**12.9**
1999	9433	66243	**14.2**	5862	23669	**24.8**	8512	60470	**14.1**
2000	10806	66089	**16.4**	6140	23612	**26.0**	8446	58896	**14.3**
2001	10709	57166	**18.7**	8476	39554	**21.4**	8692	59059	**14.7**
2002	10044	54158	**18.5**	8248	28410	**29.0**	8849	59140	**15.0**
2003	14392	78778	**18.3**	8705	29286	**29.7**	8535	59843	**14.3**
2004	13929	75693	**18.4**	8959	30949	**28.9**	8709	63129	**13.8**

Table 6 shows analogous information to Table 5 for trends in injury severity across the five jurisdictions contributing data to this component of the analysis. Table 6 shows there are also clear differential trends in injury severity between each of the jurisdictions. This meant that adjustments for jurisdiction and year of crash, as well as their interaction, was also necessary for the injury severity analysis, with year of crash again treated as a categorical variable.

A further point illustrated by Table 5 is the difference in average injury risk between crashes in NSW and WA and crashes in Queensland. The raw injury rate observed in Queensland is of the order of 1.5 to 2 times higher than that observed in NSW and WA. Whether this is because crashes in Queensland are actually more severe or because of a reporting bias towards more severe crashes in Queensland is unclear. Similarly, Table 6 shows average injury severity in WA is much lower than the other jurisdictions. This is possibly due to a different definition of severe injury in WA compared to the other jurisdictions although the definition given in the WA crash data coding manual does not reflect this. Regardless, neither of these differences is considered problematic in computing the ratings provided adjustment for jurisdiction of crash is made in the covariate models of injury risk and severity. The important point for ratings computation is that relative injury risk or severity between vehicle models is consistent across jurisdictions, regardless of the average risk or severity in each state. Interrogation of the data suggested this was the case.

Table 6: *Numbers of drivers of 1982-2004 light passenger vehicles injured in crashes in NSW and Victoria during each of the years 1987-2004 and in Western Australia, Queensland and New Zealand during each of the years 1991-2004.*

Year	NSW			VIC		
	Killed or Seriously Injured	Injured	Severe Injury Rate (%)	Killed or Seriously Injured	Injured	Severe Injury Rate (%)
1987	920	4212	**21.8**	519	2119	**24.5**
1988	1047	4788	**21.9**	508	2513	**20.2**
1989	1099	5310	**20.7**	629	2999	**21.0**
1990	1211	5596	**21.6**	511	2334	**21.9**
1991	1195	5402	**22.1**	528	2315	**22.8**
1992	1297	5819	**22.3**	518	2537	**20.4**
1993	1254	5843	**21.5**	792	2772	**28.6**
1994	1263	6135	**20.6**	956	3225	**29.6**
1995	1380	6490	**21.3**	1165	3878	**30.0**
1996	1470	6971	**21.1**	1228	4327	**28.4**
1997	1798	7535	**23.9**	1203	4215	**28.5**
1998	2404	8577	**28.0**	403	1339	**30.1**
1999				2351	10473	**22.4**
2000				2682	11235	**23.9**
2001				2934	11023	**26.6**
2002				3158	11449	**27.6**
2003				3266	12095	**27.0**
2004				3231	11711	**27.6**

Year	New Zealand			QLD			WA		
	Killed or Seriously Injured	Injured	Severe Injury Rate (%)	Killed or Seriously Injured	Injured	Severe Injury Rate (%)	Killed or Seriously Injured	Injured	Severe Injury Rate (%)
1991	1185	5222	**22.7**	380	1184	**32.1**	1038	5919	**17.5**
1992	1543	7813	**19.7**	640	2171	**29.5**	1085	6087	**17.8**
1993	1092	5544	**19.7**	739	2688	**27.5**	1072	6352	**16.9**
1994	969	5494	**17.6**	1010	3464	**29.2**	1059	6684	**15.8**
1995	964	6016	**16.0**	1153	4087	**28.2**	1007	5912	**17.0**
1996	1065	5653	**18.8**	1108	4329	**25.6**	940	6512	**14.4**
1997	1022	5384	**19.0**	1491	6052	**24.6**	1106	6894	**16.0**
1998	1015	5321	**19.1**	1905	7131	**26.7**	1165	7441	**15.7**
1999	1330	6320	**21.0**	1627	5862	**27.8**	1156	8512	**13.6**
2000	1121	5226	**21.5**	1653	6140	**26.9**	1010	8446	**12.0**
2001	1259	6228	**20.2**	2223	8476	**26.2**	948	8692	**10.9**
2002	1312	7192	**18.2**	2222	8248	**26.9**	1425	8849	**16.1**
2003	1369	7837	**17.5**	2561	8705	**29.4**	1496	8535	**17.5**
2004	1364	7757	**17.6**	2800	8959	**31.3**	1662	8709	**19.1**

4.1.5 Methods for Assessing Crashworthiness from New Zealand Data Only

Assessment of trends in crashworthiness by year of manufacture and year of first registration in New Zealand were based only on the analysis of crash data from New Zealand. Since only injury crashes are reliably reported in New Zealand, a modification of the methods described above was needed to estimate relative injury risk from the New Zealand data. The modified

methodology is described fully in Newstead and Watson (2005a) and is based on conditional risk estimators that give unbiased relative risk estimates consistent with the ones derived from the full injury and non-injury data sets.

4.2 Overview of the Analysis Methods: Aggressivity

4.2.1 Aggressivity Method

As described in the project background section, aggressivity ratings in Australia were initially based on the injury outcomes of other drivers and unprotected road users separately. Until the most recent ratings update of Newstead et al (2005b) aggressivity ratings have only focused on the measure of aggressivity towards other vehicle drivers and the measure of aggressivity towards unprotected road users had not been further considered as a stand alone rating. In the most recent update of the used car safety ratings (Newstead et al 2005b) an aggressivity rating was derived which considers the injury outcome of both other vehicle drivers and unprotected road users in a single measure. This report uses this aggressivity rating measure.

The aggressivity rating estimates the risk of death or admission to hospital to both the drivers of the other cars and to unprotected road users when involved in a collision with the subject model car. Unprotected road users include pedestrians, bicyclists and motorcyclists. Because an estimate of the risk of injury cannot be calculated for unprotected road users as explained above the measure of aggressivity injury risk used was based only on the injury risk to the other driver (ROU). It is defined as:

Aggressivity Injury Risk = ROU = proportion of other vehicle drivers involved in crashes who were injured

In contrast, complete records of both other drivers and unprotected road users injured in crashes are available and can be used to examine injury severity outcomes in the aggressivity measure. The aggressivity injury severity measure (SOU) is defined as:

Aggressivity Injury Severity = SOU = proportion of other vehicle drivers or unprotected road users who were killed or admitted to hospital.

Based on the definition of ROU and SOU above, an aggressivity measure for each subject car model was then calculated as before:

Aggressivity to other driver or unprotected road user = AOU = ROU x SOU.

The aggressivity measure estimates the risk of the driver of another car or an unprotected road user being killed or admitted to hospital when involved in a collision with the subject model vehicle. As such, it is more representative of the total aggressivity performance of the vehicles being rated across all potential vulnerable collision partners than the aggressivity measure used in the used car safety ratings prior to the last update (Newstead et al 2005b)

Consideration was given to taking into account likely differences between the crash circumstances of the subject car models, which may result in a distorted view of its aggressivity

only partly related to the characteristics of the subject cars. Factors available in the data to consider such differences were as follows.

- **agefcd** : age of driver of subject car (<=25 years, 26-59 years, >=60 years)
- **sexfcd** : sex of driver of subject car
- **ageoo** : other car driver age (<=25 years, 26-59 years, >=60 years)
- **sexoo** : other car driver sex (male, female)
- **speedzone:** speed limit at the crash location (≤75 km/h; ≥80 km/h)
- **state:** jurisdiction of crash (Victoria, NSW, QLD, WA, NZ)
- **year:** year of crash (1987, 1988, … ,2004)

A further critical factor that is likely to vary between vehicle models is the mix of collisions between other vehicles and unprotected road users. The injury severity component of the aggressivity measure (SOU) is an average of injury severity outcomes between drivers of other vehicles and unprotected road users involved in collisions with the focus vehicle. Since injury outcomes for unprotected road users are typically more severe than for drivers of other vehicles, it is necessary to adjust the aggressivity injury severity measure to account for differences in the proportion of unprotected road user crashes between vehicle models. Furthermore, it is also likely that there are differences in the injury outcomes between different types of unprotected road users in crashes with vehicles. Hence the severity measure also needed to be adjusted for differences in the mix of unprotected road user types impacted between different vehicles. To adjust for potential differences between aggressivity rated vehicles in the type of collision partner, a further factor was included in the logistic regression models for aggressivity injury severity. The factor used was:

- **crash type:** collision partner type (vehicle, pedestrian, bicyclist or motorcyclist)

Estimation of the aggressivity measure has utilised logistic regression techniques to adjust ROU and SOU separately for any major differences that emerge between models of the subject cars regarding these factors. The adjusted ROU and SOU have been multiplied together for each subject car model to provide the final measure of aggressivity, AOU.

In formulating the old aggressivity rating Cameron et al (1998) also considered adjusting the aggressivity ratings for the injury outcome of the drivers of the vehicle model being rated for aggressivity, hence providing an indication of the crash severity. This was found to make little difference to the relative aggressivity ratings between vehicle models and has not been further considered here. Cameron et al (1998) also considered using the injury outcome of the most severely injured occupant of the vehicle colliding with the focus vehicle model in estimating the aggressivity index. Again, little difference was found in the estimated aggressivity ratings when considering all vehicle occupants than when considering drivers only so this method was not pursued here.

4.2.2 Logistic Models, Confidence Limits and Assessment of Aggressivity of Specific Vehicle Models and Market Groups

A logistic model of the same form used for estimation of vehicle crashworthiness ratings was used for estimation of vehicle aggressivity ratings. The key difference in the logistic models for vehicle aggressivity was that the response variables being modelled were not the injury risk or injury severity of the driver of the focus vehicle, as for crashworthiness. Rather, the injury risk and injury severity of the road user with which the focus vehicle model collided were modelled

as the response variables. Given the similarity of the structure of the aggressivity injury risk, ROU, and injury severity, SOU, with their crashworthiness parallels, the method of computing confidence limits on each ROU and SOU was the same as given for the corresponding crashworthiness measures above.

Before adjusted aggressivity ratings could be obtained it was necessary to consider logistic models of each of the aggressivity components, ROU and SOU separately, to identify possible factors, other than vehicle design, that might have influenced injury outcome to the other driver. As for crashworthiness rating estimation, a stepwise procedure was used to identify which factors had an important influence. This was done without considering the type of car (make/model or market group) in the model, as the aim was to determine which other factors were most likely to have an influence across a broad spectrum of crashes. Logistic models were obtained separately for injury risk, RO, and injury severity, SO, because it was likely that the various factors would have different levels of influence on these two component probabilities of the aggressivity measure.

Factors considered in the models are listed in the previous section. These variables were chosen for consideration because they were available in each of the New South Wales, Victorian, Western Australia, Queensland and New Zealand crash databases. Logistic regressions were again carried out using the Logistic Regression procedure of the SAS statistical package (SAS, 1989) using maximum likelihood estimation, the marginal method for forming design variables and a hierarchical structure considering all possible interactions in a stepwise procedure.

Aggressivity injury risk and injury severity for individual vehicle models was estimated after adding a variable representing the subject car model to the respective logistic "covariate" models. The car model variable was forced into the logistic equation and individual car model coefficients were computed to represent deviations of that car from the average. In a similar manner to the calculation of crashworthiness ratings, car models were excluded for the calculation of the aggressivity ratings if there were less than 100 vehicles with which they had crashed or there were less than 20 injured drivers or unprotected road users with which they had crashed.

After exclusion, the regression analyses were performed on 294 individual car models for calculation of the old aggressivity rating. The variable representing car model was therefore categorical with 294 nominal levels. The choice of the design for the logistic model allowed the injury risk and injury severity estimates for each individual car model to be compared with the overall (average) rating for all cars. For each car model in each aggressivity measure, a 95% confidence interval for the logit functions of aggressivity injury risk, and injury severity was obtained after first adjusting for the average value of the "covariate" model and then allowing for the deviation from average for that particular car model. Estimates of injury risk and injury severity were obtained by the reverse logistic transform. A 95% confidence interval was determined after adjusting for the average values of the significant factors and their interactions. Aggressivity by 12 broad market groups, as defined for crashworthiness ratings, was also computed along with 95% confidence limits.

The final combined aggressivity ratings for other road users are given by:

$$AOU = ROU \times SOU$$

For a given model of focus car, j, the aggressivity rating, AOU_j, was therefore calculated as:

$$AOU_j = ROU_j \times SOU_j$$

where ROU_j denotes the aggressivity injury risk for car model j and SOU_j denotes the aggressivity injury severity for car model j. Computation of the variance and hence confidence limits on the quantity AOU are carried out in the same way as for the crashworthiness measure, C.

5. RESULTS

5.1 Vehicle Crashworthiness Ratings

5.1.1 Injury Risk

Injury risk was estimated from the data on 2,106,456 drivers involved in tow-away crashes in NSW, Queensland and Western Australia during 1987-2004 (as described in Section 2). This data set is referred to as the "involved drivers". Because of missing values in one or more of the covariates driver sex and age, speed zone and number of vehicles involved in the crash amongst the 2,106,456 involved drivers and vehicle models of interest, the final file used for analysis consisted of the 1,231,772 drivers for which all the covariate data was complete. Of these drivers 219,185 were injured. The "covariate" model for injury risk was determined from the variables described in Section 4.1.1.

The following terms were significantly associated with injury risk and were included in the logistic model:

Base effect terms	**First order interactions**	**Second order interactions**
Sex	Speedzone*Nveh	Age *Speedzone*Nveh
Speedzone	Sex*Nveh	Sex*Speedzone*Nveh
Age	Sex*Age	Speedzone*Year*Nveh
Nveh	Age*Nveh	Speedzone*Year*State
State	Speedzone*Age	Speedzone*Nveh*State
Year	State*Year	State*Year*Nveh
	Nveh*State	Age*State*Nveh
	Year*Nveh	Age*Speedzone*State
	Age*State	
	Age*Year	
	Speedzone*Year	
	Speedzone*State	
	Sex*Speedzone	

No other term significantly improved the fit of the logistic model.

The overall (average) injury risk for involved drivers in tow-away crashes in NSW, Western Australia and Queensland was 17.79 per 100 drivers. In other words, the probability that a driver involved in a tow-away crash in NSW, Western Australia or Queensland was injured was 17.79%.

Appendix 2 gives the estimates of injury risk derived by logistic regression for 305 individual car models that had a sufficiently accurate crashworthiness rating after post analysis exclusions for wide confidence limits or high coefficient of variation (see below). Injury risk ranged from 7.81% for the 1996-2004 Peugeot 406 to 43.31% for the 1982-1990 Daihatsu Hi Jet.

An estimate of the variability in the injury risk estimates was calculated from the width of the corresponding 95% confidence intervals. Individual confidence interval widths ranged from 0.77% for the 1982-1988 Falcon XE-XF to 17.39% for the 1983-1990 Ford Spectron. The small variability for the Falcon X series Sedan is not surprising since there were more cars of this model than any other in the data set and precision is known to improve with increasing sample size.

The estimated injury risk for each market group is also given in Appendix 2. The large four wheel drive vehicles had the lowest injury risk (13.39%) and the light car market group had the highest (22.93%).

5.1.2 Injury Severity

The data on "injured drivers" covered 443,284 drivers of 1982-2004 model vehicles who were injured in crashes in Victoria, NSW, Western Australia, Queensland or New Zealand during 1987-2004 (as described in Section 2). Because of missing values in one or more of the covariates amongst the 443,284 injured drivers, the final file used for analysis consisted of the 252,141 drivers for which all the covariate data was complete. Of these drivers 53,526 were seriously injured. The "covariate" model for injury severity was determined from the variables described in Section 4.1.1.

The following terms were significantly associated with injury severity and were included in the logistic model:

Base effect terms	**First order interactions**	**Second order interactions**	**Third order interactions**
Sex	Sex*State	Speedzone*Nveh*State	Speedzone*State*Year*Nveh
Speedzone	Speedzone*Nveh	Speedzone*State*Year	
Age	Age*Sex	Age*State*Nveh	
Nveh	Nveh*State	Age*State*Year	
State	State*Speedzone	Age*Speedzone*State	
Year	Speedzone*Age	State*Year*Nveh	
	Age*State	Speedzone*Year*Nveh	
	Age*Nveh		
	State*Year		
	Speedzone*Year		
	Age*Year		
	Sex*Speedzone		
	Year*Nveh		

No other term significantly improved the fit of the logistic model.

The overall (average) injury severity for injured drivers in the data analysed was 21.23 per 100 drivers. In other words, the probability that a driver injured in a crash was severely injured was 21.23%. Appendix 3 gives the estimates of injury severity derived by logistic regression for 305 individual car models, or sets of combined models. Of the cars analysed, injury severity ranged from 4.69% for the 1998-2004 Volkswagen Passat to 51.65% for the 1982-1984 Alfa Romeo GTV.

An estimate of the variability in the estimates of injury severity was calculated from the width of the corresponding 95% confidence intervals. Individual confidence interval widths ranged from 1.86% for the 1982-88 Ford Laser and Mazda 323 / Familia to 44.4% for the 1988-2004 Landrover Freelander.

The estimated injury severity for each market group is also given in Appendix 3. Compact four wheel drive vehicles performed best with respect to injury severity, having the lowest average injury severity of 19.87%. The light car market group had the highest average injury severity of 22.62%.

5.1.3 Crashworthiness Ratings

The crashworthiness ratings for each car model and market group were obtained by multiplying the individual injury risk and injury severity estimates. Because each of the two components had been adjusted for the confounding factors, the resultant crashworthiness rating was also adjusted for the influence of these factors.

Crashworthiness ratings were obtained for each individual model and market group after adjusting for the confounding factors.

Appendix 4 gives the crashworthiness ratings and the associated 95% confidence intervals for each of the 305 car models included in the analyses. Appendix 4 also gives the crashworthiness ratings with 90% confidence limits for each of the 305 vehicle models. Each rating is expressed as a percentage, representing the number of drivers killed or admitted to hospital per 100 drivers involved in a tow-away crash. Overall ratings for the market groups are also given.

Each crashworthiness rating is an *estimate* of the true risk of a driver being killed or admitted to hospital in a tow-away crash and, as such, each estimate has a level of uncertainty about it. This uncertainty is indicated by the confidence limits in Appendix 4. There is 95% probability that the confidence interval will cover the true risk of serious injury (death or hospital admission) to the driver of the particular model of vehicle.

The ratings in Appendix 4 exclude those models where:

- the width of the confidence interval exceeded 7 and the comparison average crashworthiness rating was within the 90% confidence interval (see section 5.1.4 for the definition of the comparison average crashworthiness), or

- the ratio of the confidence interval width to the rating score (coefficient of variation) exceeded 1.6 and the comparison average crashworthiness rating was within the 90% confidence interval.

Both criteria above differ from those used in previous updates to include vehicles which have a rating significantly different to the average crashworthiness rating although the confidence interval exceeds 7 or the coefficient of variation exceeds 1.6. The decision was made to alter the criteria because those vehicles whose confidence limit does not overlap the average can be classified statistically as either better or worse than average which was considered useful for consumer information. The criteria now exclude only those vehicles that are not statistically significantly different from average due to excessive variation in the estimated rating.

Table 7 gives a summary of the estimated ratings for each of the 12 defined vehicle market groups. It shows the estimated injury risk and severity components, and the resulting crashworthiness rating with upper and lower 95% confidence limits, and the width of the 95% confidence limit. The relative ranking of the crashworthiness rating on each market group is also given in Table 7 although this should be interpreted with care as there is not necessarily a statistically significant difference between the average crashworthiness of vehicle market groups with different rankings. Statistical significance in average crashworthiness between market groups at the 5% level is only achieved when the 95% confidence limits do not overlap. Similar comments apply to interpreting results in Appendix 4.

Table 7: *Estimated Vehicle Crashworthiness by Market Grouping*

Market Group	Injury Risk (%)	Injury Severity (%)	Crashworthiness Rating*	Overall rank order	Lower 95% Confidence limit	Upper 95% Confidence limit	Width of Confidence interval
Overall Average	**17.79**	**21.23**	**3.78**				
COMPACT FOUR WHEEL DRIVE	19.53	19.87	3.88	7	3.60	4.18	0.57
MEDIUM FOUR WHEEL DRIVE	14.85	20.08	2.98	2	2.71	3.28	0.56
LARGE FOUR WHEEL DRIVE	13.39	21.81	2.92	1	2.75	3.10	0.35
COMMERCIAL - VAN	19.45	21.43	4.17	9	3.92	4.44	0.52
COMMERCIAL - UTE	16.46	21.74	3.58	5	3.45	3.71	0.27
LARGE	16.46	20.81	3.43	4	3.35	3.50	0.15
LUXURY	15.17	20.23	3.07	3	2.94	3.20	0.26
MEDIUM	18.48	20.91	3.86	6	3.76	3.97	0.22
PEOPLE MOVERS	19.80	22.13	4.38	11	4.11	4.68	0.57
LIGHT	22.93	22.62	5.19	12	5.04	5.33	0.29
SMALL	20.11	21.21	4.27	10	4.17	4.37	0.20
SPORTS	18.70	22.05	4.12	8	3.91	4.34	0.43

* Serious injury rate per 100 drivers involved

5.1.4 Comparisons with the All Model Average Rating

Based on the average injury risk and injury severity values in the data used to compute the ratings estimate, the average crashworthiness of all vehicles appearing in the data was 3.78% (3.78 serious driver injuries per 100 crash involvements). Computing the all model average in this way gives more weight to vehicles with greater representation in the crash data. Another way of computing the all model average rating is to simply take an un-weighted numerical average of the 305 vehicles for which a crashworthiness rating was calculated. This method gives equal weight to each vehicle in the average. For the 305 vehicles rated in this study, the un-weighted numerical average crashworthiness is 4.02 (4.02 serious driver injuries per 100 crash involvements).

Ultimately the point against which ratings for individual vehicles are compared is arbitrary, whether it is either of the averages described above or some other point. For the purpose of comparing the crashworthiness ratings to an average value in this study, the un-weighted numerical average of all vehicles included in the analysis (4.02) was used. This was chosen as it gave better distribution of the vehicles into the five rating categories used for presentation of the ratings for consumer information (see Section 5.3). Any other comparison value could be used with equal legitimacy. However, it should be noted that the criteria for exclusion of the ratings for a particular vehicle from presentation are dependent on the average chosen so a change in the

comparison average crashworthiness will potentially change the selection of vehicles for which ratings are presented.

90% confidence limits were used to judge whether the true risk of death or hospitalisation for a driver of a specific model car involved in a tow-away crash is really different from the defined average for all models, i.e. 4.02 per 100 involved drivers. An upper limit below the average is indicative of superior crashworthiness, whereas a lower limit above the average suggests inferior crashworthiness. Other models also have crashworthiness ratings at the low or high end of the scale, but their confidence limits overlap the all model average. Although such models may also have superior or inferior crashworthiness characteristics, the database did not contain sufficient numbers of these models for the data to represent scientific evidence that this is the case.

In terms of statistical significance, it should be noted that classifying vehicles as having inferior or superior crashworthiness compared to the defined average means only that vehicle models with 'superior' crashworthiness have statistically significantly better crashworthiness than vehicles in the defined 'inferior' group. It is possible that vehicles within the inferior and superior crashworthiness categories also had statistically significant differences in crashworthiness. This could be assessed by examining overlap in the statistical confidence limits for any pair wise comparison of two vehicles. One of the main points in defining groups of vehicles with inferior and superior crashworthiness is to show that the analysis can differentiate with statistical precision crashworthiness between groups of vehicles within the rated vehicle population.

Eighty-seven models had ratings representing evidence of superior crashworthiness because their upper 90% confidence limits were less than the average rating. These were distributed across market group classifications as follows:

Compact Four Wheel Drives	6
Medium Four Wheel Drives	6
Large Four Wheel Drives	5
Commercial – Vans	3
Commercial – Utes	9
Large cars	14
Luxury cars	26
Medium cars	7
People Movers	3
Small cars	5
Sports cars	3

The specific models were (in order of estimated risk of serious driver injury in a crash, from lowest to highest):

- Volkswagen Passat (1998-2004)
- Kia Carnival (1999-2004)
- Peugeot 406 (1996-2004)
- Subaru Forester (2002-2004)
- Chrysler Voyager (1997-2004)
- Peugeot 306 (1994-2001)
- Honda CR-V (2002-2004)

- Holden Rodeo (2003-2004)
- Mazda 19929 / Sentia / Efini MS-9 (1992-1996)
- Honda Prelude (1997-2002)
- Saab 9000 (1986-1997)
- Ford Falcon Panel Van (1996-1999)
- Volkswagen Caravelle / Transporter (1995-2004)
- BMW 5 Series E39 (1996-2003)
- Holden Statesman/Caprice WH (1999-2003)
- Mitsubishi Pajero NM / NP (2000-2004)
- Jaguar XJ6 (1987-1994)
- Volkswagen Golf / Bora (1999-2004)
- Nissan Pathfinder / Terrano (1995-2002)
- Honda Accord (1999-2002)
- BMW 3 Series E46 (1999-2004)
- Subaru Forester (1997-2002)
- Ford Falcon Ute AU (2000-2002)
- Honda Legend (1986-1995)
- Volvo 700/900 Series (1984-1992)
- Toyota Camry (2002-2004)
- Mercedes Benz E-Class W210 (1996-2002)
- Honda CR-V (1997-2001)
- Nissan Navara (1997-2004)
- Toyota Landcruiser (1998-2004)
- Nissan Patrol / Safari (1998-2004)
- Mercedes Benz E-Class W124 (1986-1994)
- Holden Vectra (1997-2003)
- Land Rover Range Rover (1982-1994)
- Ford Mondeo (1995-2001)
- Toyota Avalon (2000-2004)
- Land Rover Discovery (1991-2002)
- Subaru Liberty / Legacy / Outback (1999-2003)
- Toyota RAV4 (2001-2004)
- Mercedes Benz C-Class W22002 (1995-2000)
- Saab 900/9-3 (1994-2002)
- Holden Commodore VY/VZ (2002-2004)
- Nissan / Ford Patrol / Maverick / Safari (1988-1997)
- Peugeot 505 (1982-1993)
- Ford Falcon BA (2002-2004)
- Honda Integra (1993-2001)
- Mitsubishi Pajero (1992-1999)
- Holden Astra TR (1996-1998)
- Honda Integra (1990-1992)
- Toyota RAV4 (1994-2000)
- Nissan Maxima / Cefiro (1995-1999)
- Ford Falcon AU (1998-2002)
- Holden Commodore VT/VX (1997-2002)
- Toyota Tarago / Previa / Estima (1991-1999)

- Toyota Corolla (1998-2001)
- Holden / Isuzu Jackaroo / Bighorn (1982-1991)
- Toyota Cressida / Mark II (1989-1993)
- Honda Accord (1991-1993)
- Volvo 200 Series (1982-1993)
- Volvo 850/S70/V70/C70 (1992-2004)
- Honda Accord (1994-1998)
- Nissan Navara (1992-1996)
- Jeep Cherokee XJ (1996-2000)
- Nissan Bluebird (1993-1997)
- Ford Fairlane N & LTD D (1988-1994)
- Ford Falcon Ute (1996-1999)
- Toyota Camry (1998-2002)
- Holden Rodeo (1999-2002)
- Holden Astra TS (1998-2004)
- Toyota Landcruiser (1990-1997)
- BMW 3 Series E36 (1992-1998)
- Ford Falcon EF/EL (1994-1998)
- Mitsubishi Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante (1996-2003)
- Toyota Hilux (1998-2002)
- Subaru Liberty / Legacy / Outback (1994-1998)
- Holden Rodeo (1996-1998)
- Toyota Hiace/Liteace (1996-2004)
- Holden / Toyota Commodore VR/VS / Lexcen (1993-1997)
- Mitsubishi Magna TR/TS / Verada KR/KS / V3000 / Diamante (1991-1996)
- Ford / Mazda Telstar / 626 / MX6 / Capella / Cronos (1992-1997)
- BMW 3 Series E30 (1982-1991)
- Ford Falcon EB Series II / Falcon ED (Apr 1992-1994)
- Honda Accord (1986-1990)
- Subaru Liberty / Legacy (1989-1993)
- Ford Falcon EA / Falcon EB Series I (1988-Mar 1992)
- Holden Commodore Ute VR/VS (1994-2000)
- Holden / Toyota Apollo JM/JP / Camry / Sceptor (1993-1997)

Seventy-two models had ratings representing evidence of inferior crashworthiness because their lower confidence limits were greater than the average rating. These were distributed across market group classifications as follows:

Compact Four Wheel Drives	2
Commercial – Vans	6
Commercial – Utes	3
Large cars	2
Luxury cars	1
Medium cars	7
People Movers	3
Light cars	23
Small cars	14

Sports cars	11

The specific models were (in order of estimated risk of serious driver injury in a crash, from highest to lowest):

- Daihatsu Hi-Jet (1982-1990)
- Suzuki Alto (1985-2000)
- Mitsubishi Starion (1982-1987)
- Daihatsu Mira (1990-1996)
- Holden / Suzuki Scurry / Carry (1982-2000)
- Suzuki Mighty Boy (1985-1988)
- Suzuki Hatch / Alto (1982-1984)
- Hyundai Getz (2002-2004)
- Subaru Sherpa / Fiori / 700 / Rex (1989-1992)
- Daihatsu Handivan (1982-1990)
- Suzuki Swift (1982-1985)
- Alfa Romeo GTV (1982-1984)
- Nissan Exa (1983-1986)
- Daihatsu Charade (1982-1986)
- Mitsubishi Starwagon / L300 (1983-1986)
- Toyota MR2 (1987-1990)
- Nissan NX/NX-R (1991-1996)
- Holden / Suzuki Barina / Swift / Cultus (1986-1988)
- Honda City (1983-1986)
- Volkswagen Golf (1982-1994)
- Nissan Micra (1995-1997)
- Daihatsu Rocky / Rugger (1985-1998)
- Subaru Brumby (1982-1992)
- Holden Shuttle / WFR Van (1982-1987)
- Hyundai Coupe (1996-2000)
- Honda CRX (1987-1991)
- Hyundai Excel (1986-1990)
- Toyota Supra (1982-1990)
- Daihatsu Charade (1988-1992)
- Honda Civic / Ballade / Shuttle (1984-1987)
- Daihatsu Charade (1993-2000)
- Ford Festiva WD/WH/WF (1994-2001)
- Ford / Mazda Festiva WA / 121 (1987-1990)
- Holden / Nissan Astra / Pulsar / Langley (1984-1986)
- Nissan Gazelle / Silvia (1984-1986)
- Daewoo Espero (1995-1997)
- Mitsubishi Mirage / Colt (1982-1988)
- Mitsubishi Cordia (1983-1987)
- Holden Gemini RB (1986-1987)
- Holden / Suzuki Barina / Swift / Cultus (1989-1999)
- Toyota Hiace/Liteace (1982-1986)
- Toyota Tarago (1983-1989)
- Mazda RX7 (1982-1985)

- Holden WB Series (1982-1985)
- Ford / Mazda Laser / 323 / Familia (1982-1988)
- Holden / Suzuki Drover / Sierra / Samurai / SJ410 / SJ413 (1982-1999)
- Holden Gemini (1982-1984)
- Ford Capri (1989-1994)
- Hyundai Excel (1990-1994)
- Holden Camira (1982-1989)
- Hyundai S Coupe (1990-1996)
- Mitsubishi Starwagon / Delica Starwagon (1987-1993)
- Nissan Bluebird (1982-1986)
- Honda Accord (1982-1985)
- Daewoo Lanos (1997-2003)
- Toyota Corolla (1982-1984)
- Honda Civic (1982-1983)
- Hyundai Excel / Accent (1995-2000)
- Toyota Starlet (1996-1999)
- Toyota Corolla (1986-1988)
- Hyundai Accent (2000-2004)
- Holden / Nissan Astra / Pulsar / Vector / Sentra (1988-1990)
- Toyota Hiace/Liteace (1987-1989)
- Holden Barina SB (1995-2000)
- Subaru 1800 / Leone / Omega / 4WD Wagon (1982-1993)
- Honda Civic / Shuttle (1988-1991)
- Toyota Corona (1982-1988)
- Mitsubishi Sigma / Galant / Sapporo / Lambda (1982-1984)
- Holden Commodore VB-VL (1982-1988)
- Nissan / Ford Pintara / Corsair / Bluebird (1989-1992)
- Toyota / Holden Corolla / Nova (1989-1993)
- Mitsubishi Magna TM/TN/TP / Sigma / V3000 (1985-1990)

5.2 Aggressivity

5.2.1 Aggressivity towards Other Car Drivers and Unprotected Road Users

Using the methods described in Section 4.2, logistic regression models of the injury risk and injury severity of the focus road user were built separately as functions of both vehicle model and market group of the focus vehicle colliding with the other road user whose injury outcome is being modelled. Variations in the other factors listed in Section 4.2.1, including other road user type, were adjusted in the model by including them as predictors in the logistic regression models along with the focus vehicle model or market group. The aggressivity injury risk measure is based only on the injury outcome to drivers of other vehicles.

The logistic regression models of the injury risk of focus drivers showed the following factors to be statistically significant predictors and these factors were included in the logistic model (factors age and sex refer to focus driver whose injury outcome is being modelled).

Base effect terms	First order interactions	Second order interaction
Sex	Sex*Year	Sex*State*Year
Speedzone	Age*Speedzone	
Age	Age*Sex	
State	Age*Year	
Year	Speedzone*Year	
	Speedzone*State	
	Age*State	
	State*Year	
	Sex*State	

In addition, the make and model of the focus vehicle was also a statistically significant predictor of focus driver injury risk when added to the logistic model. This indicated that there is differential performance between vehicle models in terms of their aggressivity towards drivers of other vehicles so far as injury risk is concerned. In the same manner, when vehicle market group was substituted for vehicle model in the logistic regression equation, it was also a significant predictor of focus driver injury risk. The average aggressivity injury risk in the data was 16.47%.

The logistic regression models of the injury severity of focus road users showed the following factors to be statistically significant predictors. These factors were included in the logistic model (factors age and sex refer to the age and sex of the other driver or unprotected road user).

Base effect terms	First order interactions	Second order interaction
Sex	Sex*State	Age*Sex*State
Speedzone	Sex*Crashtype	Speedzone*State*Crashtype
Age	Age*Sex	Speedzone*State*Year
State	Age*Crashtype	Age*State*Crashtype
Year	Year*Crashtype	Speedzone*Year*Crashtype
Crashtype	Speedzone*State	
	Age*State	
	State*Crashtype	
	State*Year	
	Speedzone*Year	
	Speedzone*Crashtype	

The model of the focus vehicle was also a statistically significant predictor of injury severity, as was the vehicle market group when substituted for vehicle model in the logistic regression equation. The average aggressivity injury severity in the data was 23.71%.

Final estimates of vehicle aggressivity towards other road users were obtained by multiplying the estimated injury risk and injury severity components for each vehicle. Confidence limits on each of the estimated aggressivity ratings were calculated using the methods described in Section 4.2.1 above. The average aggressivity rating in the data, used for comparisons against aggressivity of individual vehicle models was 4.08%.

Accurate aggressivity ratings were obtained for 284 of the 294 different vehicle models that satisfied the inclusion criteria for analysis. Of the 294 vehicle models satisfying the inclusion criteria for analysis described above, 10 vehicle models were excluded from presentation

through application of the same exclusion criteria used for the crashworthiness ratings. The estimated aggressivity ratings and their injury risk and injury severity components for individual vehicle models are given in Appendix 5 along with 95% confidence limits on the estimated aggressivity ratings.

Analysis by Market Groups

Table 8 summarises the estimated injury risk, injury severity and aggressivity ratings by the 12 broad market groups along with the estimated 95% confidence limits on the aggressivity ratings. The estimated aggressivity rating is the expected number of road users killed or seriously injured per 100 involved in two-car tow-away collisions where their vehicle impacts with one of the designated models or market groups. Table 8 shows large four wheel drive vehicles to be the most aggressive towards drivers of other vehicles, with an average of 6.09 unprotected road users or drivers being killed or seriously injured for every 100 tow-away crashes with a large four wheel drive. Similarly, Table 8 shows light cars to be the least aggressive towards unprotected road users or drivers of other vehicles, with an average aggressivity rating of 2.66.

Table 8: *Estimated Vehicle Aggressivity towards Other Drivers and Unprotected Road Users by Market Grouping*

Market Group	Other Driver Injury Risk (%)	Other Driver Injury Severity (%)	Aggressivity Rating *	Overall rank order	Lower 95% Confidence limit	Upper 95% Confidence limit	Width of Confidence interval
Overall Average	**16.47**	**23.71**	**3.91**				
COMPACT FOUR WHEEL DRIVE	15.21	23.64	3.60	6	3.28	3.94	0.66
MEDIUM FOUR WHEEL DRIVE	19.46	24.24	4.72	9	4.31	5.16	0.85
LARGE FOUR WHEEL DRIVE	20.98	29.03	6.09	12	5.78	6.42	0.63
COMMERCIAL - VAN	20.17	24.89	5.02	11	4.72	5.34	0.63
COMMERCIAL - UTE	18.36	25.85	4.75	10	4.56	4.94	0.37
LARGE	16.15	23.19	3.74	7	3.65	3.84	0.18
LUXURY	15.20	22.25	3.38	4	3.22	3.55	0.32
MEDIUM	14.95	21.95	3.28	3	3.17	3.39	0.22
PEOPLE MOVERS	18.25	24.24	4.42	8	4.11	4.76	0.64
LIGHT	12.50	21.30	2.66	1	2.56	2.77	0.22
SMALL	13.03	21.87	2.85	2	2.77	2.93	0.17
SPORTS	15.45	22.72	3.51	5	3.28	3.76	0.48

* Serious injury rate per 100 drivers of other vehicles and unprotected road users involved in collisions with vehicles from the given market group

5.2.2 Aggressivity Rating Statistically Significant Makes and Models

Appendix 5 shows the estimated aggressivity ratings towards drivers of other vehicles and unprotected road users for the 284 individual vehicle models rated. Ratings ranged from a minimum of 1.36 serious injuries per 100 crashes for the 1983-1992 Alfa Romeo 33 to a maximum of 8.62 serious injuries per 100 crashes for the 2001-04 Holden Monaro. Of the 284 individual vehicle models for which an aggressivity rating was calculated, 74 models had an aggressivity rating which was significantly less (better) than the overall average of 4.08 serious injuries per 100 tow-away crashes. These seventy-four vehicle models were distributed across market group classifications as follows:

Compact Four Wheel Drives	3
Commercial – Vans	2
Commercial – Utes	1
Large cars	1
Luxury cars	4
Medium cars	7
Light cars	22
Small cars	31
Sports cars	3

The models were, in order of increasing aggressivity:

- Alfa Romeo 33 (1983-1992)
- Suzuki Baleno / Cultus Crescent (1995-2002)
- Renault Feugo (1982-1987)
- Daihatsu Pyzar (1997-2001)
- Daihatsu Terios (1997-2004)
- Honda Acty (1983-1986)
- Mazda 121 Metro / Demio (1997-2002)
- Saab 900 Series (1982-1992)
- Subaru Forester (1997-2002)
- Ford Escort (1982-1982)
- Suzuki Mighty Boy (1985-1988)
- Holden Barina XC (2001-2004)
- Daihatsu Sirion / Storia (1998-2004)
- Chrysler Neon (1996-1999)
- Hyundai S Coupe (1990-1996)
- Honda Civic (1982-1983)
- Honda Integra (1986-1988)
- Daihatsu Handivan (1982-1990)
- Honda Accord (1991-1993)
- Daihatsu Charade (1988-1992)
- Mazda 121 / Autozam Review (1994-1996)
- Mercedes Benz C-Class W202 (1995-2000)
- Subaru Sherpa / Fiori / 700 / Rex (1989-1992)
- Toyota Echo (1999-2004)
- Honda Civic (1996-2000)
- Mazda 323 / Familia / Lantis (1990-1993)
- Daewoo Cielo (1995-1997)
- Ford Capri (1989-1994)
- Daihatsu Mira (1990-1996)
- Honda Accord (1982-1985)
- Mitsubishi Lancer / Mirage CC (1993-1995)
- Mazda 323 / Familia / Lantis (1995-1998)
- Hyundai Accent (2000-2004)
- Toyota Corolla (1982-1984)
- Daihatsu Charade (1993-2000)
- Holden / Suzuki Barina / Swift / Cultus (1989-1999)

- Ford Festiva WD/WH/WF (1994-2001)
- Ford / Mazda Festiva WA / 121 (1987-1990)
- Holden / Suzuki Barina / Swift / Cultus (1986-1988)
- Toyota / Holden Corolla / Nova (1994-1997)
- Honda CR-V (1997-2001)
- Ford / Mazda Laser / 323 (1999-2003)
- Daewoo Nubira (1997-2003)
- Toyota Starlet (1996-1999)
- Daihatsu Charade (1982-1986)
- Nissan Bluebird (1993-1997)
- Holden Gemini (1982-1984)
- Ford / Mazda Telstar / 626 / MX6 / Capella / Cronos (1992-1997)
- Daihatsu Applause (1989-1999)
- Mitsubishi Lancer / Mirage CA (1989-1990)
- Subaru 1800 / Leone / Omega / 4WD Wagon (1982-1993)
- Holden Astra TS (1998-2004)
- Holden Barina SB (1995-2000)
- Nissan Pulsar / Vector / Sentra (1996-1999)
- Mitsubishi Lancer / Mirage CE (1996-2003)
- Honda Civic / Shuttle (1988-1991)
- Hyundai Excel (1990-1994)
- Ford Laser (1995-1997)
- Ford / Mazda Laser / 323 / Familia (1982-1988)
- Ford Laser (1991-1994)
- Mitsubishi Mirage / Colt (1982-1988)
- Toyota Corolla (1986-1988)
- Honda Civic / Ballade / Shuttle (1984-1987)
- Hyundai Excel / Accent (1995-2000)
- Nissan Bluebird (1982-1986)
- Toyota / Holden Corolla / Nova (1989-1993)
- Toyota Corolla (1998-2001)
- Ford / Mazda Telstar / 626 / MX6 / Capella (1983-1986)
- Nissan Pulsar / Vector / Sentra (1992-1995)
- Holden / Nissan Astra / Pulsar / Vector / Sentra (1988-1990)
- Holden / Nissan Astra / Pulsar / Langley (1984-1986)
- Mitsubishi Sigma / Galant / Sapporo / Lambda (1982-1984)
- Toyota Corona (1982-1988)
- Holden / Toyota Commodore VN/VP / Lexcen (1989-1993)

Similarly, 56 models had an aggressivity rating which was significantly greater (worse) than the overall average of 4.08 serious injuries per 100 tow away crashes. These fifty-six vehicle models were distributed across market group classifications as follows:

Compact Four Wheel Drives	2
Medium Four Wheel Drives	4
Large Four Wheel Drives	7
Commercial – Van	6
Commercial – Ute	19

Large cars	7
Luxury cars	2
People Mover	3
Small cars	1
Sports cars	3

The models were, in order of decreasing aggressivity:

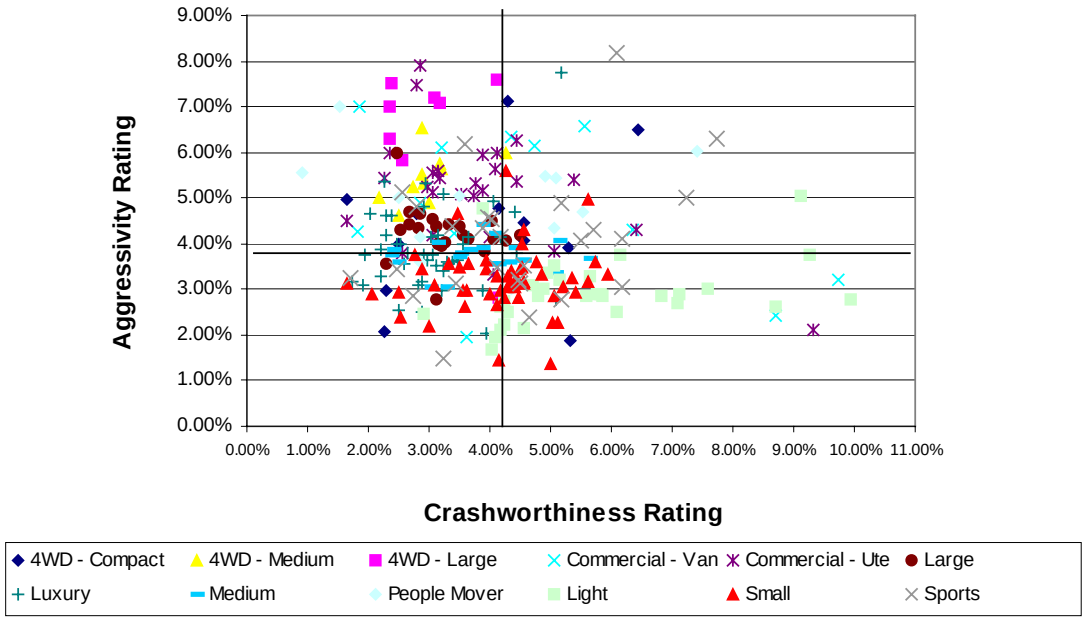
- Holden Monaro (2001-2004)
- Toyota Hilux (2003-2004)
- Toyota Supra (1982-1990)
- Ford Ford F-Series (1982-1992)
- Jaguar XJ6 (1982-1986)
- Toyota Landcruiser (1982-1989)
- Land Rover Range Rover (1982-1994)
- Holden Commodore VY/VZ Ute (2002-2004)
- Mercedes Benz Vito (1999-2004)
- Toyota Landcruiser (1990-1997)
- Honda HR-V (1999-2002)
- Nissan Patrol / Safari (1982-1987)
- Chrysler Voyager (1997-2004)
- Nissan Patrol / Safari (1998-2004)
- Volkswagen Caravelle / Transporter (1995-2004)
- Toyota Hiace/Liteace (1982-1986)
- Holden / Isuzu Jackaroo / Bighorn (1982-1991)
- Daihatsu Rocky / Rugger (1985-1998)
- Toyota Hiace/Liteace (1990-1995)
- Toyota Landcruiser (1998-2004)
- Nissan Exa (1983-1986)
- Toyota 4Runner/Hilux (1982-1985)
- Nissan 300ZX / Fairlady Z (1990-1995)
- Toyota Hiace/Liteace (1987-1989)
- Toyota Hiace/Liteace (1996-2004)
- Mitsubishi Starwagon / L300 (1983-1986)
- Toyota Avalon (2000-2004)
- Nissan Navara (1997-2004)
- Mitsubishi Pajero (1982-1990)
- Holden / Isuzu Rodeo / Pickup (1989-1995)
- Holden Commodore VU Ute (2000-2002)
- Nissan / Ford Patrol / Maverick / Safari (1988-1997)
- Nissan Pathfinder / Terrano (1988-1994)
- Toyota 4Runner/Hilux (1986-1988)
- Toyota Hilux (1998-2002)
- Holden Rodeo (1999-2002)
- Mitsubishi Starwagon / Delica Starwagon (1987-1993)
- Holden Rodeo (1996-1998)
- Ford Falcon Ute AU (2000-2002)
- Holden WB Series (1982-1985)

- Toyota 4Runner/Hilux (1989-1997)
- Volvo 850/S70/V70/C70 (1992-2004)
- Mitsubishi Pajero (1992-1999)
- Nissan Navara (1992-1996)
- Nissan Navara (1986-1991)
- Ford Falcon Ute (1996-1999)
- Holden Commodore Ute VR/VS (1994-2000)
- Ford / Nissan Falcon Ute / XFN Ute (1982-1995)
- Mitsubishi Cordia (1983-1987)
- Holden Commodore VT/VX (1997-2002)
- Toyota Camry (1998-2002)
- Ford Falcon XE/XF (1982-1988)
- Ford Falcon EB Series II / Falcon ED Apr (1992-1994)
- Ford Falcon EA / Falcon EB Series I (1988-Mar 1992)
- Ford Falcon EF/EL (1994-1998)

5.2.5 Relationship between Aggressivity and Crashworthiness

In assessing the British vehicle safety indices, Broughton (1996) found a strong inverse relationship between the indices for crashworthiness and aggressivity. Figure 1 shows the new aggressivity measure plotted against crashworthiness for those vehicle models with both ratings. As Figure 1 shows, the inverse relationship between the two measures is not particularly strong. The dotted lines in Figure 1 represent the average aggressivity and crashworthiness of the vehicles assessed. Points in the lower left quadrant defined by the dotted lines represent vehicles with relatively low aggressivity as well as good (low) estimated crashworthiness. This area is populated by a number of small, luxury and medium vehicle models as well as some sports vehicles and compact 4WDs. In contrast, vehicle models in the upper right quadrant of Figure 1 defined by the dotted lines show relatively poor crashworthiness and high aggressivity. There are a number of commercial vans and utilities in this quadrant along with some small vehicle models, sports vehicles, people movers and compact 4WDs. The remaining two quadrants are populated with vehicles that only perform well on either crashworthiness or aggressivity measures. Light cars tend to have low aggressivity but also poor crashworthiness whilst large and medium 4WDs tend to exhibit converse traits.

Figure 1: *Estimated Vehicle Aggressivity towards Other Drivers and Unprotected Road Users vs. Crashworthiness Rating*



Absence of a strong relationship between the measures of aggressivity and crashworthiness confirms that the two quantities considered here are measuring two different aspects of a vehicle's safety performance. Whilst one would expect some relationship between the two measures given their common but opposite relationships with mass (Broughton, 1996; Cameron et al 1998), the lack of a strong relationship suggests vehicle mass is only playing a small part in aggressivity rating relative to vehicle total safety design. The independence of these two measures does not seem to have been achieved to the same degree under other systems (Broughton, 1996).

5.3 Presentation of Crashworthiness and Aggressivity Ratings for Consumer Information

Discussion in the previous work of Cameron et al (1998) noted, for simplicity of presentation and interpretation, particularly in the area of consumer safety advice, effort needed to be made to find a method of simultaneously using the information on vehicle crashworthiness and aggressivity. Possible solutions discussed included development of a single measure of total vehicle safety or, alternatively, development of some other cohesive method of summary presentation that reflects overall vehicle safety. In Newstead et al (2000), a method of presentation of the estimated crashworthiness ratings for Australian vehicles was devised that is similar in philosophy to the presentation method devised by Folksam Insurance for presentation of Swedish ratings. The method takes into account both the rating point estimate and confidence limits, but removes the emphasis from the point estimate.

An identical approach to presenting ratings has been taken here. Rated vehicles have been classified into five categories based on the range in which the confidence limits on the estimated ratings lie. The five categories are defined as follows.

- At least 15% safer than average: if the upper confidence limit on the estimated rating is less than 0.85 times the average crashworthiness rating for the vehicle fleet.
- At least safer than average: if the upper confidence limit on the estimated rating is less than the average crashworthiness rating for the vehicle fleet.
- Average: if the confidence interval on the estimated rating overlaps the average crashworthiness rating for the vehicle fleet.
- At least less safe than average: if the lower confidence limit on the estimated rating is greater than the average crashworthiness rating for the vehicle fleet.
- At least 15% less safe than average: if the lower confidence limit on the estimated rating is greater than 1.15 times the average crashworthiness rating for the vehicle fleet.

Presentation of the estimated crashworthiness ratings in this way is shown in Appendix 6. This presentation style has the advantage that it combines information about both the rating point estimate and confidence limit to classify the safety performance of the vehicle. This method of presentation takes the potential emphasis of the consumer off comparison of only the point estimate ratings, an emphasis that can be potentially misleading from the point of view of statistical confidence. Rather, the presentation method categorises vehicles according to the statistical significance of the difference of their estimated safety rating from defined points. Colour coding of the categories would typically be used with green depicting the safest category through blue, yellow and brown to red depicting the least safe category. 90% two-sided confidence limits have been used to categorise the crashworthiness ratings in Appendix 6. These are equivalent to 95% one-sided confidence limits if a directional hypothesis of crashworthiness greater or less than the average is being assumed.

A single column at the right of the table in Appendix 6 summarises the aggressivity ratings for each vehicle. In a manner similar to the classification of crashworthiness ratings, the estimated aggressivity ratings have been classified into five categories with each represented by a symbol in the final column of the table. These are:

- xx: Much more aggressive than average – if the lower confidence limit on the estimated rating is greater than 1.15 times the average aggressivity rating for the vehicle fleet.
- x: More aggressive than average - if the lower confidence limit on the estimated aggressivity rating is greater than the average aggressivity rating for the vehicle fleet.
- **o**: Average - if the confidence interval on the estimated rating overlaps the average aggressivity rating for the vehicle fleet.
- +: Less aggressive than average - if the upper confidence limit on the estimated rating is less than the average aggressivity rating for the vehicle fleet.
- ++: Much less aggressive than average – if the upper confidence limit on the estimated rating is less than 0.85 times the average aggressivity rating for the vehicle fleet.

Some vehicle models in Appendix 6 have no symbol in the aggressivity rating column. These vehicles have been involved in an insufficient number of two-car crashes and unprotected road user crashes to have an aggressivity rating estimated for them. Assignment of vehicle aggressivity ratings to categories in Appendix 6 is based on the 90% two-sided (95% one-sided) confidence limits on the ratings to be consistent with the assignment of crashworthiness ratings to categories.

5.4 Crashworthiness by Year of Manufacture of the Australian Vehicle Fleet

5.4.1 Injury Risk

Injury risk was estimated from the data on 2,274,243 drivers involved in tow-away crashes in NSW, Western Australia and Queensland during 1987 to 2004 (as described in Section 2). This data set is referred to as the "involved drivers". Because of missing values of some of the factors to be included in the logistic regression, and the exclusion of pre-1964 vehicles and unknown years, analysis was performed on data relating to 1,971,411 involved drivers, 354,932 of whom were injured.

The "covariate" model for injury risk was determined from the variables described in Section 4.1.1. The following covariates and interactions were statistically significantly associated with injury risk and were included in the logistic regression model.

Base effect terms	First order interactions	Second order interactions	Third order interactions
Sex	Sex*Speedzone	Sex*Speedzone*Nveh	Age*Sex*Speedzone*State
Nveh	Speedzone*Nveh	Sex*State*Year	Age*Speedzone*Nveh*State
Speedzone	Sex*Nveh	Age*Speedzone*Nveh	
Age	Speedzone*Age	Age*Sex*Speedzone	
State	Age*Sex	Age*Sex*Year	
Year (of crash)	Year*State	Age*Nveh*State	
	Age*Nveh	Nveh*State*Year	
	Nveh*State	Speedzone*Nveh*State	
	Nveh*Year	Speedzone*State*Year	
	Age*State	Age*State*Year	
	Age*Year	Speedzone*Nveh*Year	
	Speedzone*State	Age*Sex*State	
	Sex*Year	Sex*Speedzone*State	
	Speedzone*Year	Age*Speedzone*State	
	Sex*State	Age*Speedzone*Year	

No other variable or interaction term significantly improved the fit of the logistic model.

The overall (average) injury risk for involved drivers in tow-away crashes in NSW, Western Australia and Queensland was 17.57%. In other words, the estimated probability that a driver involved in a tow-away crash in these states was injured was 17.57%.

Appendix 7 gives the estimates of injury risk derived by logistic regression for the individual years of manufacture. The variability in the injury risk estimates relative to the year of manufacture can be seen from the width of the corresponding 95% confidence intervals.

5.4.2 Injury Severity

The data on "injured drivers" covered 431,407 drivers who were injured in crashes in Victoria or NSW during 1987-2004 or Queensland and Western Australia during 1991-2004 (as described in Section 2). Because of missing values of some of the associated crash factors and the

exclusion of pre-1964 vehicles and unknown years, logistic regression was performed on data relating to 415,272 injured drivers, 97,572 of whom were severely injured (killed or admitted to hospital).

The "covariate" model for injury severity was determined from the variables described in Section 4.2.1. The analysis identified a number of statistically significant covariate effects. These were:

Base effect terms	First order interactions	Second order interactions	Third order interactions
Sex	Sex*Speedzone	Speedzone*Nveh*Year	Speedzone*Nveh*State*Year
Nveh	Speedzone*Nveh	Age*Speedzone*Nveh	Age*Sex*State*Year
Speedzone	Speedzone*State	Age*Sex*Year	Age*Nveh*State*Year
Age	Speedzone*Age	Age*State*Year	
State	Age*Sex	Age*Sex*State	
Year (of crash)	Year*State	Speedzone*Nveh*State	
	Age*Nveh	Speedzone*State*Year	
	Nveh*State	Sex*State*Year	
	Speedzone*Year	Nveh*State*Year	
	Age*State	Sex*Speedzone*Year	
	Age*Year	Age*Sex*Nveh	
	Sex*State	Age*Speedzone*State	
	Sex*Year	Age*Speedzone*Year	
	Nveh*Year	Age*Nveh*Year	
	Sex*Nveh	Age*Nveh*State	
		Sex*Speedzone*Nveh	
		Sex*Nveh*State	

No other variable or interaction term significantly improved the fit of the logistic model.

The overall (average) injury severity for injured drivers was 22.13%. In other words, the estimated probability that a driver injured in a crash was severely injured was 22.13%.

Appendix 7 gives the estimates of injury severity derived by logistic regression for the individual years of manufacture. The variability in the estimates of injury severity relative to year of manufacture can be seen from the width of the corresponding 95% confidence intervals.

5.4.3 Crashworthiness by Year of Manufacture

The crashworthiness estimates for each year of manufacture were obtained by multiplying the individual injury risk and injury severity estimates. Because each of the two components has been adjusted for the confounding factors, the resultant crashworthiness estimate is also adjusted for the influence of them.

Appendix 7 gives the crashworthiness estimates and the associated 95% confidence intervals for each of the 41 years of manufacture included in the analysis. Each estimate is expressed as a percentage, representing the number of drivers killed or admitted to hospital per 100 drivers involved in a tow-away crash.

The true risk of a driver being killed or admitted to hospital in a tow-away crash is only estimated by each figure, and as such each estimate has a level of uncertainty about it. This uncertainty is indicated by the confidence limits in Appendix 7. There is 95% probability that the confidence interval will cover the true risk of serious injury (death or hospital admission) to the driver of a vehicle of the particular year of manufacture.

The crashworthiness estimates and their confidence limits are plotted for each year of manufacture in Figure 2. The relatively wide confidence intervals observed on the estimates of crashworthiness for years of manufacture 1964 to 1969 and 2004 are a reflection of the smaller numbers of crashes involving vehicles manufactured in these years appearing in the data.

Figure 2: *Crashworthiness by year of manufacture (with 95% confidence limits)*

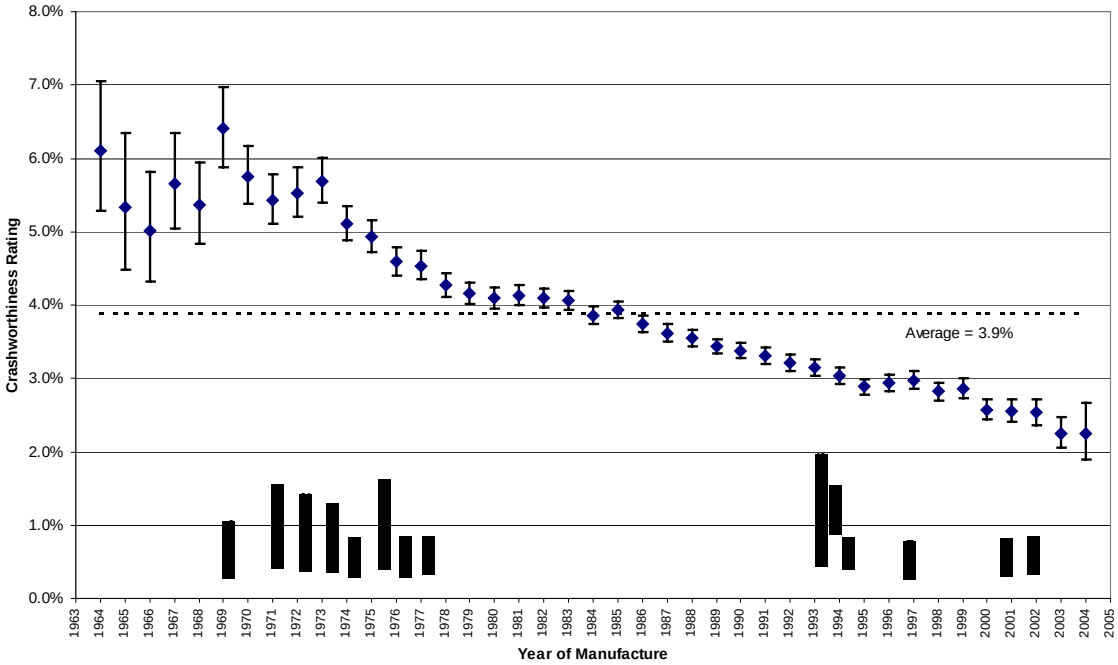


Figure 2 shows general and significant improvement in vehicle crashworthiness with increasing year of manufacture over the years considered. Specifically, little improvement can be seen in the years 1964 to 1969 followed by rapid improvement over the period 1970 to 1978 with a plateau from 1979 to 1985. Significant gains were measured over the period 1985 to 1995 with a further plateau from 1995 to 1999. There is evidence of further significant gains from 2000 with vehicles manufactured over the period 2000 to 2004 being statistically significantly safer on average than those manufactured before 1999.

To summarise the magnitude of the improvement in crashworthiness seen in vehicles during the 1970s, the average crashworthiness estimate for the 1978-85 year vehicles was compared with the average for those manufactured during 1964-69. This showed a reduction of approximately 27% in the risk of serious injury for drivers involved in tow-away crashes between these two time periods. Further statistically significant improvements in crashworthiness have also been observed over the period 1986 to 2004. Comparing average crashworthiness of vehicles manufactured in the period 1978-85 with those manufactured from 1986-1990, 1991-1995 and 1996-2003 showed improvements of 14%, 24% and 34% respectively compared to the reference time period. 2004 year of manufacture has been excluded from these comparisons because of the relatively wide confidence limits on the crashworthiness estimate. Over the entire 41 years of

vehicle manufacture analysed, the risk of driver death or serious injury in a crash has reduced by about 63%.

The injury risk component of the crashworthiness estimate, together with its 95% confidence limits, is plotted in Figure 3. In a similar way, the injury severity component is plotted in Figure 4. Examination of these figures together shows the improvements in crashworthiness with year of manufacture observed in Figure 2 are due to decreases in both the risk and severity of injury, with larger reductions in injury risk. Reductions in injury risk of around 46% over the 41 years of manufacture studied were observed in Figure 3. In contrast, Figure 4 shows a reduction in injury severity of around 32% over the same years of manufacture.

Figure 3: *Injury risk by year of manufacture (with 95% confidence limits)*

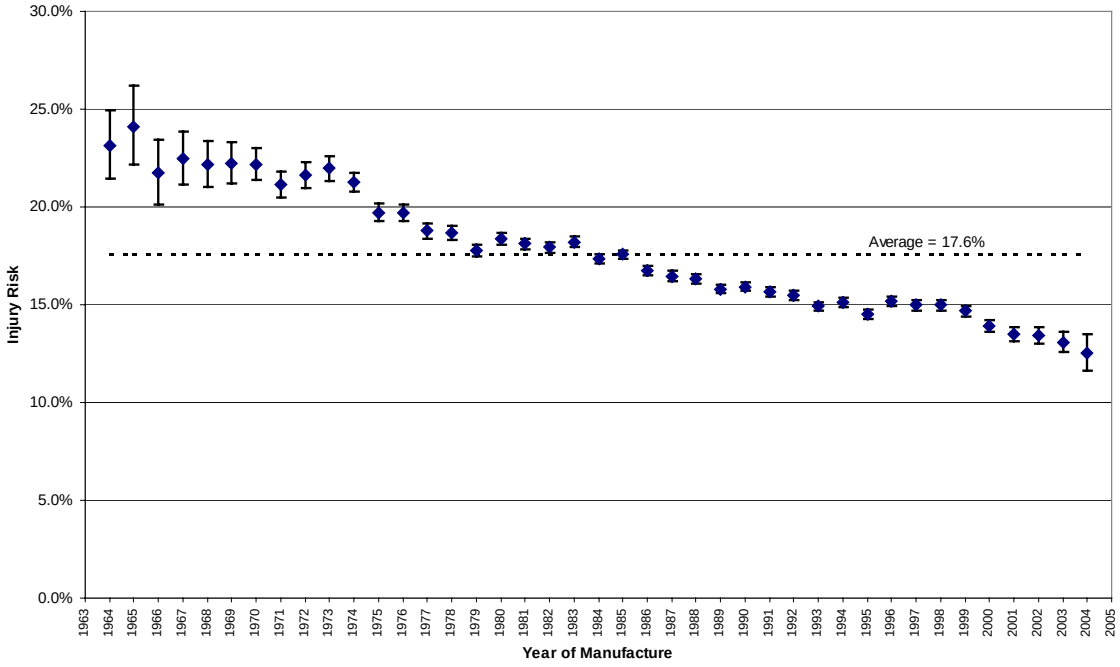
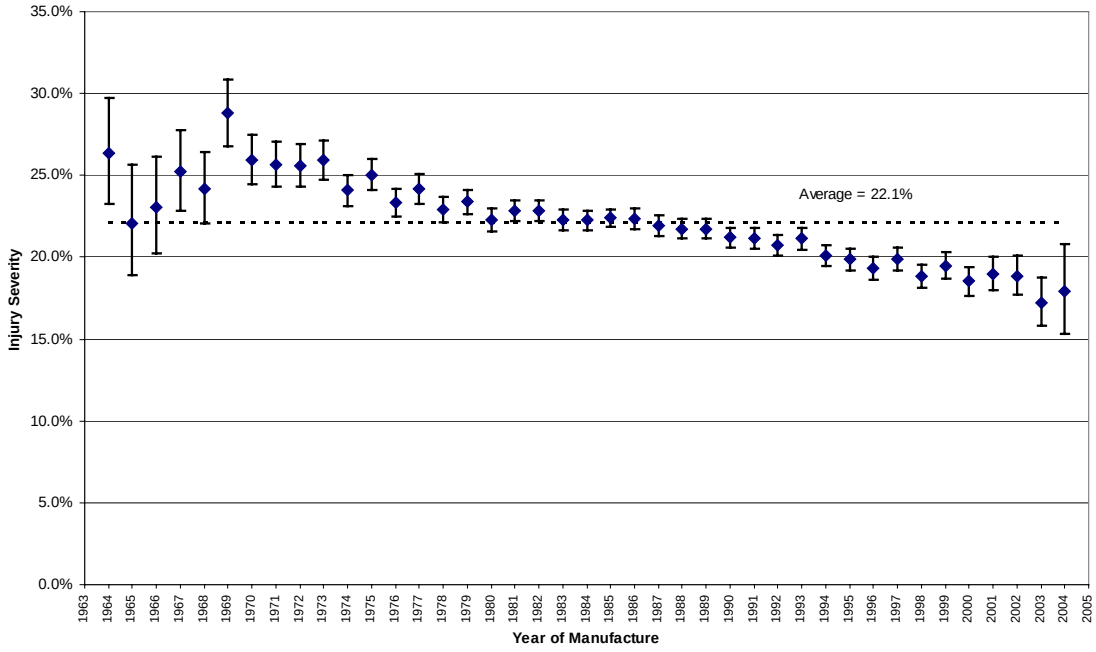


Figure 4: *Injury severity by year of manufacture (with 95% confidence limits)*



5.4.4 Discussion on the Analysis of Crashworthiness by Year of Manufacture

The findings of this research are closely consistent with those of the original study by Cameron et al (1994a) for the years of manufacture common to both. This is as expected given that the data used in the analysis here is an extension of that used in Cameron et al's study with the addition of crashes occurring in Victoria and NSW during 1993 to 2004 and Western Australia and Queensland during 1991-2004. As shown by Cameron et al, after a period of little change during the late 1960s, there was rapid improvement over the years from about 1970 to 1979. Drivers of vehicles manufactured during these years could be expected to have benefited from the implementation of a number of Australian Design Rules (ADRs) for motor vehicle safety which previous research has shown to be effective in providing occupant protection (Cameron 1987), namely:

- ADR 4 (seat belts fitted in front seats) from January 1969
- ADR 2 ("anti-burst" door latches and hinges) from January 1971
- ADR 10A ("energy-absorbing" steering columns) also from January 1971
- ADR 22 (head restraints) from January 1972
- ADR 10B (steering columns with limited rearward displacement) from January 1973
- ADR 4B (inertia reel seat belts fitted in front seats) from January 1975
- ADR 22A (minimum-height adjustable head restraints) from January 1975
- ADR 29 (side door strength) from January 1977.

In addition, the following ADRs introduced over the same period could also be expected to have provided increased injury protection for drivers:

- ADR 5A (seat belt anchorage points for front seats) from January 1969
- ADR 3 (strengthened seat anchorages) from January 1971
- ADR 8 (safety glass in windscreens and side windows) from July 1971
- ADR 11 ("padded" sun visors) from January 1972
- ADR 14 ("breakaway" rear vision mirrors) from January 1972

- ADR 21 ("padded" instrument panels) from January 1973
- ADR 4A (improved seat belt buckles), effective from April 1974
- ADR 5B (improved location of seat belt anchorages) from January 1975
- ADR 4C (dual-sensing locking retractor inertia reel seat belts) from January 1976.

The years of implementation of these ADRs are shown on Figure 2 for comparison with the crashworthiness estimates for the vehicles manufactured during the 1970s.

This study extends previous work to provide estimates of the relative crashworthiness of vehicles manufactured in 2004 as well as more accurate estimates for prior years, particularly the late 1990s. Figure 2 shows a clear trend to improving vehicle crashworthiness by year of manufacture throughout the early 1990s and now from the year 2000 onwards. It is most likely that these improvements have stemmed from vehicle manufacturer reaction to two areas of activity in vehicle safety that emerged during the 1990s, namely:

- The introduction of programs to give advice to consumers on relative vehicle safety performance. Vehicle crashworthiness ratings ranking vehicles' relative driver protection based on real crash data were first published in 1992 and have been updated regularly since then providing a measure of the relative safety of a large number of the most popular vehicles in the Australian fleet. The Australian New Car Assessment Program (ANCAP), which rates relative driver and front left passenger protection based on controlled laboratory impact testing of vehicles, first published test results in April 1993 for 9 popular vehicle models. Regular releases covering many of the most popular new vehicle models followed. In the late 1990s, ANCAP was harmonised with EuroNCAP to provide a test protocol considering frontal offset and side impact tests as well as a pedestrian impact. The move to harmonisation with EuroNCAP has widened the range of models tested and increased the public profile of the test program, further emphasising safety as an issue for consumer vehicle choice.

- Drafting and implementation of three new Australian Design Rules (ADRs) specifying standards for occupant protection in passenger cars as part of the Motor Vehicle Standards Act. They are ADRs 69, 72 and 73. A brief description of each follows.

    - ADR 69 sets standards for vehicle occupant protection in full frontal collisions (involving the full width of the front of the vehicle). It was approved as a national standard on 16th December 1992, coming into effect for all newly released passenger car models (class MA) on 1st July 1995 and for all new passenger cars (class MA) sold from 1st January 1996. All newly released and all new forward control passenger vehicles (class MB) and off road passenger vehicles (class MC) were required to comply with the standard from 1st January 1998 and 1st January 2000 respectively. A similar staged compliance was also introduced for certain light goods vehicles (class NA1) on July 1st 1998 and 1st July 2004 for all newly released vehicles and all new vehicles respectively. The classes required to be compliant cover the majority of the passenger carrying vehicle fleet.

    - ADR 72 sets standards for vehicle occupant protection in side impact collisions through conduct of a dynamic test. It was approved as a national standard on 7th January 1997. It came into effect for all newly released passenger car models (class MA) on 1st January 1999 and for all new passenger cars (class MA) sold from 1st January 2004. All newly released and all new forward control passenger vehicles

(class MB) and off road passenger vehicles (class MC) were required to comply with the standard from 1st January 2000 and 1st January 2004 respectively. A similar staged compliance was also introduced for light goods vehicles (class NA) on July 1st 2000 and 1st July 2005 for all newly released vehicles and all new vehicles respectively. Again, the classes required to be compliant cover the majority of the passenger carrying vehicle fleet.

- ADR 73 sets standards for vehicle occupant protection in an offset frontal collision (involving 40% of the width of the front of the vehicle). It was approved as a national standard on 20th July 1998. It came into effect for all newly released passenger car models (class MA) with a gross vehicle mass of less than 2.5 tonnes on 1st January 2000 and for all new passenger cars (class MA) with a gross vehicle mass of less than 2.5 tonnes sold from 1st January 2004. No other class of vehicle is covered by this standard, including forward control passenger vehicles (class MB) and off road passenger vehicles (class MC).

It might be expected that consumer vehicle safety advice such as crashworthiness ratings and ANCAP, which rate a vehicle's relative occupant protection, may encourage vehicle manufacturers to raise the priority of occupant protection in vehicle design so as to have their product perform well in these safety ratings. The implementation of the three new ADRs occurred from the mid 1990s but it is also possible that manufacturers worked towards meeting these standards in their new vehicles well before compliance was required, hence showing benefits over the period from the early 1990s onwards. Many imported vehicles already meet overseas design rules before their introduction in Australia as ADRs. The last five points of Figure 2 seem, and particularly the last 2 points, to suggest a particularly notable effect of the introduction of ADRs 72 and 73.

In interpreting the estimated trends in crashworthiness by year of manufacture, it should be noted that each estimate represents the average crashworthiness of vehicles of that year of manufacture appearing in the available crash data. As such, the estimated trends not only represent the effects of changes to vehicle safety standards through improved design and specification, to a certain degree they also represent changes in the mix of vehicles in the fleets from which the crash data are drawn. Trends may reflect changes in the proportion of each market segment represented in the fleet over time. Trends in crashworthiness within each specific market group are further investigated below. As found in Newstead and Cameron (2001), trends may also reflect buyer choice for specific makes and models over time, with the crashworthiness of the more popular vehicle models altering the average. Specifically, Newstead and Cameron (2001) found that buyer preference based on price for less safe small cars during the 1990s was limiting improvement in the average crashworthiness of the fleet over that time. This is reflected in the plateau of Figure 2 during the mid 1990s.

Because interpretation of the trends in crashworthiness over time are as described, what Figure 2 represents is a monitor of the real crashworthiness performance of the Australian vehicle fleet by year of manufacture. Given the data from which the trends are estimated cover four of Australia's largest states, it is likely the estimates accurately represent national trends in Australia, despite the data not being available nationally. Trends are a function of improvements in vehicle design and specification, changes in the representation of market group in the fleet as well as buyer preference for specific makes and models. Future trends can be influenced by bringing about changes in any of these factors. It should also be noted that because year of crash is included as a factor in the logistic regression models used to estimate crashworthiness by year

of manufacture, the estimates presented in Figures 2 to 4 do not reflect general improvements in safety observed in the states from which data has been analysed. They reflect only the composition and safety performance improvements of the vehicle fleet.

Further updates of the study of crashworthiness by year of vehicle manufacture for the Australian vehicle fleet are planned for the future. Adding additional years' crash data will further improve the statistical accuracy of estimates as well as adding estimates for further years of manufacture.

5.5 Crashworthiness by Year of Manufacture and Market Group for the Australian Vehicle Fleet

Using the methods of Newstead and Cameron (2001), trends in vehicle crashworthiness by year of manufacture have been estimated separately for each vehicle market group. Unlike Newstead and Cameron (2001) who only estimated trends within four market groups of vehicle (small, medium, large and four wheel drive) analysis here has considered each of the 12 market groups into which vehicles are classified in the crashworthiness and aggressivity ratings presented above. Because vehicle model information was required to assign a market grouping, analysis of trends by year of manufacture within market group could only be carried out for vehicles manufactured from 1982 to 2004. In contrast to estimation of crashworthiness ratings by vehicle model, there was no minimum data requirement for a particular model to be included in the analysis. Hence all vehicle models for which a market group could be assigned were included. However, despite aggregation over vehicle models, it was not possible to estimate crashworthiness estimates for particular years of manufacture in certain market groups due to insufficient data quantities.

In the analysis presented by Newstead and Cameron (2001), relative trends in crashworthiness by year of vehicle manufacture across market groups were presented after removing the overall trend in the combined data. A further difference in the analysis presented here compared to that of Newstead and Cameron (2001) is that the overall trend in the data has not been removed. This makes the analysis by market group presented here more directly comparable with the overall analysis by year of manufacture presented in Section 5.4 above.

5.5.1 Injury Risk

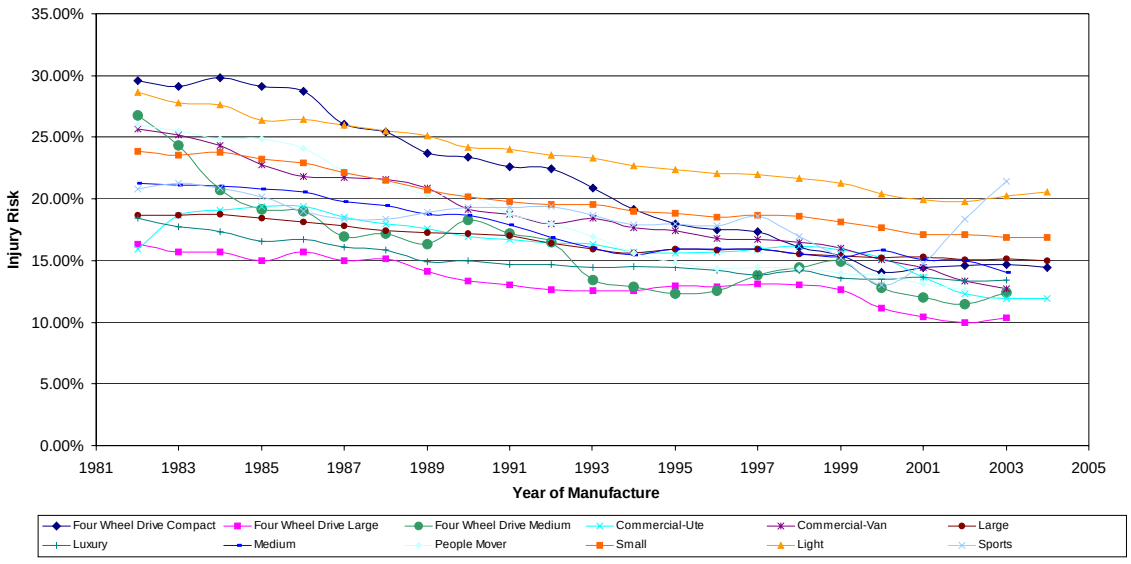
Injury risk was estimated from the data on 1,224,797 drivers of 1982 to 2004 vehicles with identified model and market group details involved in tow-away crashes in NSW, Western Australia and Queensland during 1987 to 2004. The "covariate" model for injury risk was determined from the variables described above. The following covariates and interactions were statistically significantly associated with injury risk and were included in the logistic regression model.

Base effect terms	First order interactions	Second order interactions
Sex	Sex*Speedzone	Sex*Speedzone*Nveh
Nveh	Speedzone*Nveh	Age*Speedzone*Nveh
Speedzone	Sex*Nveh	Age*Nveh*State
Age	Speedzone*Age	Nveh*State*Year
State	Age*Sex	Speedzone*Nveh*State
Year (of crash)	Year*State	Age*Sex*Speedzone
	Age*Nveh	Age*Speedzone*Year
	Nveh*State	Speedzone*Nveh*Year
	Nveh*Year	
	Age*State	
	Age*Year	
	Speedzone*State	
	Speedzone*Year	

No other variable or interaction term significantly improved the fit of the logistic covariate model. A term representing the interaction of vehicle year of manufacture and market group was added to the covariate model and the model re-estimated.

Figure 5 shows the estimates of injury risk by year of vehicle manufacture for each of the 12 market groups considered. Estimates have been smoothed using a linear smoothing function over a window of three years (the central year and a year either side). Smoothing of the estimates was carried out to better identify the trends in the data. Smoothing in this way also compensates for known error in the recording of the year of vehicle manufacture, an error typically up to one year from the true date of manufacture.

Figure 5: *Estimated injury risk by year of vehicle manufacture and market group*



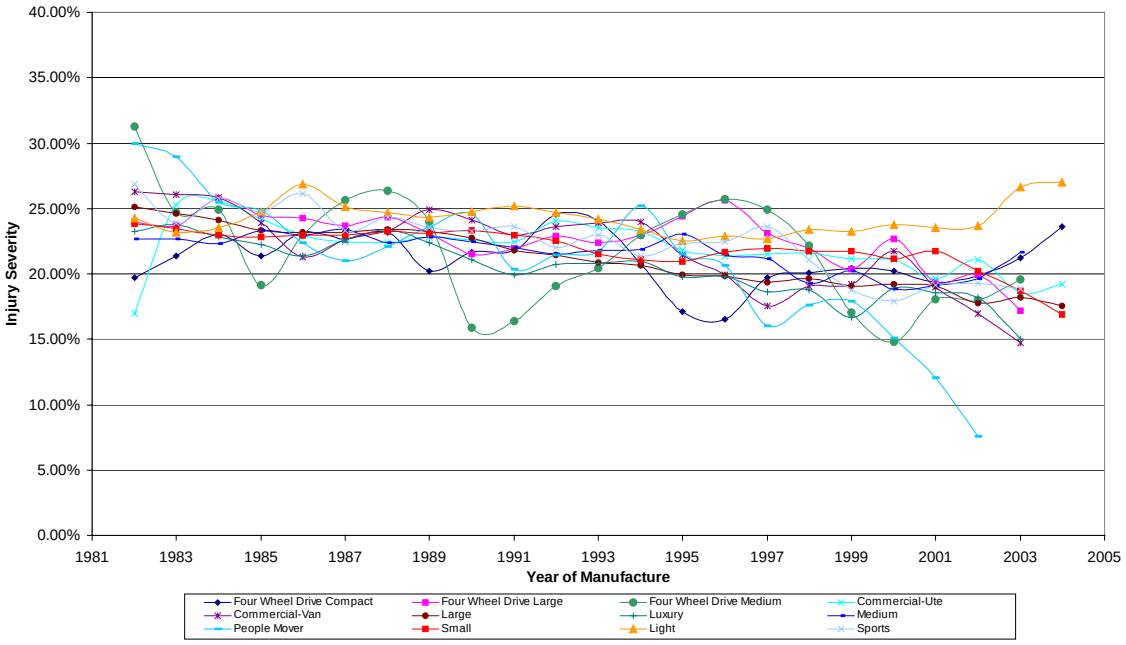
5.5.2 Injury Severity

The data for computation of injury severity covered 210,793 drivers of 1982-2004 model vehicles who were injured in crashes in Victoria or NSW during 1987-2004 or Queensland or Western Australia during 1991-2004. The "covariate" model for injury severity was determined from the variables described above and identified a number of statistically significant covariate effects. These were:

Base effect terms	First order interactions	Second order interactions
Sex	Sex*Speedzone	Speedzone*Nveh*State
Nveh	Sex*State	Speedzone*State*Year
Speedzone	Age*Sex	Age*Nveh*State
Age	Nveh*State	Age*State*Year
State	Speedzone*State	
Year (of crash)	Year*State	
	Age*Nveh	
	Age*State	
	Age*Year	
	Speedzone*Year	
	Speedzone*Nveh	
	Nveh*Year	

No other variable or interaction term significantly improved the fit of the logistic covariate model. A term representing the interaction of vehicle year of manufacture and market group was added to the covariate model and the model re-estimated. Figure 6 shows the estimates of injury severity by year of vehicle manufacture for each of the 12 market groups considered. Estimates have again been smoothed to better identify the trends in the data.

Figure 6: *Estimated injury severity by year of vehicle manufacture and market group*

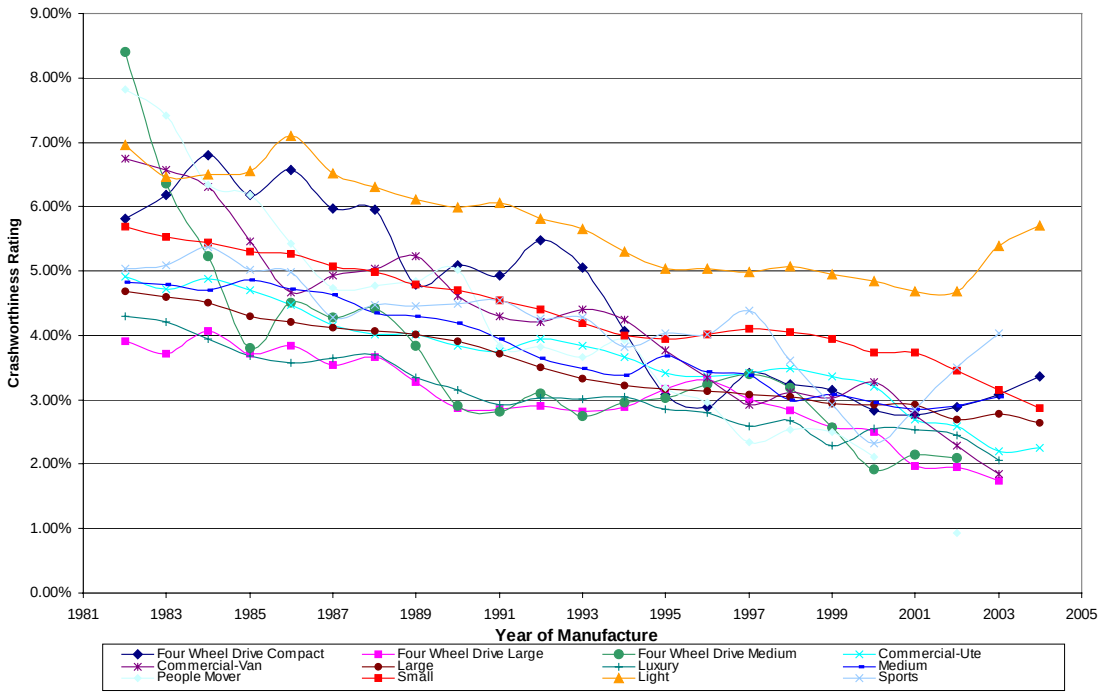


5.5.3 Crashworthiness by Year of Manufacture and Market Group

The crashworthiness estimates for each year of manufacture were obtained by multiplying the individual injury risk and injury severity estimates. Because each of the two components has been adjusted for the confounding factors, the resultant crashworthiness estimate is also adjusted for the influence of them.

Appendix 8 gives the crashworthiness estimates and the associated 95% confidence intervals (in brackets) for each of the years of manufacture from 1982 to 2004 by each of the 12 vehicle market groups considered. Each estimate is expressed as a percentage, representing the number of drivers killed or admitted to hospital per 100 drivers involved in a tow-away crash. The crashworthiness estimates are plotted for each year of manufacture and vehicle market group in Figure 7. Again, the values in Figure 7 have been smoothed for reasons given above.

Figure 7: *Estimated crashworthiness by year of vehicle manufacture and market group*



Comparison of estimates in Figure 7 with those in Figures 5 and 6 reveal differential trends in crashworthiness by year of vehicle manufacture between market groups is driven by differential trends in both injury risk and injury severity but more so by the trends in injury risk (Figure 5). This reflects the results shown in the previous section where trends in crashworthiness for the fleet as a whole were also largely driven by trends in injury risk. Figure 6 shows that gains in reducing injury severity have been more modest over the study period whilst there is little differential in relative injury severity between any of the market groups over the whole time period. In contrast, significant gains in injury risk were estimated over the study period with significantly different average injury risk between market groups.

Although there has been general improvement in crashworthiness by year of vehicle manufacture in each of the 12 market groups studied, Figure 7 shows there were differences in the rate and timing of improvement between each of the 12 market groups. For example, the large car segment has shown steady improvement in crashworthiness over the study period, with

average crashworthiness for this sector being around 43% lower in 2004 compared to 1982. In contrast, the small car segment showed a steady improvement in crashworthiness of around 30% until the early 1990s followed by a plateau or reversal in improvement and then renewed improvement since about 1998 and particularly from 2001 onwards.

A notable feature of Figure 7 is the contrast in safety performance between the small and light car classes over time. Although reaching a plateau in the 1990's, crashworthiness of the small car class has improved rapidly after that period. In contrast, the light car class has showed little or no improvement in crashworthiness for the mid 1990's and there is evidence in Figure 7 that crashworthiness of vehicles from the two most recent years of manufacture studied has become poorer. Crashworthiness of light vehicles has always been the poorest of all the light passenger vehicle fleet. Failure to improve this situation in recent years even at the rate of the rest of the light vehicle fleet mean that there is a considerable safety gap between light vehicles and the rest of the fleet. In fact the risk of death or serious injury in 2004 model light vehicles is around twice the average of the rest of the fleet. This observation should be of great concern to governments and the community at large, particularly given the recent increase in light vehicle sales in response to rapidly escalating fuel prices. Clearly, further investigation of the safety deficiencies in the light vehicle class needs to be investigated along with consideration of ways in which to remedy the identified problem.

Figure 7 clearly shows differential performance in crashworthiness between vehicle market groups, reflecting the same differences seen in average crashworthiness by market groups found in the make and model specific ratings presented above (see Appendix 4). It is, however, difficult from Figure 7 to gauge differential improvements in crashworthiness over time. This is due to the complexity of the figure with 12 market groups as well as the relatively high variance in some of the year to year estimates despite smoothing. To try and better measure differential time based safety improvements by market group, Figure 8 presents average crashworthiness by 5-year time blocks of manufacture for the periods 1982-1986, 1987-1991, 1992-1996 and 1997-2001 and by a 3-year time block for the period 2002-2004. In addition, estimates have been scaled to be relative to the first time block (1982-1986) for each market groups. Whilst Figure 8 no longer reflects average differences in crashworthiness between market groups, it more clearly demonstrates differential performance between market groups in improving crashworthiness over time.

Figure 8: *Average crashworthiness by year of manufacture and market group by year range relative to the 1982-1986 average*

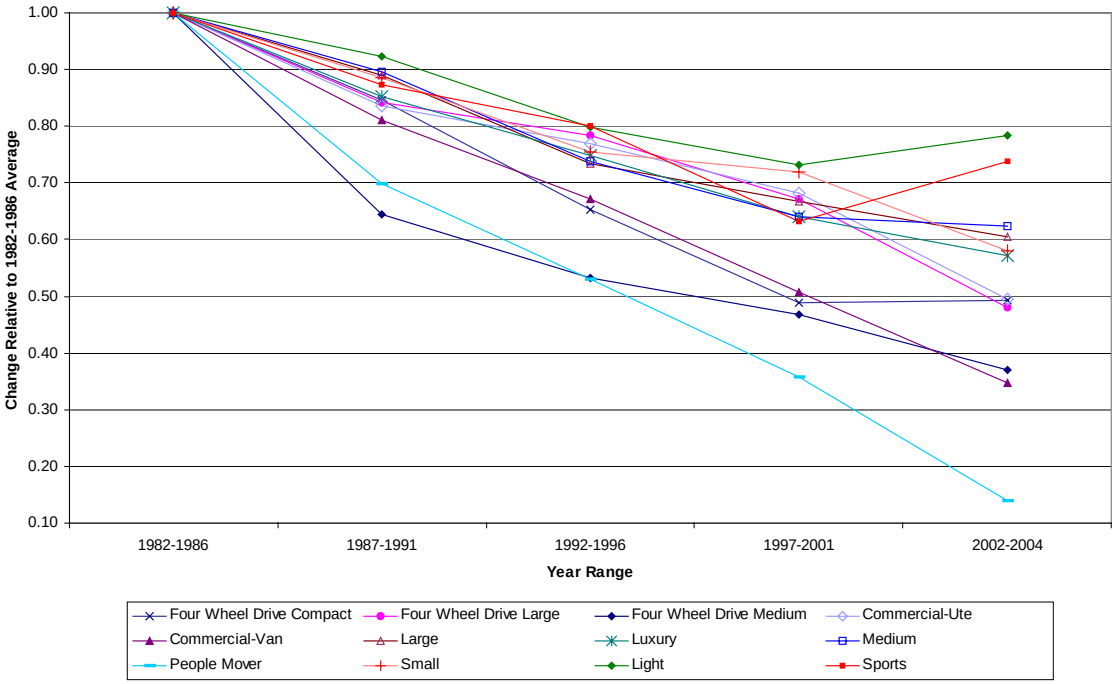


Figure 8 shows that certain vehicle market groups have experienced greater relative improvements in crashworthiness over the study period than others. The people mover market group has shown the greatest improvement in crashworthiness over the study period of over 85%, albeit coming from an initially poor base. The compact, medium and large 4WDs and commercial van and commercial ute market groups have shown the next greatest improvement in crashworthiness over the study period of between 50 and 65 percent. Gains were consistent across time in all these segments apart from the compact 4WD segment that did not appear to improve in crashworthiness between the most recent two time blocks. The medium, large, luxury, medium and small segments have shown the most modest gains over the study period of between 38 and 43 percent. Gains were consistent across time in all these segments apart from the medium segment that did not appear to improve in crashworthiness between the most recent two time blocks. At the other end of the scale the light and sports market groups showed improvement in the period from 1982 to 2001of between 27 and 37 percent but in the last time block this improvement was reversed to between 22 and 26 percent. This further reinforces the comments made previously about the light vehicle fleet.

As for crashworthiness by year of vehicle manufacture for the fleet as a whole, trends by market group are driven by improvements in vehicle design and specification as well as consumer preference for specific vehicle models within a market segment. Trends within a market group can also be influenced by changes in the overall mix of vehicles in the fleet, specifically with respect to average mass and geometric properties. Newstead and Cameron (2001) discussed reasons why similar improvements in vehicle crashworthiness have not been seen across all market segments during the 1990s. One of the primary reasons cited for trends to poorer crashworthiness in the small car segment (a combination of the small and light car segments in this report) during the mid 1990s was a trend to consumers choosing to purchase the cheapest but least safe small vehicles on the market, rather than the safest vehicles, over that period. In contrast, purchases of large vehicles remained with the 4 locally manufactured models of large car that have generally improved in crashworthiness from the mid to late 1990s. The influence on choice of vehicle in determining the trends in the figures presented needs to be studied

further, particularly with respect to those vehicle classes showing divergent trends such as the light vehicle class.

A further possible reason for trends to poorer crashworthiness in small cars discussed by Newstead and Cameron (2001) was the polarisation of the Australian vehicle fleet in terms of size. In the second half of the 1990s, buyers moved away from the medium vehicle class to buy predominantly either large or small cars. It was thought possible this polarisation has had detrimental effects on the total safety of the Australian fleet by reducing vehicle compatibility in collisions. This is a particular problem for drivers of small vehicles and could also potentially explain to some degree the poorer crashworthiness in the light car class here. Further monitoring of fleet mix trends and its effect on crashworthiness need to be carried out to fully understand and quantify this influence on safety outcomes.

5.6 Crashworthiness by Year of Manufacture of the New Zealand Vehicle Fleet

5.6.1 Injury Risk

Injury risk was estimated from the data on 76,520 drivers involved in a two-vehicle collision during 1991 to 2004 where the other driver was injured. This data set is referred to as the "involved drivers". Because of missing values of some of the factors to be included in the logistic regression, and the exclusion of pre-1964 vehicles and unknown years, analysis was performed on data relating to 41,125 involved drivers, 17,821 of whom were injured.

The "covariate" model for injury risk was determined from the variables described in Sections 2.5.1 and 2.5.2. The following covariates and interactions were statistically significantly associated with injury risk and were included in the logistic regression models.

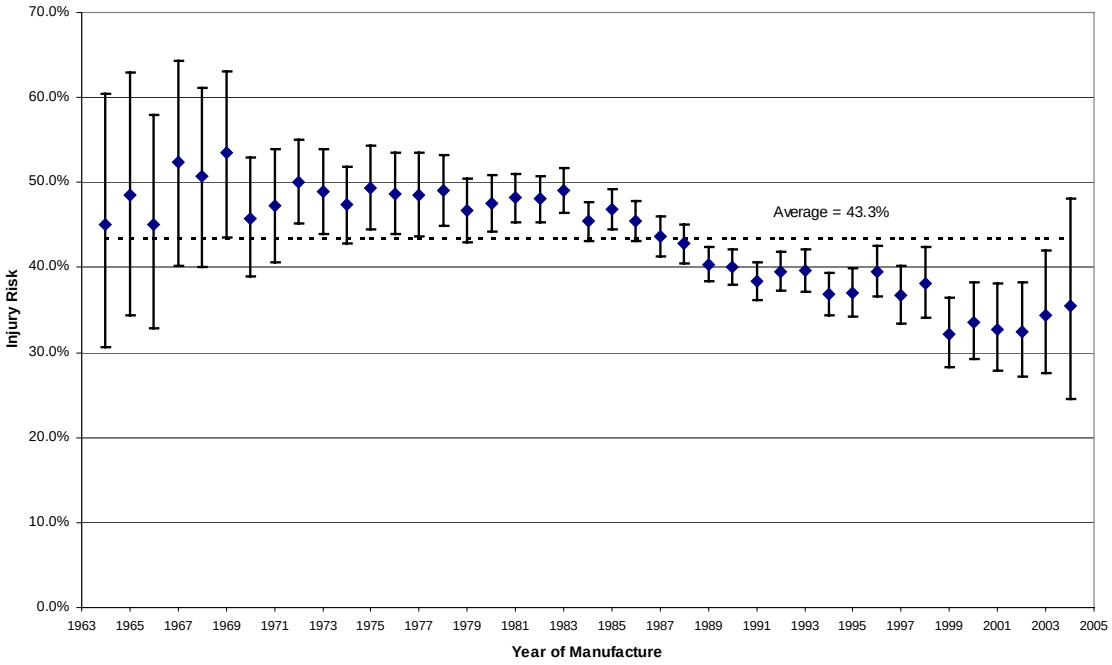
Base effect terms
Age
Sex
Speedzone
Year (of crash)

No other variable or interaction term significantly improved the fit of each of the logistic models.

The overall (average) injury risk for involved drivers in matched two-vehicle casualty crashes in New Zealand where the opposing driver was injured was 43.3%. In other words, the estimated probability that a driver involved in a two-vehicle crash in New Zealand was injured where the colliding vehicle driver was also injured was 43.3%.

Appendix 9 gives the estimates of injury risk derived by logistic regression for each individual year of manufacture for all vehicles combined. The variability in the injury risk estimates relative to the year of manufacture can be seen from the width of the corresponding 95% confidence intervals. Figure 9 plots injury risk by year of vehicle manufacture with associated 95% confidence limits.

Figure 9: *Injury risk by year of manufacture (with 95% confidence limits)*



5.6.2 Injury Severity

The data on "injured drivers" covered 91,523 drivers who were injured in crashes in New Zealand during 1991-2004 (as described in Section 2.5). Because of missing values of some of the associated crash factors and the exclusion of pre-1964 vehicles and unknown years, logistic regression was performed on data relating to 89,390 injured drivers 17,579 of who were severely injured (killed or admitted to hospital).

Significant variables identified in the covariate model are as follows.

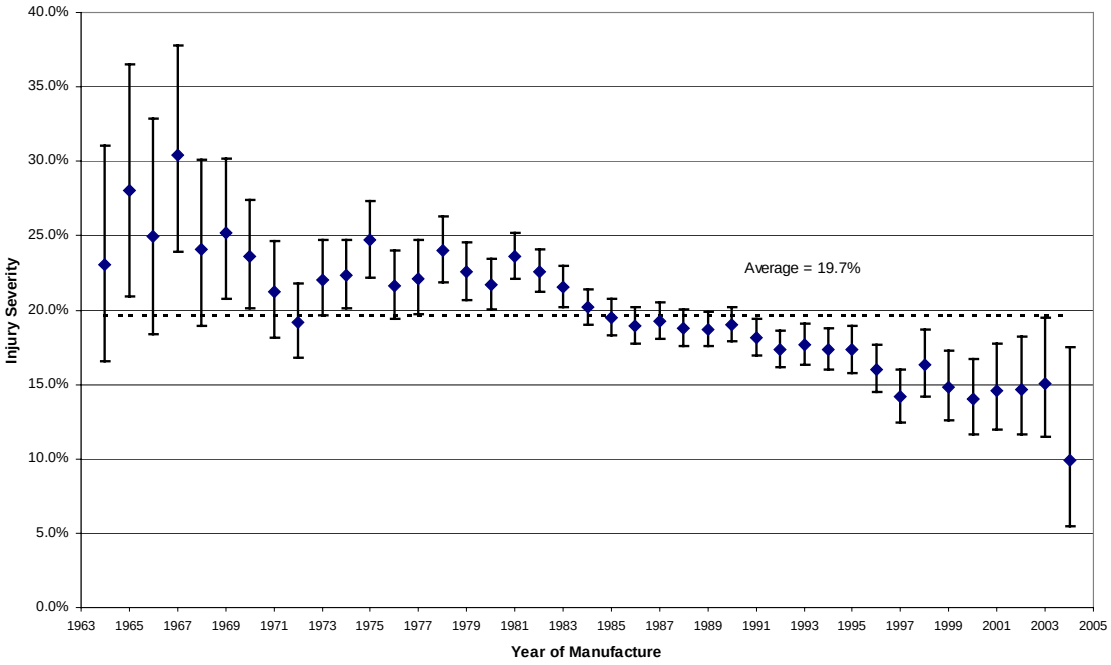
Base effect terms	First order interactions
Age	*Speedzone*Nveh*
Sex	*Age*Sex*
Nveh	*Age*Nveh*
Speedzone	*Age*Speedzone*
Year (of crash)	

No other variable or interaction term significantly improved the fit of the logistic model.

The overall (average) injury severity for injured drivers in all vehicles was 19.7%. In other words, the estimated probability that a driver injured in a crash was severely injured was 19.7%.

Appendix 9 gives the estimates of injury severity derived by logistic regression for the individual years of manufacture for all vehicles. The variability in the estimates of injury severity relative to year of manufacture can be seen from the width of the corresponding 95% confidence intervals. Figure 10 plots injury severity by year of vehicle manufacture with associated 95% confidence limits.

Figure 10: *Injury severity by year of manufacture (with 95% confidence limits)*



5.6.3 Crashworthiness by Year of Manufacture

The crashworthiness estimates for each year of manufacture were obtained by multiplying the corresponding individual injury risk and injury severity estimates. Because each of the two components has been adjusted for the confounding factors, the resultant crashworthiness estimate is also intrinsically adjusted for their influence.

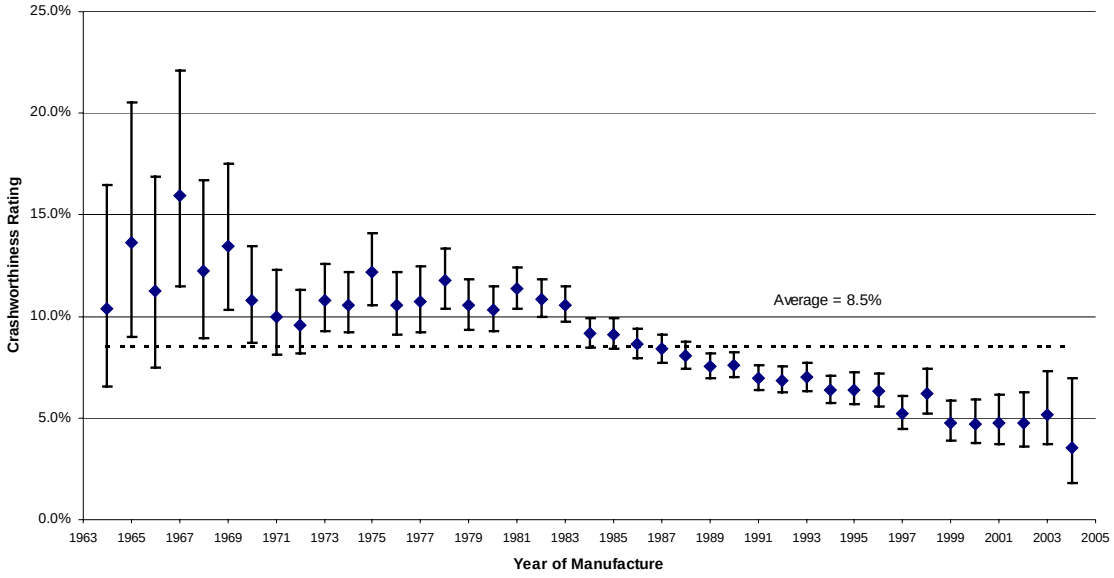
Appendix 9 gives the crashworthiness estimates and the associated 95% confidence intervals for each of the years of manufacture included in the analysis. Each estimate is expressed as a percentage, representing the number of drivers killed or admitted to hospital per 100 drivers involved in a crash.

The true risk of a driver being killed or admitted to hospital in a crash is only estimated by each figure, and as such each estimate has a level of uncertainty about it. This uncertainty is indicated by the confidence limits in Appendix 9. There is 95% probability that the confidence interval will cover the true risk of serious injury (death or hospital admission) to the driver of a vehicle of the particular year of manufacture.

The crashworthiness estimates and their confidence limits are plotted for each year of manufacture for all vehicles in Figure 11. The relatively wide confidence intervals observed on the estimates of crashworthiness for years of manufacture 1964 to 1969 and 2004 are a reflection of the smaller numbers of crashes involving vehicles manufactured in these years appearing in the data. Figure 11 shows general and significant improvement in vehicle crashworthiness with increasing year of manufacture over the years considered. Specifically, little improvement can be seen in the years 1964 to 1983 followed by rapid improvement over the period 1984 to 1995 with vehicles manufactured from 1988 being statistically significantly safer on average than those manufactured before 1983. With the exception of 1996 and 1998, there is visual evidence of a decreasing trend in the period after 1995. Examination of the corresponding risk and severity plots for all vehicles in Figure 9 and 10 respectively show the improvements in

crashworthiness with year of manufacture observed in Figure 11 are due to improvements in both injury risk and injury severity by year of vehicle manufacture.

Figure 11: *Crashworthiness by year of manufacture (with 95% confidence limits) for all vehicles (both new vehicles and used imports).*



5.6.4 Discussion on the analysis of Crashworthiness by Year of Manufacture of the New Zealand Vehicle Fleet

Before interpreting the results of the analysis, it is useful to give a brief summary of the history of the vehicle industry and its regulation in New Zealand.

For most of the twentieth century, starting with the General Motors assembly plant in 1926, New Zealand had a local vehicle industry. In the late 1980s, however, the face of the industry changed dramatically as a result of the progressive removal of import controls from all automotive products and reduction of tariffs on both vehicles and components. There seem to have been a number of motivating factors for the Government decision to allow used vehicles to be imported into New Zealand. One was to provide a wider source of relatively new and relatively affordable vehicles for New Zealand consumers (which in turn put pressure on new-vehicle prices). The need for this was highlighted by a trend towards an ageing vehicle fleet in New Zealand at that time. Another motivation for the used import program was to attempt to reduce the number of motorcycles in the New Zealand fleet. New motor cycle registrations had been at a high level during the 1970s and early 1980s and they were known to be a less safe means of transport than a car.

The 1990s saw a boom in the sale of used import vehicles in New Zealand along with a corresponding decline in the sales of new vehicles. Figures quoted in TRC(2002) show the percentage of used imports in annual vehicle registrations from 1960 to 1986 was generally well less than 10%. The period from 1987 onwards saw a sharp rise in this percentage and by 2002 around 68% of all vehicle registrations in a year were used imported vehicles. Annual registrations of vehicles sold new in New Zealand have shown a corresponding decline over the

period from around 90,000 units in the early 1980s to around 60,000 units by the early 2000s. Under these economic constraints, by the late 1990s the local light-vehicle assembly industry had ceased operation.

The increase in the percentage of used import vehicle registrations in New Zealand is also reflected in crash data summaries such as LTSA(2002). As was shown in Newstead and Watson (2005a) the proportion of crashed vehicles by year of first registration in New Zealand that are used imports generally follows the trends expected from the registration statistics with rapid growth between 1987 and 2002.

The vast majority of the used light passenger vehicles imported into New Zealand come from Japan. Indeed, around 75-80% of all new registrations of both new and used vehicles in New Zealand are Japanese vehicles with Australian vehicles the next most prevalent at around 8% of new vehicle registrations.

Like most countries, New Zealand has a system of regulations to govern the safety of vehicles on the road. The earliest of these were the Traffic Regulations 1936 (TR36), updated in 1954 (TR54) and 1976 (TR76). For many years, the general focus of the Traffic Regulations was to set requirements for vehicles built in New Zealand. However, a separate set of regulations governing vehicle standards was developed in order to align New Zealand legislation with that of standard-setting bodies in the safety-conscious jurisdictions overseas from which the vehicles were sourced, namely Australia, Japan, UN/ECE and the USA. These Transport (Vehicle Standards) Regulations (1990) (VSRs) set out the technical standards with which motor vehicles must comply in order to be registered in New Zealand.

Over the period since 1990, the vehicle standards policy in New Zealand has been clarified by Government in consultation with the vehicle industry using the consultative rule-making procedure, and today the VSRs have been replaced by Land Transport Rules covering standards and safety requirements. In addition, the important Compliance Rule sets out requirements for inspection and certification of vehicles to ensure they meet the safety requirements at import and when on the road in New Zealand. Details of the vehicle standards requirements and legislation are available on the Land Transport New Zealand web site (www.landtransport.govt.nz)

It is with this history of vehicle safety standards regulation in New Zealand in mind that the analyses presented in this report should be interpreted. Because the analysis presented in this study is based on a census of all reported injury crashes in New Zealand over the period 1991 to 2004, they can be considered as representative estimates of the trends in secondary safety performance of the entire light passenger vehicle fleet in New Zealand.

Trends in estimated crashworthiness by year of vehicle manufacture for the New Zealand light passenger vehicle fleet as a whole show statistically significant improvement in crashworthiness in vehicles manufactured over the period 1964 to 2004. Estimates in Figure 11 show that the crashworthiness of vehicles manufactured in the 1960s was relatively poor, although the confidence limits on these estimates are relatively wide due to the small numbers of these vehicles in the available data. For vehicles manufactured during the 1970s, the crashworthiness estimates are relatively static showing no trend to improving or worsening crashworthiness. From about 1984 onwards, however, there is a consistent trend to improving crashworthiness by year of vehicle manufacture in the New Zealand fleet. Estimates suggest that the risk of driver death or serious injury in a crash in a vehicle manufactured in the early 21st century is about half that of the driver of an early 1980s vehicle.

Major legislative change in New Zealand governing vehicle safety standards only started to come into force from around 1990 through the VSRs and Land Transport Rules, particularly the Compliance Rule, which required proof of standards compliance if a vehicle was to enter the NZ fleet. It is also important to note that there was a revision to the Frontal Impact Rule on 1 April 2002, which now requires that a Class MA vehicle (passenger car) must have been manufactured in accordance with an approved frontal impact standard if it is to enter the New Zealand fleet. (Frontal impact protection systems of course contribute to improving vehicle crashworthiness). The crashworthiness ratings for 2002 onwards do not yet reflect an improvement in crashworthiness as a result of the introduction of the new Frontal Impact Rule apart from an apparent improvement in 2004, the latest year studied. This observation should be treated with some caution however given the small number of vehicles involved and thus correspondingly wide confidence intervals.

The estimates of vehicle crashworthiness by year of manufacture for the New Zealand fleet as a whole are an average of the estimates for vehicles sold new and the used imports. The average is weighted from the number of each registration type crashing for each year of manufacture.

As has been noted in analysing safety trends in the Australian vehicle fleet (Newstead and Cameron, 2001), the estimates of crashworthiness by year of vehicle manufacture for any particular year of manufacture reflect the composition of the fleet by market group and specific makes and models in that year. This comment certainly also applies to the analysis of the New Zealand vehicle fleet presented here.

5.7 Crashworthiness by Year of First Registration in New Zealand for Used Imports

A further analysis that is of great interest with respect to the used import program in New Zealand is the crashworthiness of the used-import subset of the vehicle fleet by year of first registration in New Zealand. The purpose of this analysis was to monitor trends in the average crashworthiness of used imports coming into New Zealand by year of import. This is in contrast to the year of manufacture analysis which examines trends in crashworthiness-related safety engineering improvements in vehicles over time.

Analysis of crashworthiness by year of first registration in New Zealand was carried out in the same way as for the year of manufacture analysis. The only fundamental difference was that the variable indicating year of manufacture in the analysis was replaced by the variable indicating year of first registration. Analysis by year of first registration in New Zealand has focused primarily on used import vehicles as the year of manufacture and first registration in New Zealand will generally be the same for vehicles sold new in New Zealand.

5.7.1 Injury Risk by Year of first Registration in New Zealand for Used Imports

Injury risk was estimated from the data on 23,600 drivers of used imported vehicles involved in a two-vehicle collision during 1991 to 2004 where the other driver was injured. This is the used import subset of the same data used for the analysis by year of manufacture. Because of missing values of some of the factors to be included in the logistic regression, and the exclusion of pre-

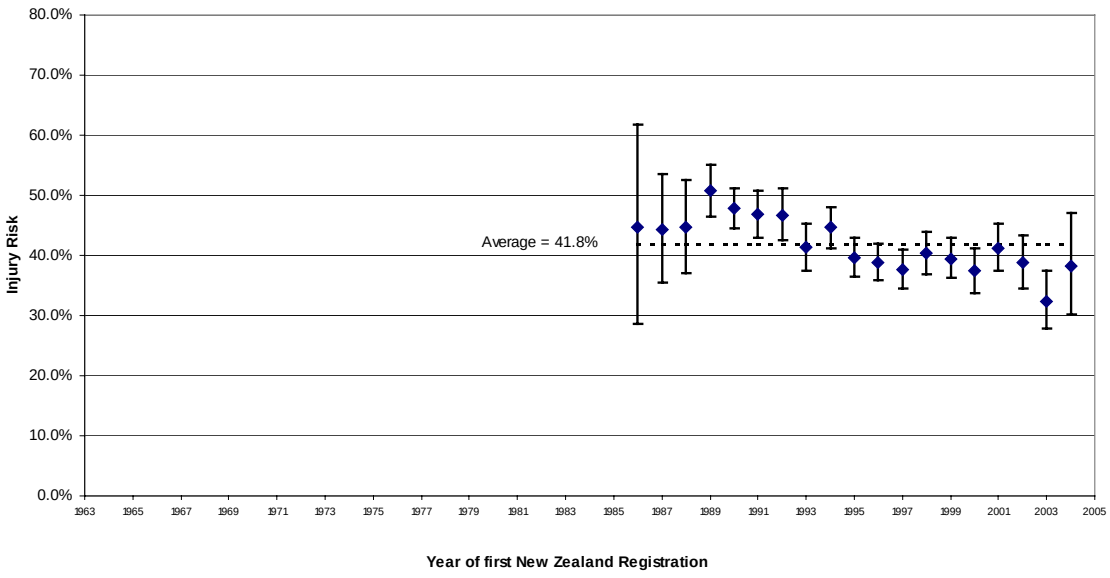
1964 vehicles and unknown years of first registration, analysis was performed on data relating to 12,846 involved drivers, 5,375 of who were injured.

The following terms were statistically significantly associated with injury risk in the covariate models for the analysis used imports.

Base effect terms
Age
Sex
Speedzone
Year (of crash)

The resulting estimates of injury risk by year of first registration for used imported vehicles are plotted along with 95% confidence limits in Figure 12. Full details of the estimates are given in Appendix 10.

Figure 12: *Injury risk by year of first registration in New Zealand (with 95% confidence limits) for used imports.*



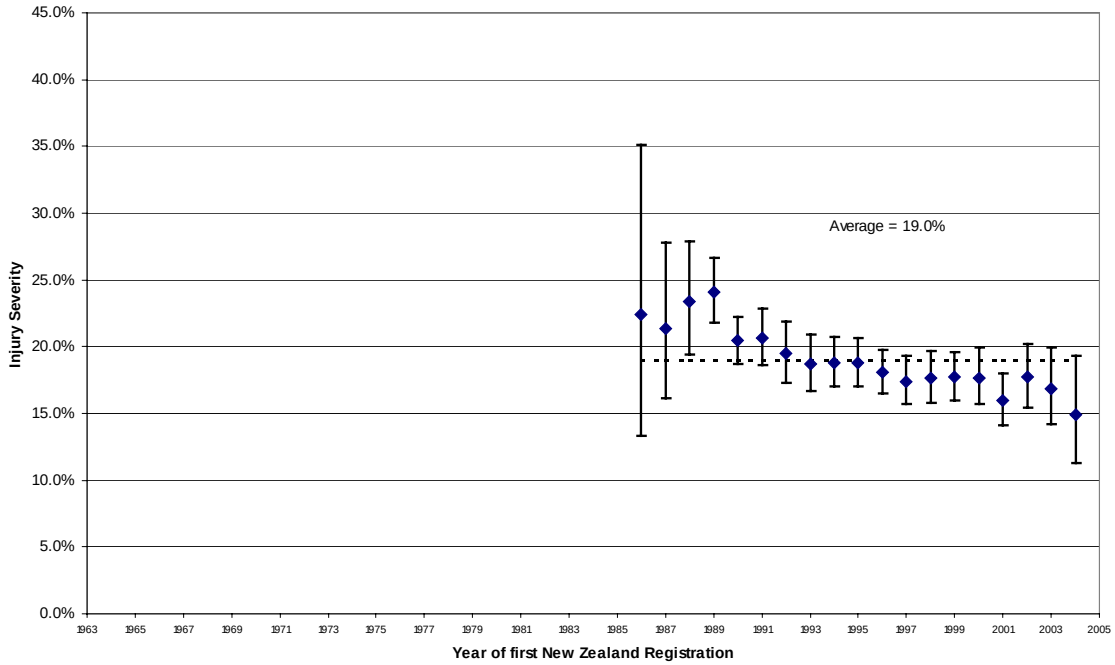
5.7.2 Injury Severity by Year of first Registration in New Zealand for Used Imports

Injury severity by year of first registration in New Zealand for used imports was estimated from the data on 27,694 injured drivers who were injured in crashes in New Zealand during 1991-2004, a subset of the data used in the analysis by year of manufacture. After exclusion of cases with missing values of some of the associated crash factors and the exclusion of pre-1964 vehicles and unknown years, logistic regression was performed on data relating to 26,832 injured drivers 5,085 of who were severely injured (killed or admitted to hospital). Covariates and interactions included in the injury severity logistic regression model are as follows.

Base effect terms	First order interactions
Age	*Speedzone*Nveh*
Sex	*Age*Sex*
Speedzone	
Nveh	
Year (of crash)	

The resulting estimates of injury severity by year of first registration for used imports are plotted along with 95% confidence limits in Figure 13. Full details of the estimates are given in Appendix 10.

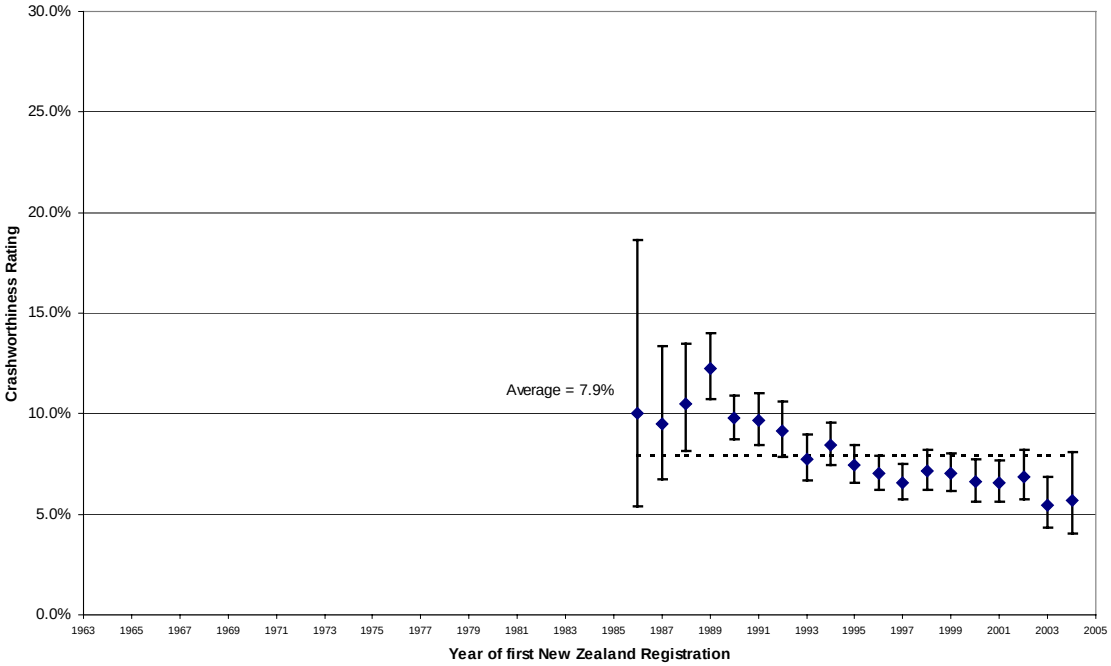
Figure 13: *Injury severity by year of first registration in New Zealand (with 95% confidence limits) for used imports.*



5.7.3 Crashworthiness by Year of First Registration in New Zealand for Used Imports

Estimates of crashworthiness by year of vehicle first registration in New Zealand for used imports were obtained by multiplying the corresponding estimates of injury risk and injury severity presented previously. The resulting crashworthiness estimates and their 95% confidence limits are presented in full in Appendix 10. Plots of the estimates and their 95% confidence limits are in Figure 14. Interpretation of the estimates is the same as for the analysis by year of manufacture presented previously.

Figure 14: *Crashworthiness by year of first registration in New Zealand (with 95% confidence limits) for used imports*



5.7.4 Discussion on the analysis of Crashworthiness by Year of First Registration in New Zealand for Used Imports

Analysis of trends in vehicle crashworthiness by year of first registration in New Zealand of the used import vehicle fleet has aimed to assess the average crashworthiness of second hand vehicles being imported into New Zealand in each calendar year and assess the impact of the second hand import program on the overall safety of all vehicles registered in New Zealand each year.

Estimates of crashworthiness trends in the used import subset of the vehicle fleet by year of first registration in New Zealand from 1986 to 2004 showed improvement in crashworthiness with time, over the years of first registration analysed. There is some suggestion that vehicles in the last two year of importation, 2003 and 2004, have achieved the best crashworthiness performance. However, this should again be tempered by the overlapping confidence limits on the estimates.

If the age profile of used import vehicles was fixed for each year of first registration in New Zealand and the vehicle type mix of the used imports reflected that of new vehicles of the same years of manufacture, it would be expected that the estimates of crashworthiness by year of first registration in New Zealand would mirror those of vehicles sold new. The only difference would be a shift in the estimates equal to the average age of the used import vehicles at their time of first registration in New Zealand. Whilst vehicles up to about 12 years old are imported, with some even older than that, the majority of used imports are in the range from 3 to 9 years old when imported, with the median age being around 6 years. Newstead and Watson (2005a) found that apart from a slight increase in average vehicle age for vehicles first registered from 1999 onwards, the age of the used imported vehicles registered in New Zealand each year was fairly static with an average age around 6 years. It might be expected that the average age of used imports might decrease from 2002 as a result of changes in the Land Transport Rule concerning

frontal impact compliance. From April 2002, all vehicles newly registered in New Zealand must comply with frontal impact occupant protection standards, as compared to only vehicles manufactured from March 1999 in the previous rule. The modified rule will make it difficult to import used vehicles manufactured before 1996, the date after which Japanese domestic vehicles manufactured had to meet the Japanese frontal impact standard accepted under the New Zealand rule. Further research should be carried out to monitor trends in the average age of used import vehicles in New Zealand at time of import.

The analysis of Newstead and Watson (2005a) showed that the used imported vehicles being brought into New Zealand are as safe on average as the vehicles sold new in New Zealand when compared on a year of manufacture basis. However, because the used vehicles are on average 6 years old when entering the country, the safety benefits of the latest vehicle technologies seems to take 6 years longer to be seen in the New Zealand fleet than if the vehicles were sold new in New Zealand. A comprehensive investigation of the effects of the used import program on the safety of the New Zealand fleet, particularly in the face of increasing motorisation and rising fuel costs, is recommended as further research.

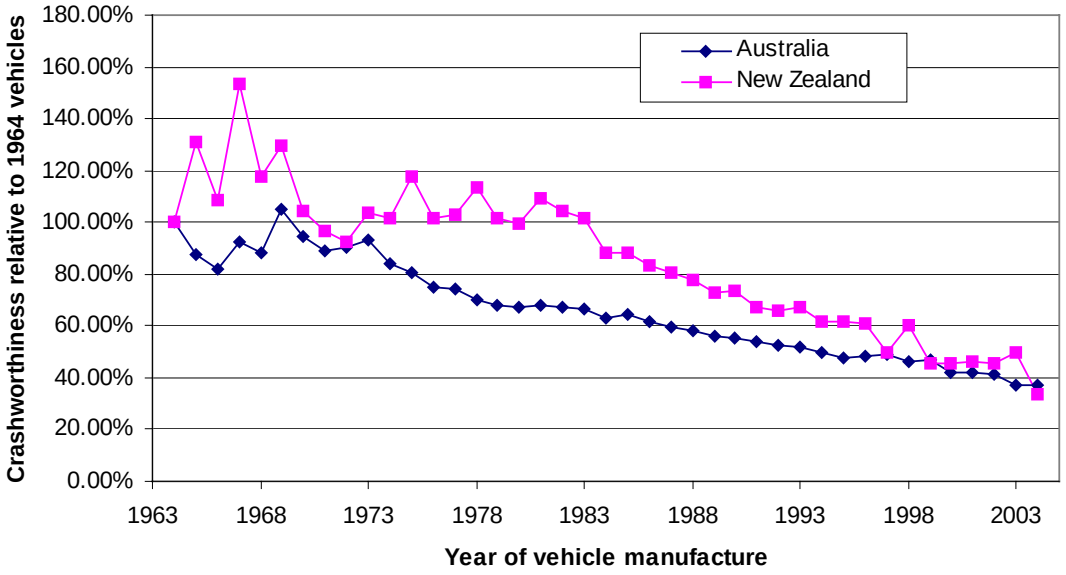
5.8 Comparison of Crashworthiness by Year of Manufacture for the Australian and New Zealand Vehicle Fleets

Because of the relatively high similarity between the types of vehicles in the Australian and New Zealand vehicle fleets, it is interesting to compare the relative trends in safety improvement between the vehicle fleets of the two countries. This comparison is also of interest to determine if the quite different strategies for vehicle safety regulation adopted in the two countries have led to fundamental difference in the patterns of vehicle safety improvement from year to year. One difficulty in making this comparison occurs because the measure of crashworthiness by year of manufacture used in each jurisdiction was scaled differently, reflecting the differences in the available data. Unfortunately the estimates from each country cannot be scaled to a common basis for comparison because the average absolute injury risk cannot be calculated from the injury-only crash data available from New Zealand (see Newstead and Watson, 2005 for a full explanation). This means that comparisons between absolute crashworthiness cannot be made between the two countries. However, because the analysis method used here provides unbiased estimates of relative crashworthiness between each year of manufacture, as does the method used to analyse the Australian data, comparisons in relative changes in crashworthiness by year of manufacture can be made between the two countries.

Using 1964 as the base year the relative change in crashworthiness by year of vehicle manufacture is shown in Figure 15 for both Australia and New Zealand. Crashworthiness by year of vehicle manufacture in Australia showed an improvement of around 30% between the end of the 1960s and the end of the 1970s in response to the introduction of a program of new Australian Design Rules concerning vehicle safety. After a relative plateau in the early 1980s a further steady improvement of about 43% in vehicle crashworthiness has been estimated between 1985 and 2004. This means that the average risk of death or serious injury to a driver in a crash in an Australian vehicle manufactured in 2004 is on average about 60% less than that of a vehicle manufactured in the 1960s. The crashworthiness of New Zealand vehicles manufactured in the 1960s was also poor compared to subsequent years. However, whilst consistent improvement in crashworthiness was seen in vehicles manufactured in the 1970s, New Zealand had little improvement in crashworthiness of vehicles manufactured during the 1970s and first half of the 1980s. Only since years of manufacture from about 1984 has New

Zealand seen consistent and dramatic improvements in average vehicle crashworthiness. In fact, the crashworthiness of New Zealand vehicles manufactured from the early 1980s to 2004 has improved by about the same amount as the total improvement seen in Australian vehicles over the period from 1964 to 2004.

Figure 15: *Crashworthiness by year of vehicle manufacture as a percentage of 1964 vehicle crashworthiness: Australia and New Zealand.*



The key difference in crashworthiness improvement by year of vehicle manufacture between Australia and New Zealand then appears not to be the magnitude of the improvement but the relative timing of the improvement. The greatest improvements in Australia were observed during the 1970s, the period during which the greatest numbers of new regulations concerning vehicle safety were introduced. Although improvements have also been estimated in Australia after these years of manufacture they have occurred at a slower rate. In contrast the greatest improvement in crashworthiness has been observed in New Zealand for vehicles manufactured from the mid 1980s to 2004. This is also the period in which the greatest movement in introducing vehicle safety regulations in the form of the VSRs and Land Transport Rules took place. Estimated trends from both countries suggest that regulation of vehicle standards is one of the best ways to achieve the biggest gains in vehicle safety performance.

6. CONCLUSIONS

Additional crash data has enabled the crashworthiness ratings to be obtained for a larger range of car models than in previous studies with the ratings now covering 305 different vehicle models manufactured from 1982-2004. The new data set has been able to produce more up-to-date and reliable estimates of the crashworthiness of individual car models than those published previously.

The rating scores estimate the risk of a driver being killed or admitted to hospital when involved in a tow-away crash, to a degree of accuracy represented by the confidence limits of the rating in each case. The estimates and their associated confidence limits are sufficiently sensitive that they are able to identify 159 models of passenger cars, four wheel drive vehicles, people movers and light commercial vehicles that have superior or inferior crashworthiness characteristics compared with the average vehicle. Ratings are presented for individual vehicle models in the Australian and New Zealand passenger fleets classified into one of 12 market groups.

This update of the ratings also revised the measure of vehicle aggressivity. The aggressivity measure considers the injury outcome to both drivers of other vehicles and unprotected road users including pedestrians, bicyclists and motorcyclists. The aggressivity rating measured the risk of death or serious injury a vehicle poses to drivers of other cars or unprotected road users with which it impacts in a crash. The mix of other drivers and unprotected road users on which the rating for each vehicle was based was standardised along with various other non-vehicle related factors using logistic regression techniques.

The aggressivity measure was calculated for 284 models of Australian and New Zealand passenger vehicles (passenger cars, four wheel drive vehicles, passenger vans and light commercial vehicles) manufactured between the years 1982-2004. The degree of accuracy of the aggressivity ratings is represented by the confidence limits of the rating in each case. The estimates and their associated confidence limits are sufficiently sensitive that they are able to identify 129 models of passenger cars, four wheel drive vehicles, passenger vans and light commercial vehicles that have superior or inferior aggressivity characteristics compared with the average vehicle. Estimated vehicle aggressivity towards drivers of other vehicles or unprotected road users was found to have a proportional relationship with vehicle mass. It was also found to have little or no relationship with ratings of vehicle crashworthiness, demonstrating the independence of the two complementary measures.

For this update, 277 of the 305, or 91%, of the vehicle models rated for crashworthiness were also able to be rated for aggressivity.

The crashworthiness of passenger vehicles in the Australian vehicle fleet (cars, station wagons, four wheel drives, vans and taxis), measured by the risk of the driver being killed or admitted to hospital as the result of involvement in a tow-away crash, has been estimated for the years of manufacture from 1964 to 2004. This study further updates the original one by Cameron et al (1994a) for years of manufacture 1964 to 1992. It shows similar patterns of improvements in crashworthiness with the greatest gains over the years 1970 to 1979 during which time a number of new Australian Design Rules aimed at occupant protection took effect. Further significant gains in crashworthiness have also been observed over the years 1986 to 2004, with notable steady gains from 1985 to 1995 and since 2000. Trends in crashworthiness by year of vehicle

manufacture from 1982 to 2004 for each of the 12 vehicle market groups were also estimated showing differential improvement in crashworthiness by market group by year of manufacture.

Analysis presented in this report has been able to further quantify the long-term trends in the crashworthiness of light passenger vehicles (cars, station wagons, four wheel drives and vans) in New Zealand both by year of vehicle manufacture and year of first registration in New Zealand for used imports. Years of vehicle manufacture from 1964 to 2004 have been considered through analysis of police reported data on crashes involving injury in New Zealand over the period 1991 to 2004. This study further updates the study by Newstead and Watson (2005a) to include years 2003 and 2004 for years of manufacture and year of first registration for used imports. It shows similar patterns of improvements in crashworthiness with analysis of trends by year of vehicle manufacture showing statistically significant improvement in the crashworthiness of New Zealand light passenger vehicles over the years of manufacture studied. Most of the measured improvement occurred over the years of manufacture from 1983 to 2004. Over this period, the risk of death or serious injury to drivers in a crash reduced by around 67% for the fleet as a whole. This period corresponded largely with the period over which significant increases in vehicle safety regulation took place in New Zealand.

Estimates of crashworthiness trends in the used import subset of the vehicle fleet by year of first registration in New Zealand were also updated to include vehicles imported over the period from 1986 to 2004. Estimates showed improvement in crashworthiness with time for the years of first registration analysed.

7. ASSUMPTIONS AND QUALIFICATIONS

The results and conclusions presented in this report are based on a number of assumptions and warrant a number of qualifications that the reader should note. These are listed in the following sections.

7.1 Assumptions

It has been assumed that:

- TAC claims records and, Victorian, NSW, Western Australian, Queensland and New Zealand Police crash reports accurately recorded driver injury, hospitalisation and death.

- There was no bias in the merging of TAC claims and Victorian Police crash reports related to the model of car and factors affecting the severity of the crash.

- Crashed vehicle registration numbers were recorded accurately on Police crash reports and that they correctly identified the crashed vehicles in the Victorian, NSW, Queensland, Western Australian and New Zealand vehicle registers.

- The adjustments for driver sex, age, speed zone, the number of vehicles involved and the state and year in which the crash occurred removed the influences of the other main factors available in the data that affected crash severity and injury susceptibility.

- The form of the logistic models used to relate injury risk and injury severity with the available factors influencing these outcomes (including the car model, market group or year of manufacture) was correct.

- Information contained in the Police crash records allowed accurate matching of both vehicles involved in crashes between two passenger cars and vehicles impacting unprotected road users for the purpose of calculating aggressivity ratings.

7.2 Qualifications

The results and conclusions warrant at least the following qualifications:

- Only driver crash involvements and injuries have been considered. Passengers occupying the same model cars may have had different injury outcomes.

- Some models with the same name through the 1982-2004 years of manufacture may have varied substantially in their construction, specification and mass. Although there should be few such models in these updated results, the rating score calculated for these models may give a misleading impression and should be interpreted with caution.

- Other factors not collected in the data (e.g. crash impact severity) may differ between the models and may affect the results. However, earlier analysis has suggested that the different rating scores are predominantly due to vehicle factors alone (Cameron et al 1992).

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APPENDIX 1

MAKES AND MODELS OF CARS INVOLVED IN VICTORIAN AND NSW CRASHES DURING 1987-2004 AND WESTERN AUSTRALIA, QUEENSLAND AND NEW ZEALAND CRASHES DURING 1991-2004

FREQUENCY FOR EACH MODEL FOR ALL TYPES OF CRASHES (NSW/VIC/QLD/WA/NZ)

Note: Only those models with a Market Group displayed were used in the crashworthiness analysis

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Alfa Romeo	164	89-92	AL01Z	60	9	69	8	4	12	0	
Alfa Romeo	33	83-92	AL02Z	505	92	597	94	29	123	1	Small
Alfa Romeo	75	86-92	AL03Z	143	20	163	17	4	21	1	Luxury
Alfa Romeo	90	85-88	AL04Z	66	7	73	6	3	9	0	
Alfa Romeo	GTV	82-84	AL05Z	134	15	149	10	10	20	1	Sports
Alfa Romeo	Sprint	82-88	AL06Z	104	21	125	28	5	33	1	Sports
Alfa Romeo	Alfasud	82-84	AL07Z	102	20	122	17	5	22	1	Small
Alfa Romeo	Alfetta	82-88	AL08Z	48	10	58	4	5	9	0	
Alfa Romeo	Guilietta	82-86	AL09Z	59	7	66	6	2	8	0	
Alfa Romeo	Quattro		AL10Z	1	0	1	1	0	1	0	
Alfa Romeo	156	99-04	AL13Z	166	25	191	14	2	16	0	
Alfa Romeo	166	99-04	AL14Z	10	3	13	1	1	2	0	
Alfa Romeo	GTV / Spider	98-04	AL15Z	54	6	60	4	0	4	0	
Alfa Romeo	147	01-04	AL16Z	42	6	48	3	2	5	0	
Alfa	Others		AL99Z	253	49	302	140	36	176	0	
Audi	Cabriolet	02-04	AU10Z	5	0	5	1	0	1	0	
Audi	A6/S6/AllRoad	95-04	AUD1Z	28	3	31	4	0	4	0	
Audi	A8	95-03	AUD2Z	3	0	3	.	.	.	0	
Audi	A4	95-01	AUD3Z	316	43	359	46	11	57	1	Luxury
Audi	A8/S8/A6		AUD4Z	41	1	42	7	1	8	0	
Audi	A3/S3	97-04	AUD5Z	161	27	188	18	1	19	0	
Audi	TT	99-03	AUD6Z	36	2	38	2	0	2	0	
Audi	A4	01-04	AUD7Z	210	38	248	18	3	21	1	Luxury
Audi	Others		AudiZ	1138	195	1333	180	48	228	0	
BMW	Z3 E36	97-03	BM10Z	115	18	133	13	5	18	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Mini	Mini Cooper	02-04	BM11Z	30	8	38	7	2	9	0	
BMW	Z4	03-04	BM12Z	7	1	8	1	1	2	0	
BMW	5 Series E60	03-04	BM13Z	4	2	6	1	1	2	0	
BMW	X5	01-04	BM14Z	31	4	35	1	0	1	0	
BMW	1 Series E87	04-04	BM17Z	1	0	1	.	.	.	0	
BMW	3 Series E30	82-91	BM3 A	2670	432	3102	464	102	566	1	Luxury
BMW	3 Series E36	92-98	BM3 B	2977	561	3538	448	91	539	1	Luxury
BMW	3 Series E46	99-04	BM3 C	882	192	1074	135	20	155	1	Luxury
BMW	3 Series Others		BM3 Z	107	46	153	43	11	54	0	
BMW	5 Series E28	82-88	BM5 A	739	91	830	85	21	106	1	Luxury
BMW	5 Series E34	89-95	BM5 B	540	84	624	81	23	104	1	Luxury
BMW	5 Series E39	96-03	BM5 C	420	51	471	48	8	56	1	Luxury
BMW	5 Series Others		BM5 Z	26	9	35	9	3	12	0	
BMW	6 Series E24	86-89	BM6 Z	5	0	5	1	0	1	0	
BMW	7 Series E23	82-88	BM7 A	214	20	234	26	7	33	1	Luxury
BMW	7 Series E32	89-94	BM7 B	143	20	163	27	7	34	1	Luxury
BMW	7 Series E38	95-01	BM7 C	117	11	128	9	1	10	0	
BMW	7 Series E65/66	02-04	BM7 D	9	1	10	1	0	1	0	
BMW	7 Series Others		BM7 Z	14	3	17	2	1	3	0	
BMW	8 Series E31	90-99	BM8 Z	15	1	16	1	0	1	0	
BMW	Others		BM99Z	1528	255	1783	302	66	368	0	
Chrysler	Voyager	97-04	CHR1Z	244	41	285	30	3	33	1	People Mover
Chrysler	Neon	96-99	CHR2Z	319	69	388	53	8	61	1	Small
Chrysler	Neon	00-02	CHR3Z	45	8	53	5	4	9	0	
Chrysler	PT Cruiser	00-04	CHR4Z	21	7	28	6	2	8	0	
Chrysler	Others		CHRYZ	16	1	17	9	0	9	0	
Citroen	BX	86-94	CI1 Z	77	4	81	27	5	32	0	
Citroen	AX	91-93	CI3 Z	4	1	5	13	3	16	0	
Citroen	Xanitia	94-00	CI4 Z	38	9	47	13	3	16	0	
Citroen	Berlingo	99-04	CI5 Z	48	6	54	2	1	3	0	
Citroen	Xsara	00-04	CI6 Z	39	8	47	8	1	9	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Citroen	XM	91-00	CI7 Z	6	1	7	1	1	2	0	
Citroen	C5	01-04	CI8 Z	25	6	31	1	0	1	0	
Citroen	C3	02-04	CI9 Z	9	0	9	.	.	.	0	
Citroen	Others		CI99Z	67	3	70	3	1	4	0	
Daihatsu	Charade	82-86	D1 A	1722	541	2263	634	182	816	1	Light
Daihatsu	Charade	87	D1 B	295	90	385	115	20	135	0	
Daihatsu	Charade	88-92	D1 C	5366	1608	6974	1128	328	1456	1	Light
Daihatsu	Charade	93-00	D1 D	4390	1266	5656	740	216	956	1	Light
Daihatsu	Charade Others		D1 Z	260	162	422	117	38	155	0	
Daihatsu	Feroza / Rocky	89-97	D11 Z	692	162	854	136	44	180	1	4WD - Compact
Daihatsu	Handivan	82-90	D12 Z	533	246	779	195	53	248	1	Commercial - Van
Daihatsu	Hi-Jet	82-90	D13 Z	121	70	191	63	22	85	1	Commercial - Van
Daihatsu	Rocky / Rugger	85-98	D14 Z	417	130	547	87	47	134	1	4WD - Compact
Daihatsu	Pyzar	97-01	D15 Z	190	54	244	32	8	40	1	Light
Daihatsu	Move	97-99	D16 Z	45	20	65	15	6	21	0	
Daihatsu	Sirion / Storia	98-04	D17 Z	632	227	859	128	34	162	1	Light
Daihatsu	Terios	97-04	D18 Z	234	111	345	93	28	121	1	4WD - Compact
Daihatsu	Handivan / Cuore	99-03	D19 Z	81	42	123	29	8	37	1	Commercial - Van
Daihatsu	Applause	89-99	D2 Z	2213	611	2824	416	105	521	1	Small
Daihatsu	YRV	01-04	D20 Z	4	3	7	3	1	4	0	
Daihatsu	Charade	03-04	D21 Z	5	1	6	1	0	1	0	
Daihatsu	Copen	03-04	D22 Z	4	0	4	1	0	1	0	
Daihatsu	Mira	90-96	D3 Z	479	249	728	202	72	274	1	Light
Daihatsu	Delta		D4 Z	1256	206	1462	120	42	162	0	
Daihatsu	F20/25/50/55/60/65		D5 Z	67	31	98	18	10	28	0	
Daihatsu	Others		D99 Z	1345	371	1716	384	109	493	0	
Daewoo	1.5i	94-95	DA01Z	356	99	455	90	9	99	1	Light
Daewoo	Cielo	95-97	DA03Z	1869	678	2547	484	117	601	1	Light
Daewoo	Espero	95-97	DA05Z	428	148	576	103	30	133	1	Medium
Daewoo	Nubira	97-03	DA06Z	1275	350	1625	270	62	332	1	Small
Daewoo	Lanos	97-03	DA07Z	2081	699	2780	465	135	600	1	Light

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Daewoo	Leganza	97-04	DA08Z	332	84	416	61	15	76	1	Medium
Daewoo / Ssango	Musso	98-02	DA09Z	88	12	100	12	6	18	0	
Daewoo	Matiz	99-04	DA10Z	285	156	441	124	21	145	1	Light
Daewoo	Tacuma	00-04	DA11Z	32	11	43	3	2	5	0	
Daewoo	Lacetti	03-04	DA12Z	13	9	22	6	0	6	0	
Daewoo	Kalos	03-04	DA13Z	60	22	82	10	6	16	0	
Ssangyong	Rexton	03-04	DA14Z	1	0	1	.	.	.	0	
Daewoo	Others		DA99Z	99	23	122	21	2	23	0	
Ford	Laser/Met	90	F01 B	4734	1161	5895	1095	236	1331	0	
Ford	Laser	91-94	F01 C	9530	2443	11973	2306	561	2867	1	Small
Ford	Laser	95-97	F01 D	2420	663	3083	545	139	684	1	Small
Ford	Laser/Met Others		F01 Z	1069	511	1580	397	95	492	0	
Ford	Cortina	82-82	F02 Z	25	11	36	304	80	384	0	
Ford	Telstar Others		F04 Z	263	122	385	93	25	118	0	
Ford	Escort	82-82	F05 Z	31	5	36	5	1	6	0	
Ford	Falcon XE/XF	82-88	F06 Z	55149	9376	64525	8504	2665	11169	1	Large
Ford	Fairlane Z & LTD F	82-87	F07 Z	6201	991	7192	938	264	1202	1	Luxury
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	F08 C	36244	6299	42543	5532	1511	7043	1	Large
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	F08 D	15019	2558	17577	2190	631	2821	1	Large
Ford	Falcon Others		F08 Z	588	162	750	211	51	262	0	
Ford	Fairlane N & LTD D	88-94	F09 A	2992	490	3482	458	162	620	1	Luxury
Ford	Fairlane N & LTD D	95-98	F09 B	847	170	1017	148	48	196	1	Luxury
Ford	Fairlane & LTD AU	99-02	F09 C	470	78	548	47	10	57	1	Luxury
Ford	Fairlane & LTD BA	03-04	F09 D	22	2	24	2	0	2	0	
Ford	Fairlane N&LTD D Others		F09 Z	11	2	13	2	0	2	0	
Ford	Mondeo	95-01	F10 Z	1165	230	1395	270	47	317	1	Medium
Ford	Capri	89-94	F43 Z	1076	305	1381	266	62	328	1	Sports
Ford	Festiva WD/WH/WF	94-01	F44 B	6996	2570	9566	1734	507	2241	1	Light
Ford	Festiva WA Others		F44AZ	25	14	39	9	5	14	0	
Ford	Falcon Panel Van	82-95	F45 A	3762	493	4255	405	98	503	1	Commercial - Van
Ford	Falcon Panel Van	96-99	F45 B	442	50	492	59	8	67	1	Commercial - Van

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Ford	Falcon Panel Van Others		F45 Z	4	0	4	.	.	.	0	
Ford / Nissan	Falcon Ute / XFN Ute	82-95	F46 A	9149	1450	10599	1022	353	1375	1	Commercial - Ute
Ford	Falcon Ute	96-99	F46 B	1469	268	1737	200	62	262	1	Commercial - Ute
Ford	Falcon Ute	99	F46 C	397	72	469	53	14	67	0	
Ford	Falcon Ute AU	00-02	F46 D	1092	176	1268	150	32	182	1	Commercial - Ute
Ford	Falcon Ute BA	03-04	F46 E	249	37	286	38	11	49	1	Commercial - Ute
Ford	Falcon Ute Others		F46 Z	9	1	10	.	.	.	0	
Ford	Ford F-Series	82-92	F47 Z	756	108	864	83	22	105	1	Commercial - Ute
Ford	Spectron	86-90	F52 Z	79	22	101	32	4	36	1	People Mover
Ford	Trader		F53 Z	441	59	500	42	16	58	0	
Ford	Commercials		F54 Z	8129	1714	9843	1253	369	1622	0	
Ford	Sierra		F55 Z	3	1	4	1	0	1	0	
Ford	Bronco	82-87	F56 Z	124	19	143	14	8	22	1	4WD - Large
Ford	Probe	94-98	F61 Z	126	31	157	33	5	38	1	Sports
Ford	Falcon EF/EL	94-98	F62 Z	28452	5340	33792	4254	1129	5383	1	Large
Ford	Transit	95-00	F64 A	598	91	689	70	18	88	1	Commercial - Van
Ford	Transit	01-04	F64 B	125	8	133	12	0	12	0	
Ford	Transit Others		F64 Z	32	4	36	27	6	33	0	
Ford	Explorer	00-01	F65 Z	193	47	240	50	19	69	1	4WD - Large
Ford	Falcon AU	98-02	F66 Z	10642	2207	12849	1588	371	1959	1	Large
Ford	Taurus	96-98	F67 Z	291	58	349	48	12	60	1	Large
Ford	Ka	99-04	F68 Z	157	58	215	51	10	61	1	Light
Ford	Cougar	99-03	F69 Z	72	13	85	6	0	6	0	
Ford	Courier		F70 Z	773	106	879	86	24	110	0	
Ford	Mustang	01-03	F71 Z	5	0	5	1	0	1	0	
Ford	Explorer	01-04	F72 Z	45	8	53	15	1	16	0	
Ford	Falcon BA	02-04	F73 Z	1318	278	1596	195	45	240	1	Large
Ford	Focus	02-04	F75 Z	163	51	214	50	10	60	1	Small
Ford	F-Series	01-04	F76 Z	25	3	28	1	0	1	0	
Ford	Territory SX	04-04	F77 Z	13	2	15	3	1	4	0	
Ford	Fiesta WP/WQ	04-04	F78 Z	3	0	3	.	.	.	0	

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Ford	Others		F99 Z	18340	4131	22471	8975	3144	12119	0	
Ferrari			FERAZ	8	0	8	1	0	1	0	
Fiat	Argenta	83-85	FI01Z	7	4	11	3	1	4	0	
Fiat	Croma	88-89	FI02Z	20	4	24	9	0	9	0	
Fiat	Regata	84-88	FI03Z	232	31	263	24	7	31	1	Small
Fiat	Superbrava	82-85	FI04Z	44	14	58	8	6	14	0	
Fiat	X-1/9	82-85	FI11Z	3	0	3	.	.	.	0	
Fiat	Others		FI99Z	73	14	87	48	8	56	0	
FSM			FSM Z	12	2	14	6	1	7	0	
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	H1 Z	41945	8299	50244	6882	2288	9170	1	Large
Holden	Calibra	94-97	H12 Z	266	38	304	66	13	79	1	Sports
Holden	Statesman/Caprice WB	82-85	H14 A	178	25	203	33	19	52	1	Luxury
Holden	Stateman/Caprice VQ	90-93	H14 B	779	113	892	104	43	147	1	Luxury
Holden	Stateman/Caprice VR/VS	94-98	H14 C	1931	385	2316	299	93	392	1	Luxury
Holden	Stateman/Caprice Others		H14 Z	184	29	213	26	3	29	0	
Holden	Nova Others		H15 Z	201	49	250	49	7	56	0	
Holden	Commodore Ute VG/VP	90-93	H18 Z	1342	252	1594	163	67	230	1	Commercial - Ute
Holden	Camira	82-89	H2 Z	14675	3425	18100	3567	906	4473	1	Medium
Holden / Isuzu	Jackaroo / Bighorn	82-91	H21 A	592	146	738	203	33	236	1	4WD - Medium
Holden / Isuzu	Jackaroo / Bighorn	92-97	H21 B	402	78	480	99	25	124	1	4WD - Medium
Holden / Isuzu	Jackaroo / Bighorn	98-02	H21 C	268	58	326	44	13	57	1	4WD - Medium
Holden	Jackaroo		H21 Z	47	9	56	37	10	47	0	
Holden	Kingswood		H22 Z	15	5	20	2	5	7	0	
Holden / Isuzu	Piazza	86-88	H23 Z	45	9	54	17	2	19	0	
Holden / Isuzu	Rodeo / Pickup	82-85	H24 A	698	122	820	108	32	140	1	Commercial - Ute
Holden / Isuzu	Rodeo / Pickup	86-88	H24 B	387	66	453	58	9	67	1	Commercial - Ute
Holden / Isuzu	Rodeo / Pickup	89-95	H24 C	5005	888	5893	620	231	851	1	Commercial - Ute
Holden	Rodeo	96-98	H24 D	1756	366	2122	274	81	355	1	Commercial - Ute
Holden	Rodeo	99-02	H24 E	1398	317	1715	209	60	269	1	Commercial - Ute
Holden	Rodeo	03-04	H24 F	57	8	65	7	1	8	0	
Holden	Rodeo Others		H24 Z	182	45	227	35	10	45	0	

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Holden	Shuttle / WFR Van	82-87	H26 Z	470	100	570	71	27	98	1	Commercial - Van
Holden	WB Series	82-85	H27 Z	1549	245	1794	146	83	229	1	Commercial - Ute
Holden	Torana/Sunbird		H28 Z	6	0	6	1	0	1	0	
Holden	Gemini	82-84	H3 A	5935	1397	7332	1457	370	1827	1	Small
Holden	Gemini	85	H3 B	1312	330	1642	322	78	400	0	
Holden	Gemini RB	86-87	H3 C	746	244	990	247	54	301	1	Small
Holden	Gemini Others		H3 Z	1	0	1	.	.	.	0	
Holden	Commodore Others		H31 Z	21	1	22	14	1	15	0	
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	H33 Z	31230	6313	37543	4937	1328	6265	1	Large
Holden	Commodore Ute VR/VS	94-00	H34 Z	4819	918	5737	596	235	831	1	Commercial - Ute
Holden	Frontera / Mu	95-03	H35 Z	112	28	140	23	8	31	1	4WD - Medium
Holden	Vectra	97-03	H36 Z	1559	349	1908	343	53	396	1	Medium
Holden	Commodore VT/VX	97-02	H37 Z	17747	3959	21706	2949	649	3598	1	Large
Holden	Suburban	98-00	H38 Z	5	2	7	2	0	2	0	
Holden	Statesman/Caprice WH	99-03	H39 Z	403	68	471	46	9	55	1	Luxury
Holden	Astra JAP 87		H4 B	803	158	961	160	43	203	0	
Holden	Astra TR	96-98	H4 D	628	137	765	159	28	187	1	Small
Holden	Astra TS	98-04	H4 E	2767	694	3461	485	96	581	1	Small
Holden	Astra Others		H4 Z	59	26	85	26	7	33	0	
Holden	Commodore VU Ute	00-02	H41 Z	797	141	938	98	42	140	1	Commercial - Ute
Holden	Commodore VY/VZ	02-04	H42 Z	1723	408	2131	298	58	356	1	Large
Holden	Commodore VY/VZ Ute	02-04	H43 Z	435	92	527	55	20	75	1	Commercial - Ute
Holden	Monaro	01-04	H44 Z	115	40	155	27	11	38	1	Sports
Holden	Cruze	02-04	H45 Z	76	29	105	21	10	31	1	4WD - Compact
Holden	Barina XC	01-04	H46 Z	403	148	551	87	23	110	1	Light
Holden	Zafira TT	01-04	H47 Z	61	9	70	5	2	7	0	
Holden	Statesman/Caprice WK/WL	03-04	H48 Z	47	11	58	5	3	8	0	
Holden	Adventra	03-04	H49 Z	6	1	7	2	0	2	0	
Holden	Barina SB	95-00	H5 D	3797	1250	5047	820	196	1016	1	Light
Holden	Barina Others		H5 Z	426	145	571	153	22	175	0	
Holden	Rodeo	03-04	H50 Z	236	36	272	25	8	33	1	Commercial - Ute

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Holden	Vectra ZC	03-04	H51 Z	16	4	20	6	1	7	0	
Holden	Astra AH	04-04	H55 Z	1	0	1	1	0	1	0	
Holden	Commodore VB-VL	82-88	H6 Z	47600	8793	56393	8039	2557	10596	1	Large
Holden	Others		H99 Z	8512	1966	10478	7225	2863	10088	0	
Hyundai	Excel	86-90	HY1 A	2553	774	3327	837	220	1057	1	Light
Hyundai	Excel	90-94	HY1 B	7596	2242	9838	1821	439	2260	1	Light
Hyundai	Excel / Accent	95-00	HY1 C	14314	4741	19055	3265	775	4040	1	Light
Hyundai	Excel Others		HY1 Z	968	272	1240	235	39	274	0	
Hyundai	Trajet	00-04	HY10Z	10	2	12	3	1	4	0	
Hyundai	Elantra	00-04	HY11Z	518	130	648	71	22	93	1	Small
Hyundai	Santa Fe	00-04	HY12Z	95	21	116	16	4	20	1	4WD - Medium
Hyundai	Getz	02-04	HY13Z	244	70	314	31	20	51	1	Light
Hyundai	Sonata	98-01	HY15A	476	109	585	78	16	94	1	Large
Hyundai	Sonata	02-04	HY15B	60	8	68	5	0	5	0	
Hyundai	Sonata Others		HY15Z	2	0	2	3	1	4	0	
Hyundai	Tiburon	02-04	HY16Z	13	3	16	2	1	3	0	
Hyundai	Terracan	01-04	HY17Z	27	1	28	1	1	2	0	
Hyundai	Elantra Lavita	01-04	HY18Z	16	1	17	5	1	6	0	
Hyundai	Sonata	89-97	HY2 Z	2458	543	3001	454	102	556	1	Large
Hyundai	S Coupe	90-96	HY4 Z	824	248	1072	197	46	243	1	Small
Hyundai	Lantra	91-95	HY5 A	1625	407	2032	305	78	383	1	Small
Hyundai	Lantra	96-00	HY5 B	2645	656	3301	514	108	622	1	Small
Hyundai	Lantra Others		HY5 Z	48	14	62	14	2	16	0	
Hyundai	Coupe	96-00	HY7 Z	468	132	600	91	35	126	1	Sports
Hyundai	Grandeaur / XG	99-00	HY8 Z	162	27	189	15	1	16	0	
Hyundai	Accent	00-04	HY9 Z	1758	521	2279	320	82	402	1	Light
Hyundai	Others		HY99Z	840	231	1071	669	256	925	0	
Mitsubishi	Mirage / Colt	82-88	I01 Z	10532	2947	13479	2801	706	3507	1	Light
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	I02 Z	11847	2116	13963	2703	673	3376	1	Medium
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	I04 Z	23106	4297	27403	4036	1137	5173	1	Large
Mitsubishi	Charger/Valiant		I05 Z	30	2	32	1	1	2	0	

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Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	I06 A	8115	1676	9791	1347	315	1662	1	Large
Mitsubishi	Magna Others		I06 Z	1	1	2	1	0	1	0	
Mitsubishi	Starion	82-87	I07 Z	138	33	171	46	23	69	1	Sports
Mitsubishi	Lancer / Mirage CA	89-90	I09 A	3436	812	4248	971	244	1215	1	Small
Mitsubishi	Lancer / Mirage CB	91-92	I09 B	1626	342	1968	436	64	500	1	Small
Mitsubishi	Lancer / Mirage CC	93-95	I09 C	3977	1013	4990	951	250	1201	1	Small
Mitsubishi	Lancer / Mirage CE	96-03	I09 D	8901	2480	11381	1720	374	2094	1	Small
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	I10 A	519	108	627	205	39	244	1	People Mover
Mitsubishi	Nimbus / Chariot	92-98	I10 B	516	104	620	122	19	141	1	People Mover
Mitsubishi	Nimbus	99-03	I10 C	154	20	174	13	3	16	0	
Mitsubishi	Cordia	83-87	I12 Z	1527	314	1841	533	140	673	1	Small
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	I15 Z	16680	3191	19871	2958	654	3612	1	Large
Mitsubishi	Galant	89-93	I16 A	10	1	11	390	84	474	0	
Mitsubishi	Galant	95-96	I16 B	1029	225	1254	261	67	328	1	Medium
Mitsubishi	Galant Others		I16 Z	9	11	20	181	40	221	0	
Mitsubishi	Canter		I21 Z	717	89	806	112	35	147	0	
Mitsubishi	Starwagon / L300	83-86	I23 A	2784	665	3449	550	191	741	1	People Mover
Mitsubishi	Starwagon / Delica Starwagon	87-93	I23 B	3770	831	4601	670	213	883	1	People Mover
Mitsubishi	Starwagon / Delica Spacegear	95-98	I23 C	1093	202	1295	156	34	190	1	People Mover
Mitsubishi	Starwagon / Delica Spacegear	98-04	I23 D	365	85	450	56	20	76	1	People Mover
MITSUBISHI	Starwagon Others		I23 Z	150	67	217	109	24	133	0	
MITSUBISHI	Commercials		I24 Z	3005	644	3649	458	163	621	0	
Mitsubishi	Pajero	82-90	I25 A	1501	288	1789	340	107	447	1	4WD - Medium
MITSUBISHI	Pajero	91	I25 B	328	38	366	63	17	80	0	
Mitsubishi	Pajero	92-99	I25 C	2102	328	2430	317	86	403	1	4WD - Medium
Mitsubishi	Pajero NM / NP	00-04	I25 D	256	34	290	33	8	41	1	4WD - Medium
MITSUBISHI	Pajero Others		I25 Z	113	41	154	30	11	41	0	
Mitsubishi	3000GT	92-97	I26 Z	3	2	5	3	1	4	0	
Mitsubishi	Challenger	98-04	I30 Z	158	26	184	30	9	39	1	4WD - Medium

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Mitsubishi	Pajero iO	99-03	I34 Z	18	7	25	6	1	7	0	
Mitsubishi	Lancer CG	02-03	I37 Z	123	46	169	39	7	46	1	Small
Mitsubishi	Magna TL/KL / Verada KL/KW	03-04	I38 Z	58	6	64	4	0	4	0	
Mitsubishi	Outlander	03-04	I39 Z	17	5	22	2	0	2	0	
Mitsubishi	Lancer CH	03-04	I40 Z	93	30	123	13	6	19	0	
Mitsubishi	Others		I99 Z	8410	2156	10566	4491	1461	5952	0	
Isuzu	NKR Series		IS01Z	509	78	587	52	13	65	0	
Isuzu	NPR Series		IS02Z	939	75	1014	52	14	66	0	
Isuzu	Others		IS99Z	1263	154	1417	158	52	210	0	
Jaguar	XJ6	82-86	J01 A	256	35	291	26	12	38	1	Luxury
Jaguar	XJ6	87-94	J01 B	324	36	360	35	9	44	1	Luxury
Jaguar	XJ6	95-97	J01 C	64	8	72	3	3	6	0	
Jaguar	XJ8	98-03	J01 D	7	0	7	.	.	.	0	
Jaguar	XJ6 Others		J01 Z	23	3	26	5	0	5	0	
Jaguar	V12 Saloon		J02 Z	11	2	13	2	0	2	0	
Jaguar	XJS	82-96	J04 Z	61	10	71	8	1	9	0	
Jaguar	XJR	95-03	J05 Z	4	0	4	1	0	1	0	
Jaguar	XK8 / XKR	96-04	J07 Z	25	3	28	2	1	3	0	
Jaguar	S-Type	99-02	J08 Z	62	4	66	4	0	4	0	
Jaguar	X-Type	02-04	J09 Z	28	4	32	3	0	3	0	
Jaguar	XJ	03-04	J10 Z	6	3	9	2	0	2	0	
Jaguar	Others		J99 Z	228	37	265	60	18	78	0	
Jaguar			JAG Z	3	1	4	2	1	3	0	
Jeep	Cherokee XJ	96-00	JE01Z	662	113	775	128	35	163	1	4WD - Medium
Jeep	Grand Cherokee	96-99	JE02Z	91	16	107	22	8	30	1	4WD - Large
Jeep	Wrangler	96-04	JE03Z	102	21	123	27	10	37	1	4WD - Medium
Jeep	Grand Cherokee	99-04	JE04Z	50	5	55	18	3	21	0	
Jeep	Cherokee KJ	01-04	JE05Z	25	2	27	4	0	4	0	
Jeep	Others		JEEPZ	172	24	196	32	7	39	0	
Kia	Sportage	98-03	K01 Z	187	48	235	49	7	56	1	4WD - Compact
Kia	Ceres	92-00	K02 Z	417	127	544	96	26	122	1	Commercial - Ute

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Kia	Mentor	97-00	K03 Z	4	3	7	2	1	3	0	
Kia	Credos	98-01	K04 Z	22	9	31	5	2	7	0	
Kia	Rio	00-04	K05 Z	534	193	727	126	29	155	1	Light
Kia	Carens	00-02	K06 Z	23	10	33	5	0	5	0	
Kia	Carnival	99-04	K07 Z	245	36	281	31	3	34	1	People Mover
Kia	Spectra	01-04	K08 Z	67	25	92	17	5	22	0	
Kia	Optima	01-04	K09 Z	3	0	3	.	.	.	0	
Kia	K2700	02-04	K10 Z	3	0	3	1	0	1	0	
Kia	Pregio	02-04	K11 Z	61	15	76	11	2	13	0	
Kia	Sorento	03-04	K12 Z	11	3	14	3	0	3	0	
Kia	Cerato	04-04	K13 Z	1	1	2	1	0	1	0	
Lada			LADAZ	196	82	278	109	29	138	0	
Lancia			LANCZ	22	2	24	1	2	3	0	
Leyland			LEY Z	37	8	45	7	5	12	0	
Land Rover	Defender	92-04	LRO1Z	193	38	231	30	15	45	1	4WD - Medium
Land Rover	Discovery	91-02	LRO2A	261	64	325	68	18	86	1	4WD - Medium
Land Rover	Discovery	02-04	LRO2B	5	2	7	.	.	.	0	
Land Rover	Discovery Others		LRO2Z	592	78	670	71	22	93	0	
Land Rover	Others		LROVZ	370	45	415	57	14	71	0	
Ford / Mazda	Laser / 323 / Familia	82-88	M01 A	37656	9903	47559	11610	2794	14404	1	Small
Mazda	323	89	M01 B	419	116	535	464	103	567	0	
Mazda	323 / Familia / Lantis	90-93	M01 C	2631	616	3247	1112	245	1357	1	Small
Mazda	323	94	M01 D	712	166	878	129	33	162	0	
Mazda	323 / Familia / Lantis	95-98	M01 E	2567	635	3202	493	120	613	1	Small
Ford / Mazda	Laser / 323	99-03	M01 F	2041	597	2638	407	91	498	1	Small
Mazda	323 Others		M01 Z	345	177	522	128	44	172	0	
Mazda	626/MX6 / Telstar	82	M02 A	10906	2378	13284	2354	697	3051	0	
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	M02 B	7680	1560	9240	2327	569	2896	1	Medium
Mazda	626/MX6 / Telstar	87	M02 C	1835	300	2135	250	63	313	0	
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	M02 D	3540	774	4314	1220	287	1507	1	Medium
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	M02 E	3779	651	4430	840	222	1062	1	Medium

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Mazda	626	98-02	M02 F	707	177	884	154	42	196	1	Medium
Mazda	626/MX6 / Telstar Others		M02 Z	265	111	376	71	34	105	0	
Mazda	929 / Luce	82-90	M03 A	2784	535	3319	590	159	749	1	Luxury
Mazda	929	91	M03 B	149	21	170	26	6	32	0	
Mazda	929 / Sentia / Efini MS-9	92-96	M03 C	136	29	165	31	4	35	1	Luxury
Mazda	929 Others		M03 Z	86	41	127	29	11	40	0	
Ford / Mazda	Festiva WA / 121	87-90	M09 A	4413	1464	5877	1149	321	1470	1	Light
Mazda	121 / Autozam Review	94-96	M09 B	2041	673	2714	466	106	572	1	Light
Mazda	121 Metro / Demio	97-02	M09 C	1203	384	1587	277	62	339	1	Light
Mazda	121 / Ford Festiva WA Others		M09 Z	172	98	270	82	26	108	0	
Mazda	RX7	82-85	M10 A	492	95	587	98	36	134	1	Sports
Mazda	RX7	86-91	M10 B	258	31	289	75	24	99	1	Sports
Mazda	RX7	92-98	M10 C	56	10	66	17	5	22	0	
Mazda	RX7 Others		M10 Z	5	0	5	2	4	6	0	
Mazda	MX5 / Eunos Roadster	89-97	M11 A	437	98	535	81	18	99	1	Sports
Mazda	MX5 / Eunos Roadster	98-04	M11 B	172	47	219	26	5	31	1	Sports
Mazda	MX5 Others		M11 Z	6	9	15	8	2	10	0	
Mazda	Commercials		M14 Z	4300	935	5235	727	263	990	0	
Mazda	MPV	94-99	M15 A	212	26	238	18	1	19	0	
Mazda	MPV	00-04	M15 B	75	9	84	5	1	6	0	
Mazda	MPV Others		M15 Z	5	1	6	1	0	1	0	
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	M16 Z	268	66	334	54	8	62	1	Sports
Mazda	Eunos 500	93-99	M17 Z	133	37	170	32	6	38	1	Luxury
Mazda	Eunos 800	94-00	M18 Z	50	7	57	10	3	13	0	
Ford / Mazda	Escape / Tribute	01-04	M21 Z	159	32	191	39	6	45	1	4WD - Compact
Ford / Mazda	Courier / B-Series / Bounty	98-02	M22 A	712	133	845	112	36	148	1	Commercial - Ute
Ford / Mazda	Courier / Bravo / Bounty	03-04	M22 B	61	8	69	7	3	10	0	
Mazda	Bravo / Ford Courier Others		M22 Z	388	32	420	40	7	47	0	
Mazda	Premacy	01-03	M23 Z	5	0	5	.	.	.	0	
Mazda	2	02-04	M24 Z	26	3	29	3	1	4	0	

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Mazda	6	02-04	M25 Z	52	6	58	3	3	6	0	
Mazda	RX8	03-04	M26 Z	14	0	14	2	0	2	0	
Mazda	3	03-04	M27 Z	92	22	114	13	1	14	0	
Mazda	Others		M99 Z	6879	1389	8268	2686	765	3451	0	
Maserati			MASRZ	2	0	2	1	0	1	0	
Mercedes Benz	100 Series		ME1 Z	235	37	272	41	8	49	0	
Mercedes Benz	C180		ME10Z	80	17	97	16	2	18	0	
Mercedes Benz	C-Class W201	87-93	ME11Z	399	86	485	83	24	107	1	Luxury
Mercedes Benz	C-Class W202	95-00	ME12Z	734	118	852	99	21	120	1	Luxury
Mercedes Benz	CLK C208	97-03	ME13Z	111	18	129	13	2	15	0	
Mercedes Benz	E-Class W123	82-85	ME14Z	272	44	316	25	9	34	1	Luxury
Mercedes Benz	E-Class W124	86-94	ME15Z	787	127	914	111	21	132	1	Luxury
Mercedes Benz	E-Class W210	96-02	ME16Z	419	57	476	50	12	62	1	Luxury
Mercedes Benz	S-CLASS W107		ME17Z	22	4	26	5	0	5	0	
Mercedes Benz	S-Class W126	82-92	ME18Z	601	83	684	64	18	82	1	Luxury
Mercedes Benz	S-Class R129	93-02	ME19Z	72	7	79	5	1	6	0	
Mercedes Benz	200 Series		ME2 Z	354	27	381	40	17	57	0	
Mercedes Benz	S-Class C140	93-98	ME20Z	134	7	141	6	1	7	0	
Mercedes Benz	SLK R170	97-04	ME21Z	91	22	113	11	2	13	0	
Mercedes Benz	A-Class W168	98-04	ME22Z	115	29	144	14	5	19	0	
Mercedes Benz	MB100 / MB140	99-04	ME24Z	117	14	131	11	1	12	0	
Mercedes Benz	S-Class W220	99-04	ME25Z	38	5	43	1	1	2	0	
Mercedes Benz	Vito	99-04	ME26Z	207	23	230	12	4	16	0	
Mercedes Benz	M-Class W163	98-04	ME27Z	124	17	141	16	3	19	0	
Mercedes Benz	CL500/600 C215	98-00	ME28Z	5	0	5	.	.	.	0	
Mercedes Benz	C-Class W203	00-04	ME29Z	57	9	66	7	0	7	0	
Mercedes Benz	300 Series		ME3 Z	466	40	506	44	11	55	0	
Mercedes Benz	Sprinter	98-04	ME30Z	139	29	168	23	3	26	1	Commercial - Van
Mercedes Benz	G-Class	83-88	ME31Z	1	0	1	1	0	1	0	
Mercedes Benz	CLK C209	03-04	ME32Z	18	3	21	3	0	3	0	
Mercedes Benz	E-Class W211	02-04	ME33Z	39	7	46	1	0	1	0	

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Mercedes Benz	S-Class R230	02-04	ME34Z	4	1	5	.	.	.	0	
Mercedes Benz	400 Series		ME4 Z	72	15	87	11	5	16	0	
Mercedes Benz	500 Series		ME5 Z	38	5	43	4	1	5	0	
Mercedes Benz	Others		ME99Z	1275	189	1464	299	84	383	0	
Holden / Nissan	Astra / Pulsar / Langley	84-86	N01 A	8746	2225	10971	2493	639	3132	1	Small
Nissan	Pulsar / Vector	87	N01 B	1357	293	1650	479	92	571	0	
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	N01 C	10494	2465	12959	2306	581	2887	1	Small
Nissan	Pulsar / Vector	91	N01 D	2466	553	3019	440	111	551	0	
Nissan	Pulsar / Vector / Sentra	92-95	N01 E	4438	987	5425	1105	250	1355	1	Small
Nissan	Pulsar / Vector / Sentra	96-99	N01 F	4503	1338	5841	920	229	1149	1	Small
Nissan	Pulsar Others		N01 Z	417	201	618	142	51	193	0	
Nissan	Pintara	86-88	N02 A	4110	808	4918	711	199	910	1	Medium
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	N02 B	6871	1480	8351	1440	401	1841	1	Medium
Nissan	Pintara Others		N02 Z	2	0	2	96	24	120	0	
Nissan	Bluebird	82-86	N03 Z	11480	2395	13875	2379	727	3106	1	Medium
Nissan	Skyline	83-88	N04 Z	4339	794	5133	939	260	1199	1	Large
Nissan	180B/200B		N05 Z	52	7	59	6	1	7	0	
Nissan	300ZX / Fairlady Z	90-95	N09 Z	405	69	474	81	22	103	1	Sports
Nissan	Stanza	82-83	N10 Z	487	101	588	88	21	109	1	Small
Nissan	280C / Laurel	82-84	N11 Z	56	9	65	9	3	12	0	
Nissan	Gazelle / Silvia	84-86	N12 Z	355	68	423	333	125	458	1	Sports
Nissan	280ZX	82-84	N13 Z	78	14	92	16	7	23	0	
Nissan	Prairie	84-86	N14 Z	336	76	412	93	23	116	1	People Mover
Nissan	Maxima	90-94	N15 A	558	101	659	185	43	228	1	Luxury
Nissan	Maxima / Cefiro	95-99	N15 B	613	134	747	154	32	186	1	Luxury
Nissan	Maxima	00-02	N15 C	163	35	198	33	6	39	1	Luxury
Nissan	Maxima Others		N15 Z	45	14	59	128	27	155	0	
Nissan	Exa	83-86	N16 A	403	107	510	103	33	136	1	Sports
Nissan	Exa	87-91	N16 B	240	39	279	55	16	71	1	Sports
Nissan	Exa Others		N16 Z	10	1	11	8	0	8	0	
Nissan	NX/NX-R	91-96	N17 Z	464	130	594	94	39	133	1	Sports

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Nissan	300C / Laurel	85-87	N20 Z	84	16	100	12	4	16	0	
Nissan	720 Ute	82-85	N21 Z	1378	263	1641	205	65	270	1	Commercial - Ute
Nissan	B120		N22 Z	101	25	126	16	8	24	0	
Nissan	H40		N23 Z	16	3	19	2	1	3	0	
Nissan	Navara	86-91	N24 A	3159	497	3656	468	164	632	1	Commercial - Ute
Nissan	Navara	92-96	N24 B	1196	200	1396	195	56	251	1	Commercial - Ute
Nissan	Navara	97-04	N24 C	564	92	656	87	21	108	1	Commercial - Ute
Nissan	Navara Others		N24 Z	285	75	360	79	18	97	0	
Nissan	Vans(Nomad/Urvan/C22/E24/Vanette)		N25 Z	2871	720	3591	569	181	750	0	
Nissan	Patrol / Safari	82-87	N26 A	1272	169	1441	164	52	216	1	4WD - Large
Nissan / Ford	Patrol / Maverick / Safari	88-97	N26 B	5059	703	5762	668	199	867	1	4WD - Large
Nissan	Patrol / Safari	98-04	N26 C	1089	169	1258	174	50	224	1	4WD - Large
Nissan	Patrol		N26 Z	211	39	250	31	16	47	0	
Nissan	Pathfinder / Terrano	88-94	N27 Z	368	60	428	183	50	233	1	4WD - Medium
Nissan	Sunny /120Y		N28 Z	24	8	32	14	2	16	0	
Nissan	Serena	92-95	N30 Z	83	16	99	38	6	44	0	
Nissan	Infiniti	93-97	N31 Z	4	1	5	1	0	1	0	
Nissan	Bluebird	93-97	N32 Z	1004	166	1170	323	75	398	1	Medium
Nissan	200SX / Silvia	94-02	N33 Z	584	114	698	63	23	86	1	Sports
Nissan	Micra	95-97	N34 Z	498	175	673	113	42	155	1	Light
Nissan	Pathfinder / Terrano	95-02	N36 Z	335	56	391	80	15	95	1	4WD - Medium
Nissan	Terrano II	97-00	N38 Z	7	3	10	3	0	3	0	
Nissan	Pulsar	00-04	N39 Z	1872	564	2436	323	98	421	1	Small
Nissan	X-Trail	01-04	N40 Z	185	42	227	33	11	44	1	4WD - Compact
Nissan	350Z	03-04	N41 Z	19	8	27	8	2	10	0	
Nissan	Maxima	03-04	N42 Z	11	4	15	1	2	3	0	
Nissan	Others		N99 Z	7660	1619	9279	4304	1411	5715	0	
FSM			NIKIZ	15	12	27	12	6	18	0	
Lada	Niva	84-99	NIVAZ	290	63	353	68	19	87	1	4WD - Compact
Honda	Civic	82-83	O1 A	648	149	797	421	100	521	1	Small
Honda	Civic / Ballade / Shuttle	84-87	O1 B	2341	550	2891	1037	269	1306	1	Small

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Honda	Civic / Shuttle	88-91	O1 C	3342	753	4095	1074	266	1340	1	Small
Honda	Civic	92-95	O1 D	3375	741	4116	854	180	1034	1	Small
Honda	Civic	96-00	O1 E	2890	659	3549	477	98	575	1	Small
Honda	Civic Others		O1 Z	217	84	301	325	71	396	0	
Honda	CRX	87-91	O10 A	293	62	355	239	76	315	1	Sports
Honda	CRX	92-98	O10 B	141	25	166	40	16	56	1	Sports
Honda	CRX Others		O10 Z	9	4	13	23	10	33	0	
Honda	Odyssey	95-00	O17 A	346	57	403	45	8	53	1	People Mover
Honda	Odyssey	00-02	O17 B	77	13	90	7	2	9	0	
Honda	Odyssey Others		O17 Z	7	0	7	.	.	.	0	
Honda	CR-V	97-01	O18 A	757	147	904	186	27	213	1	4WD - Compact
Honda	CR-V	02-04	O18 B	272	50	322	36	5	41	1	4WD - Compact
Honda	CR-V Others		O18 Z	7	4	11	21	8	29	0	
Honda	HR-V	99-02	O19 Z	211	43	254	32	10	42	1	4WD - Compact
Honda	Legend	86-95	O2 B	640	79	719	116	25	141	1	Luxury
Honda	Legend	96-98	O2 C	52	7	59	5	0	5	0	
Honda	Legend	99-04	O2 D	25	4	29	5	1	6	0	
Honda	Legend Others		O2 Z	12	8	20	34	10	44	0	
Honda	S2000	99-04	O20 Z	86	8	94	6	0	6	0	
Honda	Civic	01-04	O21 Z	347	67	414	57	12	69	1	Small
Honda	Jazz	02-04	O22 Z	54	19	73	22	4	26	0	
Honda	MDX	03-04	O24 Z	11	0	11	1	0	1	0	
Honda	Accord Euro	03-04	O25 Z	44	11	55	10	1	11	0	
Honda	Accord	03-04	O26 Z	49	10	59	7	1	8	0	
Honda	Odyssey	04-04	O27 Z	3	0	3	.	.	.	0	
Honda	Accord	82-85	O3 A	1819	408	2227	957	237	1194	1	Luxury
Honda	Accord	86-90	O3 B	1749	301	2050	780	162	942	1	Luxury
Honda	Accord	91-93	O3 C	1011	143	1154	239	56	295	1	Luxury
Honda	Accord	94-98	O3 D	1898	308	2206	331	72	403	1	Luxury
Honda	Accord	99-02	O3 E	295	62	357	50	8	58	1	Luxury
Honda	Accord Others		O3 Z	126	47	173	181	46	227	0	

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Honda	Prelude	82-82	O4 A	197	36	233	30	6	36	1	Sports
Honda	Prelude	83-91	O4 B	2724	466	3190	1095	254	1349	1	Sports
Honda	Prelude	92-96	O4 C	986	160	1146	174	61	235	1	Sports
Honda	Prelude	97-02	O4 D	329	69	398	52	6	58	1	Sports
Honda	Prelude Others		O4 Z	58	25	83	87	22	109	0	
Honda	Integra	86-88	O5 A	540	102	642	323	76	399	1	Sports
Honda	Integra	89	O5 B	295	70	365	176	46	222	0	
Honda	Integra	90-92	O5 C	491	88	579	158	27	185	1	Sports
Honda	Integra	93	O5 D	139	29	168	20	6	26	0	
Honda	Integra	93-01	O5 E	621	107	728	131	24	155	1	Sports
Honda	Integra	02-04	O5 F	47	13	60	9	1	10	0	
Honda	Integra Others		O5 Z	38	19	57	16	3	19	0	
Honda	Concerto	89-93	O6 Z	375	84	459	144	42	186	1	Small
Honda	NSX	91-02	O7 Z	10	0	10	1	1	2	0	
Honda	Acty	83-86	O8 Z	274	59	333	43	16	59	1	Commercial - Van
Honda	City	83-86	O9 Z	294	115	409	539	113	652	1	Light
Honda	Others		O99 Z	1729	464	2193	1183	386	1569	0	
Peugoet	205	87-94	PE1 Z	179	36	215	42	11	53	1	Light
Peugeot	607	01-04	PE10Z	3	0	3	1	0	1	0	
Peugeot	405	89-97	PE2 Z	366	73	439	113	29	142	1	Luxury
Peugeot	505	82-93	PE3 Z	598	72	670	82	29	111	1	Luxury
Peugeot	306	94-01	PE4 Z	706	133	839	139	18	157	1	Small
Peugeot	605	94-96	PE5 Z	35	4	39	6	2	8	0	
Peugeot	406	96-04	PE7 Z	136	12	148	20	4	24	1	Luxury
Peugeot	206	99-04	PE8 Z	194	45	239	22	10	32	1	Light
Peugeot	307	01-04	PE9 Z	99	16	115	16	2	18	0	
Peugeot	Others		PE99Z	234	38	272	115	30	145	0	
Porsche	944	82-91	PO1 Z	83	10	93	13	5	18	0	
Porsche	911	82-04	PO2 Z	18	1	19	7	3	10	0	
Porsche	968	92-95	PO4 Z	1	0	1	.	.	.	0	
Porsche	Cayenne	03-04	PO6 Z	2	0	2	.	.	.	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Porsche	Others		PO99Z	360	40	400	45	30	75	0	
Proton	Wira	95-96	PRO1Z	575	213	788	131	41	172	1	Small
Proton	Satria	97-04	PRO2Z	73	24	97	7	3	10	0	
Proton	Waja	01-04	PRO3Z	4	2	6	1	1	2	0	
Proton	Jumbuck	03-04	PRO4Z	11	0	11	1	0	1	0	
			PROTZ	41	11	52	9	4	13	0	
Renault	20	82-83	RE1 Z	14	4	18	7	4	11	0	
Renault	Megane Cabriolet	01-04	RE10Z	15	3	18	2	1	3	0	
Renault	Clio	02-04	RE11Z	42	15	57	11	1	12	0	
Renault	Megane II	03-04	RE12Z	2	1	3	.	.	.	0	
Renault	Feugo	82-87	RE2 Z	306	44	350	61	13	74	1	Sports
Renault	21	87-91	RE3 Z	14	3	17	5	2	7	0	
Renault	25	85-91	RE4 Z	35	8	43	16	4	20	0	
Renault	19	91-96	RE5 Z	150	43	193	38	7	45	1	Small
Renault	Laguna	95-96	RE7 Z	26	5	31	4	3	7	0	
Renault	Laguna	02-04	RE8 Z	3	1	4	3	0	3	0	
Renault	Scenic	01-04	RE9 Z	37	7	44	3	1	4	0	
Renault	Others		RE99Z	251	40	291	59	11	70	0	
Rover	3500	82-87	RO Z	134	28	162	34	3	37	1	Luxury
Rover	416i/827		RO1 Z	236	43	279	31	9	40	0	
Rover	Quintet	82-86	RO2 Z	200	52	252	60	17	77	1	Small
Rover	825	87-88	RO3 Z	28	5	33	9	1	10	0	
MG	MGF / MG TF	99-04	RO4 Z	109	20	129	14	4	18	0	
Landrover	Freelander	98-04	RO5 Z	86	16	102	16	6	22	1	4WD - Compact
MG	ZT	02-04	RO6 Z	4	1	5	.	.	.	0	
Rover	75	01-04	RO7 Z	11	2	13	1	1	2	0	
Rover	Others		RO99Z	299	63	362	167	52	219	0	
Rolls Royce			ROLLZ	24	5	29	3	2	5	0	
Land Rover	Range Rover	82-94	RROV1	761	91	852	122	37	159	1	4WD - Large
Land Rover	Range Rover	95-02	RROV2	70	13	83	24	3	27	0	
Land Rover	Range Rover	02-04	RROV3	6	0	6	.	.	.	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Range Rover	Others		RROVZ	12	8	20	9	2	11	0	
Saab	Others		SA00Z	612	111	723	157	38	195	0	
Saab	900 Series	82-92	SA1 A	741	132	873	124	37	161	1	Luxury
Saab	900/9-3	94-02	SA1 B	715	102	817	73	17	90	1	Luxury
Saab	900 Others		SA1 Z	1	2	3	.	.	.	0	
Saab	9000	86-97	SA2 Z	672	115	787	104	12	116	1	Luxury
Saab	09-5	98-04	SA3 Z	106	27	133	19	2	21	1	Luxury
Saab	09-3	03-04	SA4 Z	14	4	18	3	2	5	0	
Saab	900/9000		SA99Z	188	30	218	28	4	32	0	
Lada	Samara	88-90	SAMAZ	53	10	63	10	4	14	0	
Seat	Ibiza	95-99	SE01Z	6	2	8	4	1	5	0	
Seat	Cordoba	95-99	SE02Z	4	3	7	3	1	4	0	
Seat	Others		SEATZ	189	36	225	16	3	19	0	
Smart	Roadster	03-04	SM02Z	2	0	2	.	.	.	0	
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	SU1 Z	5014	1286	6300	1109	378	1487	1	Medium
Subaru	Liberty / Legacy	89-93	SU2 A	3329	659	3988	879	231	1110	1	Medium
Subaru	Liberty / Legacy / Outback	94-98	SU2 B	1417	306	1723	266	68	334	1	Medium
Subaru	Liberty / Legacy / Outback	99-03	SU2 C	1143	213	1356	136	31	167	1	Medium
Subaru	Liberty / Legacy / Outback	03-04	SU2 D	34	3	37	4	2	6	0	
Subaru	Liberty Others		SU2 Z	94	35	129	182	52	234	0	
Subaru	Vortex	85-89	SU3 Z	50	14	64	25	6	31	0	
Subaru	Sherpa / Fiori / 700 / Rex	89-92	SU4 Z	555	296	851	274	68	342	1	Light
Subaru	SVX / Alcyone	92-95	SU5 Z	18	3	21	1	0	1	0	
Subaru	Brumby	82-92	SU6 Z	1282	417	1699	252	143	395	1	Commercial - Ute
Subaru	Impreza	93-00	SU7 A	2516	574	3090	424	134	558	1	Small
Subaru	Impreza	01-04	SU7 B	421	81	502	51	12	63	1	Small
Subaru	Impreza Others		SU7 Z	17	5	22	26	6	32	0	
Subaru	Forester	97-02	SU8 Z	611	146	757	141	26	167	1	4WD - Compact
Subaru	Forester	02-04	SU9 Z	152	36	188	26	4	30	1	4WD - Compact
Subaru	Others		SU99Z	2486	562	3048	855	281	1136	0	
Suzuki	Swift	82-85	SZ01A	178	63	241	45	18	63	1	Light

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Holden / Suzuki	Barina / Swift / Cultus	86-88	SZ01B	3221	1078	4299	1099	292	1391	1	Light
Holden / Suzuki	Barina / Swift / Cultus	89-99	SZ01C	11503	3488	14991	2579	655	3234	1	Light
Suzuki	Swift Others		SZ01Z	156	59	215	52	23	75	0	
Suzuki	Vitara / Escudo	88-98	SZ02A	2326	589	2915	533	128	661	1	4WD - Compact
Suzuki	Grand Vitara	99-04	SZ02B	106	29	135	33	7	40	1	4WD - Compact
Suzuki	Vitara Others		SZ02Z	58	25	83	43	15	58	0	
Suzuki	Hatch / Alto	82-84	SZ03Z	723	357	1080	256	82	338	1	Light
Holden / Suzuki	Scurry / Carry	82-00	SZ04Z	383	163	546	130	45	175	1	Commercial - Van
Suzuki	Alto	85-00	SZ05Z	117	68	185	140	42	182	1	Light
Suzuki	Mighty Boy	85-88	SZ06Z	395	175	570	125	38	163	1	Commercial - Ute
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	SZ07Z	3242	1010	4252	752	203	955	1	4WD - Compact
Suzuki	Baleno / Cultus Crescent	95-02	SZ08Z	887	264	1151	179	36	215	1	Small
Suzuki	Carry	99-04	SZ09Z	47	13	60	12	2	14	0	
Suzuki	Ignis	00-02	SZ10Z	97	42	139	38	8	46	1	Light
Suzuki	Jimny	98-04	SZ11Z	45	19	64	19	7	26	0	
Suzuki	Liana	01-04	SZ12Z	39	8	47	5	2	7	0	
Suzuki	Others		SZ99Z	1570	591	2161	733	265	998	0	
Toyota	Corolla	82-84	T01 A	8976	2217	11193	2666	608	3274	1	Small
Toyota	Corolla	85	T01 B	3274	782	4056	993	236	1229	0	
Toyota	Corolla	86-88	T01 C	14147	3524	17671	3182	808	3990	1	Small
Toyota	Corolla	89	T01 D	2421	472	2893	428	116	544	0	
Toyota / Holden	Corolla / Nova	89-93	T01 E	17916	4545	22461	3955	1065	5020	1	Small
Toyota / Holden	Corolla / Nova	94-97	T01 F	10863	2767	13630	2145	523	2668	1	Small
Toyota	Corolla	98-01	T01 G	3197	865	4062	639	113	752	1	Small
Toyota	Corolla	02-04	T01 H	1396	359	1755	239	59	298	1	Small
Toyota	Corona	82-88	T03 Z	16389	3443	19832	2907	758	3665	1	Medium
Toyota	Camry	83-86	T04 Z	3875	716	4591	606	156	762	1	Medium
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	T05 A	23981	4810	28791	3795	1029	4824	1	Medium
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	T05 B	17459	3734	21193	2583	687	3270	1	Large
Toyota	Camry	98-02	T05 C	7767	1654	9421	1068	239	1307	1	Large
Toyota	Celica	81-85	T06 A	2202	426	2628	505	106	611	1	Sports

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Toyota	Celica	86-89	T06 B	1903	329	2232	314	77	391	1	Sports
Toyota	Celica	90-93	T06 C	1634	299	1933	307	76	383	1	Sports
Toyota	Celica	94-99	T06 D	809	192	1001	156	36	192	1	Sports
Toyota	Celica	00-04	T06 E	170	36	206	16	5	21	1	Sports
Toyota	Celica Others		T06 Z	61	24	85	50	17	67	0	
Toyota	Crown / Cressida / Mark II	82-85	T07 A	1898	358	2256	387	118	505	1	Luxury
Toyota	Crown / Cressida / Mark II	86-88	T07 B	874	124	998	88	35	123	1	Luxury
Toyota	Cressida / Mark II	89-93	T07 C	1809	276	2085	203	61	264	1	Luxury
Toyota	Crown/Cres Others		T07 Z	42	7	49	22	4	26	0	
Toyota	Tercel	83-88	T09 Z	406	95	501	94	27	121	1	Small
Toyota	Lexcen Others		T10 Z	1	0	1	2	0	2	0	
Toyota	Supra	82-90	T11 Z	406	82	488	69	26	95	1	Sports
Toyota	MR2	87-90	T12 A	159	41	200	90	33	123	1	Sports
Toyota	MR2	91-00	T12 B	129	23	152	54	12	66	1	Sports
Toyota	MR2 Others		T12 Z	15	3	18	20	3	23	0	
Toyota	Paseo / Cynos	91-99	T13 Z	917	242	1159	210	53	263	1	Sports
Toyota	Bundera		T14 Z	10	4	14	4	1	5	0	
Toyota	Hiace/Liteace	82-86	T15 A	4015	764	4779	850	250	1100	1	Commercial - Van
Toyota	Hiace/Liteace	87-89	T15 B	2066	362	2428	489	123	612	1	Commercial - Van
Toyota	Hiace/Liteace	90-95	T15 C	3729	614	4343	623	185	808	1	Commercial - Van
Toyota	Hiace/Liteace	96-04	T15 D	2551	421	2972	269	64	333	1	Commercial - Van
Toyota	Hiace/Liteace Others		T15 Z	201	54	255	127	27	154	0	
Toyota	4Runner/Hilux	82-85	T16 A	4531	920	5451	665	264	929	1	Commercial - Ute
Toyota	4Runner/Hilux	86-88	T16 B	3616	680	4296	708	252	960	1	Commercial - Ute
Toyota	4Runner/Hilux	89-97	T16 C	12288	2430	14718	2156	817	2973	1	Commercial - Ute
Toyota	Hilux	98-02	T16 D	2418	544	2962	390	131	521	1	Commercial - Ute
Toyota	Hilux	03-04	T16 E	177	24	201	21	8	29	1	Commercial - Ute
Toyota	4Runner/Hilux Others		T16 Z	819	291	1110	324	123	447	0	
Lexus	ES300 / Windom	92-01	T17 Z	353	56	409	57	18	75	1	Luxury
Toyota	Tarago	83-89	T18 A	4184	1060	5244	703	215	918	1	People Mover
Toyota	Tarago	90	T18 B	203	30	233	49	5	54	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Toyota	Tarago / Previa / Estima	91-99	T18 C	2174	337	2511	244	62	306	1	People Mover
Toyota	Tarago / Previa / Estima	00-04	T18 D	215	42	257	22	5	27	1	People Mover
Toyota	Tarago Others		T18 Z	117	32	149	23	9	32	0	
Toyota	Commercials		T19 Z	3390	569	3959	354	100	454	0	
Toyota	Landcruiser	82-89	T20 A	6143	1049	7192	793	340	1133	1	4WD - Large
Toyota	Landcruiser	90-97	T20 B	6812	1053	7865	874	345	1219	1	4WD - Large
Toyota	Landcruiser	98-04	T20 C	2066	366	2432	343	108	451	1	4WD - Large
Toyota	Landcruiser Others		T20 Z	606	194	800	157	78	235	0	
Toyota	RAV4	94-00	T21 A	1082	234	1316	281	52	333	1	4WD - Compact
Toyota	RAV4	01-04	T21 B	454	91	545	75	17	92	1	4WD - Compact
Toyota	RAV4 Others		T21 Z	47	13	60	16	6	22	0	
Toyota	Starlet	96-99	T22 Z	2417	729	3146	507	138	645	1	Light
Lexus	LS400 / Celsior	90-00	T25 Z	114	21	135	17	3	20	1	Luxury
Lexus	IS200 / IS300	99-04	T26 Z	198	39	237	16	1	17	0	
Toyota	Echo	99-04	T27 Z	1500	465	1965	315	84	399	1	Light
Lexus	GS300	97-04	T28 Z	69	7	76	6	0	6	0	
Toyota	Avalon	00-04	T29 Z	813	167	980	120	23	143	1	Large
Toyota	MR2	00-04	T30 Z	31	14	45	1	0	1	0	
Lexus	LS430	00-04	T31 Z	12	1	13	.	.	.	0	
Toyota	Corolla 4WD Wagon	92-96	T32 Z	176	37	213	20	10	30	1	Small
Toyota	Spacia	93-00	T33 A	92	26	118	14	2	16	0	
Toyota	Spacia	01-02	T33 B	10	3	13	3	0	3	0	
Toyota	Spacia Others		T33 Z	1	0	1	.	.	.	0	
Lexus	ES300	01-04	T34 Z	14	0	14	.	.	.	0	
Lexus	SC430	01-04	T35 Z	6	0	6	.	.	.	0	
Toyota	Camry	02-04	T36 Z	505	123	628	86	15	101	1	Large
Toyota	Prius	01-02	T37 Z	6	0	6	.	.	.	0	
Toyota	Avensis	01-04	T38 Z	45	9	54	3	4	7	0	
Toyota	Prius	03-04	T39 Z	2	0	2	.	.	.	0	
Toyota	Kluger	03-04	T40 Z	32	3	35	4	0	4	0	
Toyota	Landcruiser Prado	96-03	T41 Z	98	19	117	12	3	15	0	

MAKE/MODEL			MODEL CODE	No. of uninjured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of injured drivers in NSW (87-2004) and QLD, WA (91-2004)	No. of involved drivers in NSW (87-2004) and QLD,WA (91-2004)	No. of injured (but not severely) drivers in NSW and Victoria (87-2004) and QLD,WA, NZ (91-2004)	No. of severely injured drivers in NSW and Victoria (87-2004) and QLD, WA, NZ (91-2004)	No. of injured drivers in NSW, Victoria (87-2004) and QLD, WA, NZ (91-2004)	ANALYSIS INCLUSION CRITERIA INV=100 INJ=20	MARKET GROUP
Toyota	Landcruiser Prado	03-04	T42 Z	73	10	83	14	1	15	0	
Lexus	RX330	03-04	T43 Z	23	3	26	1	0	1	0	
Toyota	Others		T99 Z	10416	2255	12671	6805	2390	9195	0	
Volvo	850/S70/V70/C70	92-04	V877Z	1139	196	1335	158	34	192	1	Luxury
Volvo	200 Series	82-93	VO02Z	2781	387	3168	292	78	370	1	Luxury
Volvo	300 Series	84-88	VO03Z	164	23	187	29	10	39	1	Luxury
Volvo	700/900 Series	84-92	VO07Z	1631	247	1878	213	38	251	1	Luxury
Volvo	960/S90/V90	90-98	VO10Z	72	16	88	14	3	17	0	
Volvo	S80	98-04	VO11Z	42	2	44	1	0	1	0	
Volvo	S60	01-04	VO12Z	42	10	52	7	1	8	0	
Volvo	XC 90	03-04	VO13Z	8	1	9	.	.	.	0	
Volvo	S40/V50	04-04	VO14Z	2	1	3	.	.	.	0	
Volvo	S40/V40	97-04	VO40Z	340	62	402	43	11	54	1	Luxury
Volvo	Others		VO99Z	1651	304	1955	406	106	512	0	
Volkswagen			VOLKZ	9	2	11	19	5	24	0	
Volkswagen	Caravelle / Transporter	88-94	VS01A	270	37	307	19	6	25	1	Commercial - Van
Volkswagen	Caravelle / Transporter	95-04	VS01B	625	95	720	57	9	66	1	Commercial - Van
Volkswagen	Caravelle / Transporter Others		VS01Z	107	18	125	10	3	13	0	
Volkswagen	Golf	82-94	VS02A	140	30	170	43	12	55	1	Small
Volkswagen	Golf	95-98	VS02B	708	127	835	69	17	86	1	Small
Volkswagen	Golf / Bora	99-04	VS02C	711	125	836	91	13	104	1	Small
Volkswagen	Golf Others		VS02Z	6	2	8	6	0	6	0	
Volkswagen	Kombi		VS03Z	6	4	10	3	1	4	0	
Volkswagen	Passat	95-97	VS04A	30	6	36	6	1	7	0	
Volkswagen	Passat	98-04	VS04B	150	22	172	25	1	26	1	Luxury
Volkswagen	Passat Others		VS04Z	3	1	4	1	0	1	0	
Volkswagen	70E Pick Up		VS07Z	24	1	25	5	1	6	0	
Volkswagen	Polo	96-00	VS08A	303	78	381	48	8	56	1	Light
Volkswagen	Polo	01-02	VS08B	28	7	35	10	1	11	0	
Volkswagen	Polo Others		VS08Z	5	1	6	2	0	2	0	
Volkswagen	New Beetle	00-04	VS10Z	52	12	64	11	1	12	0	

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Volkswagen	Polo	02-04	VS11Z	22	4	26	3	0	3	0	
Volkswagen	LT	03-04	VS12Z	2	0	2	1	0	1	0	
Volkswagen	Touareg	03-04	VS13Z	5	0	5	1	0	1	0	
Volkswagen	Others		VS99Z	259	41	300	68	25	93	0	
Unknown				235021	75037	310056	61884	19925	81809	0	
			Total	**1405630**	**329344**	**1734974**	**319472**	**92382**	**411854**	**339**	

APPENDIX 2

LOGISTIC REGRESSION ESTIMATES OF INJURY RISK BY MODEL AND MARKET GROUP

CRASHWORTHINESS INJURY RISK RATINGS

NSW Data (1987-2004), Queensland and Western Australia Data (1991-2004)

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			17.79			
Compact Four Wheel Drive Vehicles			19.53	18.92	20.15	1.23
Daihatsu	Feroza / Rocky	89-97	19.31	16.69	22.23	5.54
Daihatsu	Rocky / Rugger	85-98	23.15	19.66	27.05	7.39
Daihatsu	Terios	97-04	24.20	20.14	28.78	8.64
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	26.17	24.74	27.64	2.90
Honda	CR-V	97-01	13.76	11.75	16.04	4.29
Honda	CR-V	02-04	12.95	9.87	16.81	6.94
Honda	HR-V	99-02	14.71	10.99	19.41	8.42
Lada	Niva	84-99	18.39	14.52	23.00	8.48
Nissan	X-Trail	01-04	14.06	10.39	18.76	8.37
Subaru	Forester	97-02	14.86	12.66	17.38	4.72
Subaru	Forester	02-04	13.74	9.88	18.78	8.91
Suzuki	Vitara / Escudo	88-98	21.28	19.74	22.90	3.16
Toyota	RAV4	94-00	14.99	13.23	16.94	3.71
Toyota	RAV4	01-04	13.06	10.67	15.90	5.23
Medium Four Wheel Drive Vehicles			14.85	14.17	15.57	1.40
Holden / Isuzu	Jackaroo / Bighorn	82-91	21.38	18.39	24.70	6.31
Holden / Isuzu	Jackaroo / Bighorn	92-97	15.42	12.42	18.98	6.55
Holden / Isuzu	Jackaroo / Bighorn	98-02	15.00	11.62	19.15	7.53
Jeep	Cherokee XJ	96-00	13.40	11.18	15.97	4.79
Land Rover	Defender	92-04	12.06	8.70	16.49	7.79
Land Rover	Discovery	91-02	13.55	10.56	17.22	6.66
Mitsubishi	Challenger	98-04	11.95	8.17	17.15	8.99
Mitsubishi	Pajero	82-90	18.01	16.16	20.02	3.86
Mitsubishi	Pajero	92-99	12.99	11.70	14.41	2.71
Mitsubishi	Pajero NM / NP	00-04	10.36	7.44	14.24	6.79
Nissan	Pathfinder / Terrano	88-94	15.56	12.22	19.62	7.40
Nissan	Pathfinder / Terrano	95-02	13.14	10.19	16.80	6.61
Large Four Wheel Drive Vehicles			13.39	13.00	13.79	0.79
Ford	Explorer	00-01	16.61	12.53	21.69	9.15
Land Rover	Range Rover	82-94	12.83	10.54	15.54	5.00
Nissan	Patrol / Safari	82-87	14.26	12.36	16.40	4.03
Nissan / Ford	Patrol / Maverick / Safari	88-97	12.47	11.59	13.39	1.80
Nissan	Patrol / Safari	98-04	11.46	9.87	13.25	3.38
Toyota	Landcruiser	82-89	16.33	15.41	17.30	1.89
Toyota	Landcruiser	90-97	13.09	12.33	13.88	1.55
Toyota	Landcruiser	98-04	12.27	11.08	13.56	2.48
Commercial Vehicles- Vans			19.45	18.92	20.00	1.08
Daihatsu	Handivan	82-90	35.97	32.38	39.73	7.36

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Daihatsu	Hi-Jet	82-90	43.31	35.90	51.04	15.13
Ford	Falcon Panel Van	82-95	17.25	15.91	18.67	2.76
Ford	Falcon Panel Van	96-99	14.20	10.97	18.18	7.22
Ford	Transit	95-00	14.59	12.00	17.62	5.62
Holden / Suzuki	Scurry / Carry	82-00	34.34	30.11	38.84	8.73
Holden	Shuttle / WFR Van	82-87	23.67	19.87	27.95	8.08
Honda	Acty	83-86	16.23	12.66	20.56	7.90
Toyota	Hiace/Liteace	82-86	22.97	21.56	24.43	2.87
Toyota	Hiace/Liteace	87-89	21.49	19.61	23.50	3.89
Toyota	Hiace/Liteace	90-95	18.63	17.33	20.01	2.68
Toyota	Hiace/Liteace	96-04	16.10	14.72	17.58	2.86
Volkswagen	Caravelle / Transporter	95-04	15.24	12.60	18.30	5.70
Commercial Vehicles- Ute			16.46	16.18	16.75	0.57
Ford / Mazda	Courier / B-Series / Bounty	98-02	14.37	12.18	16.87	4.69
Ford / Nissan	Falcon Ute / XFN Ute	82-95	16.48	15.69	17.31	1.62
Ford	Falcon Ute	96-99	15.49	13.81	17.34	3.53
Ford	Falcon Ute AU	00-02	13.03	11.30	14.99	3.69
Ford	Falcon Ute BA	03-04	11.54	8.40	15.66	7.25
Ford	Ford F-Series	82-92	15.25	12.75	18.14	5.39
Holden	Commodore Ute VG/VP	90-93	16.92	15.04	18.98	3.95
Holden	Commodore Ute VR/VS	94-00	15.31	14.37	16.31	1.93
Holden	Commodore VU Ute	00-02	13.26	11.28	15.52	4.24
Holden	Commodore VY/VZ Ute	02-04	15.05	12.32	18.25	5.93
Holden / Isuzu	Rodeo / Pickup	82-85	20.04	17.04	23.42	6.38
Holden / Isuzu	Rodeo / Pickup	86-88	19.77	15.87	24.35	8.48
Holden / Isuzu	Rodeo / Pickup	89-95	16.87	15.85	17.95	2.10
Holden	Rodeo	96-98	16.19	14.66	17.85	3.19
Holden	Rodeo	99-02	16.71	15.02	18.54	3.51
Holden	Rodeo	03-04	9.96	7.16	13.68	6.52
Holden	WB Series	82-85	17.01	15.13	19.08	3.94
Kia	Ceres	92-00	19.11	16.16	22.47	6.31
Nissan	720 Ute	82-85	19.69	17.61	21.96	4.35
Nissan	Navara	86-91	16.52	15.21	17.92	2.71
Nissan	Navara	92-96	14.94	13.08	17.01	3.93
Nissan	Navara	97-04	13.48	11.06	16.34	5.28
Subaru	Brumby	82-92	22.12	20.17	24.19	4.02
Suzuki	Mighty Boy	85-88	36.62	32.39	41.07	8.68
Toyota	4Runner/Hilux	82-85	19.31	18.17	20.51	2.35
Toyota	4Runner/Hilux	86-88	18.07	16.83	19.38	2.55
Toyota	4Runner/Hilux	89-97	16.70	16.06	17.37	1.31
Toyota	Hilux	98-02	15.93	14.67	17.27	2.60
Large Cars			16.46	16.30	16.62	0.33
Ford	Falcon XE/XF	82-88	17.50	17.12	17.89	0.77
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	16.59	16.17	17.02	0.85
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	15.21	14.64	15.81	1.17
Ford	Falcon EF/EL	94-98	15.47	15.04	15.90	0.86
Ford	Falcon AU	98-02	15.25	14.63	15.90	1.27
Ford	Falcon BA	02-04	14.74	13.14	16.50	3.36
Ford	Taurus	96-98	15.05	11.71	19.15	7.44

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Holden	Commodore VB-VL	82-88	18.73	18.32	19.15	0.84
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	17.00	16.61	17.40	0.79
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	16.15	15.73	16.57	0.84
Holden	Commodore VT/VX	97-02	15.74	15.24	16.25	1.01
Holden	Commodore VY/VZ	02-04	15.92	14.48	17.48	3.00
Hyundai	Sonata	98-01	16.17	13.48	19.26	5.78
Hyundai	Sonata	89-97	17.66	16.31	19.10	2.79
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	18.49	17.95	19.04	1.09
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	15.59	14.87	16.33	1.46
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	16.55	16.00	17.13	1.13
Nissan	Skyline	83-88	18.19	17.04	19.39	2.34
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	17.25	16.71	17.81	1.10
Toyota	Camry	98-02	15.50	14.79	16.25	1.46
Toyota	Camry	02-04	15.79	13.28	18.67	5.39
Toyota	Avalon	00-04	13.92	11.99	16.09	4.10
Luxury Cars			15.17	14.88	15.47	0.59
Audi	A4	95-01	12.49	9.34	16.50	7.15
BMW	3 Series E30	82-91	16.67	15.26	18.18	2.92
BMW	3 Series E36	92-98	16.20	14.98	17.51	2.53
BMW	3 Series E46	99-04	15.50	13.52	17.71	4.19
BMW	5 Series E28	82-88	13.94	11.48	16.82	5.34
BMW	5 Series E34	89-95	14.64	11.94	17.83	5.89
BMW	5 Series E39	96-03	10.34	7.92	13.41	5.49
Ford	Fairlane Z & LTD F	82-87	16.51	15.56	17.49	1.93
Ford	Fairlane N & LTD D	88-94	13.75	12.61	14.98	2.37
Ford	Fairlane N & LTD D	95-98	14.49	12.51	16.73	4.22
Ford	Fairlane & LTD AU	99-02	14.20	11.48	17.43	5.95
Holden	Statesman/Caprice WB	82-85	14.45	9.97	20.50	10.53
Holden	Stateman/Caprice VQ	90-93	14.87	12.49	17.62	5.14
Holden	Stateman/Caprice VR/VS	94-98	15.58	14.15	17.13	2.98
Holden	Statesman/Caprice WH	99-03	11.95	9.46	14.99	5.53
Honda	Accord	82-85	21.75	19.91	23.71	3.80
Honda	Accord	86-90	17.07	15.36	18.92	3.56
Honda	Accord	91-93	13.36	11.43	15.57	4.15
Honda	Accord	94-98	14.53	13.07	16.13	3.06
Honda	Accord	99-02	15.51	12.19	19.52	7.32
Honda	Legend	86-95	12.33	9.97	15.15	5.18
Jaguar	XJ6	82-86	15.86	11.59	21.32	9.73
Jaguar	XJ6	87-94	11.08	8.06	15.06	7.00
Lexus	ES300 / Windom	92-01	14.53	11.32	18.46	7.14
Mazda	929 / Luce	82-90	19.67	18.19	21.23	3.04
Mazda	929 / Sentia / Efini MS-9	92-96	17.00	11.94	23.63	11.69
Mercedes Benz	C-Class W201	87-93	16.96	13.84	20.60	6.76
Mercedes Benz	C-Class W202	95-00	12.87	10.80	15.27	4.47
Mercedes Benz	E-Class W123	82-85	13.24	9.92	17.46	7.55
Mercedes Benz	E-Class W124	86-94	14.44	12.23	16.96	4.73
Mercedes Benz	E-Class W210	96-02	11.30	8.77	14.45	5.68
Mercedes Benz	S-Class W126	82-92	13.62	11.10	16.62	5.52
Nissan	Maxima	90-94	16.46	13.68	19.68	6.00

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Nissan	Maxima / Cefiro	95-99	16.76	14.24	19.63	5.38
Peugeot	405	89-97	15.69	12.55	19.44	6.89
Peugeot	505	82-93	11.93	9.55	14.82	5.27
Peugeot	406	96-04	7.81	4.46	13.33	8.87
Saab	900 Series	82-92	17.36	14.80	20.26	5.47
Saab	900/9-3	94-02	12.00	9.94	14.42	4.48
Saab	9000	86-97	16.02	13.48	18.93	5.45
Toyota	Crown / Cressida / Mark II	82-85	18.89	17.17	20.75	3.58
Toyota	Crown / Cressida / Mark II	86-88	14.93	12.64	17.55	4.91
Toyota	Cressida / Mark II	89-93	14.24	12.72	15.91	3.19
Volvo	850/S70/V70/C70	92-04	14.35	12.55	16.36	3.82
Volvo	200 Series	82-93	13.72	12.48	15.07	2.60
Volvo	300 Series	84-88	15.36	10.41	22.07	11.66
Volvo	700/900 Series	84-92	14.70	13.06	16.50	3.45
Volvo	S40/V40	97-04	14.15	11.13	17.83	6.70
Volkswagen	Passat	98-04	11.40	7.56	16.83	9.27
Medium Cars			18.48	18.25	18.72	0.47
Daewoo	Espero	95-97	22.24	19.09	25.75	6.66
Daewoo	Leganza	97-04	17.06	13.86	20.83	6.97
Ford	Mondeo	95-01	15.14	13.37	17.10	3.73
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	19.60	18.71	20.52	1.82
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	18.10	16.93	19.33	2.40
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	14.78	13.73	15.90	2.17
Mazda	626	98-02	15.73	13.61	18.11	4.50
Holden	Camira	82-89	23.15	22.43	23.89	1.46
Holden	Vectra	97-03	15.78	14.26	17.43	3.17
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	20.42	19.62	21.24	1.62
Mitsubishi	Galant	95-96	18.87	16.70	21.26	4.56
Nissan	Bluebird	82-86	20.81	20.04	21.61	1.57
Nissan	Bluebird	93-97	14.00	12.09	16.15	4.06
Nissan	Pintara	86-88	18.30	17.15	19.50	2.36
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	19.13	18.23	20.07	1.84
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	20.38	19.34	21.46	2.12
Subaru	Liberty / Legacy	89-93	16.67	15.49	17.91	2.41
Subaru	Liberty / Legacy / Outback	94-98	15.68	14.06	17.44	3.38
Subaru	Liberty / Legacy / Outback	99-03	13.39	11.75	15.22	3.47
Toyota	Camry	83-86	18.94	17.70	20.24	2.54
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	17.63	17.13	18.13	1.00
Toyota	Corona	82-88	20.52	19.87	21.19	1.32
People Movers			19.80	19.26	20.36	1.11
Chrysler	Voyager	97-04	12.41	9.20	16.53	7.33
Honda	Odyssey	95-00	13.06	10.16	16.65	6.49
Kia	Carnival	99-04	9.29	6.70	12.74	6.04
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	22.01	18.60	25.84	7.24
Mitsubishi	Nimbus / Chariot	92-98	17.26	14.39	20.55	6.16
Mitsubishi	Starwagon / L300	83-86	26.50	24.80	28.27	3.47
Mitsubishi	Starwagon / Delica Starwagon	87-93	22.63	21.28	24.05	2.77

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mitsubishi	Starwagon / Delica Spacegear	95-98	17.76	15.62	20.12	4.50
Mitsubishi	Starwagon / Delica Spacegear	98-04	18.20	14.87	22.08	7.20
Nissan	Prairie	84-86	22.00	17.90	26.72	8.82
Toyota	Tarago	83-89	22.67	21.45	23.94	2.49
Toyota	Tarago / Previa / Estima	91-99	12.99	11.71	14.37	2.66
Light Cars			22.93	22.65	23.20	0.55
Daewoo	1.5i	94-95	23.60	19.77	27.91	8.14
Daewoo	Cielo	95-97	21.77	20.25	23.38	3.13
Daewoo	Lanos	97-03	20.07	18.68	21.54	2.86
Daewoo	Matiz	99-04	27.94	24.04	32.20	8.16
Daihatsu	Charade	82-86	27.96	25.98	30.04	4.06
Daihatsu	Charade	88-92	24.19	23.13	25.29	2.16
Daihatsu	Charade	93-00	22.63	21.50	23.80	2.30
Daihatsu	Mira	90-96	34.19	30.69	37.88	7.20
Daihatsu	Pyzar	97-01	18.96	14.66	24.17	9.50
Daihatsu	Sirion / Storia	98-04	21.32	18.81	24.06	5.25
Ford	Festiva WD/WH/WF	94-01	23.19	22.34	24.07	1.73
Ford	Ka	99-04	20.18	15.64	25.64	10.00
Holden	Barina SB	95-00	22.13	20.99	23.31	2.32
Holden	Barina XC	01-04	20.73	17.73	24.09	6.37
Honda	City	83-86	31.79	27.10	36.89	9.78
Hyundai	Excel	86-90	24.75	23.21	26.35	3.13
Hyundai	Excel	90-94	22.67	21.80	23.57	1.77
Hyundai	Excel / Accent	95-00	22.51	21.88	23.15	1.27
Hyundai	Getz	02-04	19.91	15.96	24.56	8.61
Hyundai	Accent	00-04	18.88	17.38	20.47	3.09
Kia	Rio	00-04	20.01	17.43	22.86	5.43
Ford / Mazda	Festiva WA / 121	87-90	24.09	22.97	25.25	2.29
Mazda	121 / Autozam Review	94-96	22.17	20.64	23.77	3.13
Mazda	121 Metro / Demio	97-02	20.35	18.50	22.34	3.84
Mitsubishi	Mirage / Colt	82-88	24.20	23.40	25.03	1.63
Nissan	Micra	95-97	23.06	20.03	26.40	6.38
Peugoet	205	87-94	20.29	14.97	26.90	11.93
Subaru	Sherpa / Fiori / 700 / Rex	89-92	37.86	34.44	41.40	6.95
Suzuki	Swift	82-85	28.48	22.77	34.97	12.20
Holden / Suzuki	Barina / Swift / Cultus	86-88	28.26	26.82	29.76	2.94
Holden / Suzuki	Barina / Swift / Cultus	89-99	23.71	22.97	24.46	1.50
Suzuki	Hatch / Alto	82-84	37.05	33.99	40.21	6.23
Suzuki	Alto	85-00	37.51	30.55	45.03	14.48
Suzuki	Ignis	00-02	25.27	18.90	32.92	14.02
Toyota	Echo	99-04	18.61	17.04	20.30	3.26
Toyota	Starlet	96-99	20.66	19.29	22.11	2.82
Volkswagen	Polo	96-00	17.54	14.16	21.52	7.36
Small Cars			20.11	19.90	20.32	0.42
Alfa Romeo	33	83-92	19.81	16.41	23.73	7.32
Chrysler	Neon	96-99	16.33	13.02	20.28	7.26
Daewoo	Nubira	97-03	17.32	15.64	19.14	3.50
Daihatsu	Applause	89-99	21.27	19.76	22.87	3.12
Fiat	Regata	84-88	15.43	11.05	21.13	10.08

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Focus	02-04	18.36	14.01	23.70	9.69
Ford / Mazda	Laser / 323 / Familia	82-88	23.67	23.18	24.16	0.97
Mazda	323 / Familia / Lantis	90-93	19.47	18.08	20.93	2.85
Mazda	323 / Familia / Lantis	95-98	19.18	17.83	20.61	2.78
Ford / Mazda	Laser / 323	99-03	17.93	16.58	19.36	2.78
Ford	Laser	91-94	20.05	19.30	20.83	1.53
Ford	Laser	95-97	19.22	17.88	20.65	2.77
Holden	Astra TR	96-98	16.02	13.63	18.74	5.11
Holden	Astra TS	98-04	15.85	14.73	17.03	2.30
Holden	Gemini	82-84	22.89	21.82	24.00	2.19
Holden	Gemini RB	86-87	27.00	24.16	30.05	5.90
Honda	Civic	82-83	21.94	18.94	25.25	6.31
Honda	Civic / Ballade / Shuttle	84-87	23.49	21.81	25.27	3.46
Honda	Civic / Shuttle	88-91	20.23	18.93	21.58	2.65
Honda	Civic	92-95	19.39	18.13	20.71	2.58
Honda	Civic	96-00	18.19	16.93	19.53	2.60
Honda	Civic	01-04	13.47	10.66	16.88	6.23
Honda	Concerto	89-93	17.81	14.52	21.66	7.14
Hyundai	Elantra	00-04	17.15	14.53	20.13	5.59
Hyundai	S Coupe	90-96	23.23	20.71	25.95	5.24
Hyundai	Lantra	91-95	20.02	18.28	21.88	3.59
Hyundai	Lantra	96-00	18.05	16.78	19.40	2.62
Mitsubishi	Cordia	83-87	23.19	21.03	25.51	4.48
Mitsubishi	Lancer / Mirage CA	89-90	19.80	18.57	21.11	2.54
Mitsubishi	Lancer / Mirage CB	91-92	19.45	17.65	21.38	3.73
Mitsubishi	Lancer / Mirage CC	93-95	19.03	17.94	20.17	2.23
Mitsubishi	Lancer / Mirage CE	96-03	19.87	19.13	20.64	1.52
Holden / Nissan	Astra / Pulsar / Langley	84-86	23.67	22.78	24.58	1.81
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	20.77	20.01	21.56	1.55
Nissan	Pulsar / Vector / Sentra	92-95	18.09	17.05	19.18	2.14
Nissan	Pulsar / Vector / Sentra	96-99	19.98	18.98	21.03	2.05
Nissan	Stanza	82-83	21.44	17.95	25.41	7.45
Nissan	Pulsar	00-04	18.30	16.89	19.81	2.92
Peugeot	306	94-01	15.10	12.83	17.70	4.88
Proton	Wira	95-96	20.25	17.75	23.00	5.25
Renault	19	91-96	22.75	17.20	29.45	12.25
Rover	Quintet	82-86	22.10	17.13	28.02	10.89
Subaru	Impreza	93-00	17.80	16.46	19.22	2.75
Subaru	Impreza	01-04	13.62	11.00	16.74	5.74
Suzuki	Baleno / Cultus Crescent	95-02	20.75	18.52	23.17	4.65
Toyota	Corolla	82-84	22.83	21.97	23.72	1.75
Toyota	Corolla	86-88	21.48	20.80	22.17	1.36
Toyota / Holden	Corolla / Nova	89-93	19.57	19.01	20.14	1.14
Toyota / Holden	Corolla / Nova	94-97	18.84	18.17	19.54	1.37
Toyota	Corolla	98-01	17.10	16.03	18.24	2.21
Toyota	Corolla	02-04	16.50	14.92	18.21	3.30
Toyota	Tercel	83-88	22.04	18.34	26.26	7.92
Toyota	Corolla 4WD Wagon	92-96	13.01	9.40	17.72	8.32
Volkswagen	Golf	82-94	20.80	14.92	28.23	13.31
Volkswagen	Golf	95-98	15.59	13.23	18.30	5.07
Volkswagen	Golf / Bora	99-04	12.84	10.83	15.16	4.33
Sports Cars			18.70	18.21	19.19	0.98

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Alfa Romeo	GTV	82-84	15.19	9.40	23.62	14.22
Ford	Capri	89-94	24.22	21.88	26.73	4.85
Holden	Calibra	94-97	14.97	11.06	19.95	8.88
Honda	CRX	87-91	22.67	18.07	28.04	9.97
Honda	CRX	92-98	17.08	11.75	24.17	12.42
Honda	Integra	86-88	20.21	16.92	23.94	7.02
Honda	Integra	90-92	17.30	14.21	20.89	6.68
Honda	Integra	93-01	15.37	12.84	18.29	5.46
Honda	Prelude	83-91	18.40	16.92	19.97	3.05
Honda	Prelude	92-96	16.09	13.91	18.54	4.63
Honda	Prelude	97-02	16.29	12.98	20.24	7.26
Hyundai	Coupe	96-00	19.54	16.59	22.88	6.29
Mitsubishi	Starion	82-87	25.70	18.92	33.91	14.99
Mazda	RX7	82-85	20.84	17.33	24.84	7.51
Mazda	RX7	86-91	13.65	9.75	18.77	9.01
Mazda	MX5 / Eunos Roadster	89-97	21.22	17.69	25.23	7.54
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	18.35	14.55	22.87	8.33
Nissan	300ZX / Fairlady Z	90-95	17.94	14.39	22.14	7.74
Nissan	Gazelle / Silvia	84-86	21.04	16.92	25.85	8.93
Nissan	Exa	83-86	27.93	23.68	32.62	8.94
Nissan	Exa	87-91	17.49	13.05	23.05	10.01
Nissan	NX/NX-R	91-96	23.59	20.15	27.41	7.26
Nissan	200SX / Silvia	94-02	15.21	12.71	18.09	5.38
Renault	Feugo	82-87	17.28	13.13	22.41	9.29
Toyota	Celica	81-85	20.56	18.86	22.37	3.51
Toyota	Celica	86-89	18.10	16.38	19.96	3.57
Toyota	Celica	90-93	17.25	15.51	19.14	3.63
Toyota	Celica	94-99	19.12	16.75	21.75	5.00
Toyota	Supra	82-90	20.92	17.16	25.24	8.08
Toyota	MR2	87-90	25.61	19.43	32.95	13.52
Toyota	MR2	91-00	20.01	13.73	28.23	14.50
Toyota	Paseo / Cynos	91-99	21.08	18.75	23.61	4.86

APPENDIX 3

LOGISTIC REGRESSION ESTIMATES OF INJURY SEVERITY BY MODEL AND MARKET GROUP

CRASHWORTHINESS INJURY SEVERITY RATINGS

Victoria and NSW Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			21.23			
Compact Four Wheel Drive Vehicles			19.87	18.57	21.23	2.66
Daihatsu	Feroza / Rocky	89-97	23.54	17.73	30.56	12.83
Daihatsu	Rocky / Rugger	85-98	27.84	21.06	35.83	14.77
Daihatsu	Terios	97-04	22.04	15.36	30.58	15.22
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	20.25	17.73	23.02	5.29
Lada	Niva	84-99	22.48	14.53	33.09	18.56
Honda	CR-V	97-01	16.75	11.73	23.36	11.64
Honda	CR-V	02-04	12.78	5.35	27.52	22.17
Honda	HR-V	99-02	29.13	16.40	46.27	29.87
Nissan	X-Trail	01-04	24.08	13.44	39.32	25.89
Subaru	Forester	97-02	15.14	10.37	21.57	11.20
Subaru	Forester	02-04	10.50	3.81	25.81	22.00
Suzuki	Vitara / Escudo	88-98	21.49	18.28	25.10	6.82
Toyota	RAV4	94-00	18.73	14.48	23.88	9.40
Toyota	RAV4	01-04	19.09	12.03	28.93	16.89
Medium Four Wheel Drive Vehicles			20.08	18.49	21.77	3.28
Holden / Isuzu	Jackaroo / Bighorn	82-91	13.46	9.63	18.51	8.88
Holden / Isuzu	Jackaroo / Bighorn	92-97	18.68	12.73	26.57	13.85
Holden / Isuzu	Jackaroo / Bighorn	98-02	21.45	12.47	34.35	21.88
Jeep	Cherokee XJ	96-00	22.29	16.22	29.81	13.59
Land Rover	Defender	92-04	24.17	14.37	37.70	23.33
Land Rover	Discovery	91-02	18.35	11.61	27.78	16.18
Mitsubishi	Pajero	82-90	23.76	19.89	28.10	8.21
Mitsubishi	Pajero	92-99	21.13	17.26	25.61	8.34
Mitsubishi	Pajero NM / NP	00-04	19.57	9.80	35.27	25.47
Mitsubishi	Challenger	98-04	24.20	12.72	41.14	28.42
Nissan	Pathfinder / Terrano	88-94	20.39	15.65	26.12	10.47
Nissan	Pathfinder / Terrano	95-02	16.66	10.16	26.11	15.95
Large Four Wheel Drive Vehicles			21.81	20.68	22.98	2.30
Ford	Explorer	00-01	25.03	16.05	36.84	20.79
Land Rover	Range Rover	82-94	18.61	13.46	25.16	11.69
Nissan	Patrol / Safari	82-87	22.29	17.17	28.40	11.23
Nissan / Ford	Patrol / Maverick / Safari	88-97	20.43	17.83	23.29	5.47
Nissan	Patrol / Safari	98-04	20.63	15.73	26.58	10.85
Toyota	Landcruiser	82-89	25.14	22.66	27.80	5.14
Toyota	Landcruiser	90-97	23.59	21.25	26.10	4.85
Toyota	Landcruiser	98-04	19.24	15.94	23.04	7.10

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Commercial Vehicles- Vans			21.43	20.26	22.66	2.40
Daihatsu	Handivan	82-90	24.17	18.86	30.40	11.54
Daihatsu	Hi-Jet	82-90	28.93	19.76	40.22	20.46
Ford	Falcon Panel Van	82-95	19.75	16.35	23.65	7.30
Ford	Falcon Panel Van	96-99	12.87	6.48	23.95	17.47
Ford	Transit	95-00	19.56	12.42	29.43	17.01
Holden / Suzuki	Scurry / Carry	82-00	28.33	21.70	36.05	14.35
Holden	Shuttle / WFR Van	82-87	26.83	18.77	36.78	18.01
Honda	Acty	83-86	22.36	13.73	34.25	20.51
Toyota	Hiace/Liteace	82-86	24.19	21.56	27.03	5.47
Toyota	Hiace/Liteace	87-89	22.02	18.69	25.77	7.08
Toyota	Hiace/Liteace	90-95	23.33	20.39	26.55	6.16
Toyota	Hiace/Liteace	96-04	19.83	15.71	24.71	9.00
Volkswagen	Caravelle / Transporter	95-04	12.19	6.33	22.20	15.86
Commercial Vehicles- Utes			21.74	21.03	22.47	1.43
Ford / Mazda	Courier / B-Series / Bounty	98-02	21.30	15.46	28.61	13.15
Ford / Nissan	Falcon Ute / XFN Ute	82-95	22.65	20.46	25.00	4.54
Ford	Falcon Ute	96-99	19.72	15.42	24.86	9.43
Ford	Falcon Ute AU	00-02	17.38	12.42	23.78	11.36
Ford	Falcon Ute BA	03-04	22.40	12.55	36.72	24.17
Ford	Ford F-Series	82-92	18.66	12.37	27.17	14.80
Holden	Commodore Ute VG/VP	90-93	24.04	19.05	29.85	10.80
Holden	Commodore Ute VR/VS	94-00	23.00	20.28	25.96	5.68
Holden	Commodore VU Ute	00-02	29.31	22.04	37.83	15.79
Holden	Commodore VY/VZ Ute	02-04	18.56	11.84	27.89	16.05
Holden / Isuzu	Rodeo / Pickup	82-85	22.16	15.90	30.00	14.10
Holden / Isuzu	Rodeo / Pickup	86-88	12.93	6.74	23.40	16.67
Holden / Isuzu	Rodeo / Pickup	89-95	24.46	21.61	27.55	5.94
Holden	Rodeo	96-98	19.68	15.89	24.12	8.23
Holden	Rodeo	99-02	18.39	14.31	23.32	9.00
Holden	Rodeo	03-04	16.66	8.03	31.42	23.39
Holden	WB Series	82-85	31.58	25.85	37.93	12.08
Kia	Ceres	92-00	26.45	18.55	36.20	17.65
Nissan	720 Ute	82-85	20.37	16.08	25.46	9.38
Nissan	Navara	86-91	23.43	20.24	26.96	6.72
Nissan	Navara	92-96	19.93	15.47	25.30	9.83
Nissan	Navara	97-04	17.37	11.35	25.67	14.32
Subaru	Brumby	82-92	29.01	24.79	33.63	8.84
Suzuki	Mighty Boy	85-88	25.43	18.97	33.18	14.21
Toyota	4Runner/Hilux	82-85	22.97	20.42	25.74	5.32
Toyota	4Runner/Hilux	86-88	22.56	20.03	25.31	5.29
Toyota	4Runner/Hilux	89-97	22.62	21.10	24.21	3.11
Toyota	Hilux	98-02	19.71	16.61	23.23	6.62
Large Cars			20.81	20.41	21.22	0.81
Ford	Falcon XE/XF	82-88	23.06	22.10	24.06	1.96
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	21.14	20.06	22.27	2.22
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	21.85	20.24	23.55	3.31
Ford	Falcon EF/EL	94-98	20.23	19.06	21.46	2.40

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Falcon AU	98-02	18.55	16.79	20.46	3.67
Ford	Falcon BA	02-04	18.14	13.66	23.68	10.02
Ford	Taurus	96-98	17.78	10.05	29.50	19.45
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	23.00	22.00	24.04	2.04
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	19.81	18.73	20.95	2.22
Holden	Commodore VT/VX	97-02	18.03	16.70	19.45	2.76
Holden	Commodore VY/VZ	02-04	15.97	12.43	20.30	7.88
Holden	Commodore VB-VL	82-88	24.06	23.05	25.10	2.05
Hyundai	Sonata	98-01	19.33	12.05	29.52	17.46
Hyundai	Sonata	89-97	20.17	16.80	24.03	7.23
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	23.07	21.76	24.43	2.66
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	20.14	18.11	22.32	4.21
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	19.68	18.25	21.19	2.93
Nissan	Skyline	83-88	22.37	19.94	25.01	5.07
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	21.13	19.63	22.71	3.08
Toyota	Camry	98-02	19.77	17.52	22.24	4.72
Toyota	Camry	02-04	14.55	8.80	23.10	14.30
Toyota	Avalon	00-04	17.86	12.06	25.64	13.58
Luxury Cars			20.23	19.50	20.98	1.49
Audi	A4	95-01	19.74	11.13	32.57	21.44
BMW	3 Series E30	82-91	19.85	16.56	23.60	7.04
BMW	3 Series E36	92-98	19.16	15.80	23.04	7.24
BMW	3 Series E46	99-04	14.31	9.36	21.26	11.90
BMW	5 Series E28	82-88	20.80	13.84	30.05	16.21
BMW	5 Series E34	89-95	22.66	15.41	32.03	16.62
BMW	5 Series E39	96-03	18.59	9.63	32.84	23.21
Ford	Fairlane Z & LTD F	82-87	22.15	19.75	24.76	5.02
Ford	Fairlane N & LTD D	88-94	22.13	19.07	25.52	6.46
Ford	Fairlane N & LTD D	95-98	22.43	17.08	28.87	11.80
Ford	Fairlane & LTD AU	99-02	18.26	9.92	31.19	21.26
Holden	Statesman/Caprice WB	82-85	39.86	26.66	54.71	28.05
Holden	Stateman/Caprice VQ	90-93	27.33	20.53	35.37	14.83
Holden	Stateman/Caprice VR/VS	94-98	22.86	18.82	27.46	8.64
Holden	Statesman/Caprice WH	99-03	16.19	8.49	28.69	20.20
Honda	Accord	82-85	23.39	20.80	26.19	5.40
Honda	Accord	86-90	20.25	17.54	23.26	5.72
Honda	Accord	91-93	21.63	16.94	27.20	10.26
Honda	Accord	94-98	20.34	16.39	24.96	8.57
Honda	Accord	99-02	14.17	7.15	26.14	18.99
Honda	Legend	86-95	18.47	12.68	26.13	13.45
Jaguar	XJ6	82-86	32.57	19.18	49.58	30.40
Jaguar	XJ6	87-94	18.38	9.56	32.44	22.88
Lexus	ES300 / Windom	92-01	23.30	14.93	34.45	19.52
Mazda	929 / Luce	82-90	22.64	19.58	26.02	6.44
Mazda	929 / Sentia / Efini MS-9	92-96	9.96	3.68	24.23	20.55
Mercedes Benz	C-Class W201	87-93	22.89	15.69	32.14	16.45
Mercedes Benz	C-Class W202	95-00	19.51	12.99	28.24	15.24
Mercedes Benz	E-Class W123	82-85	23.15	12.13	39.66	27.53
Mercedes Benz	E-Class W124	86-94	16.48	10.88	24.18	13.30

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mercedes Benz	E-Class W210	96-02	20.36	11.69	33.05	21.36
Mercedes Benz	S-Class W126	82-92	23.66	15.25	34.81	19.56
Nissan	Maxima	90-94	19.13	14.37	25.00	10.64
Nissan	Maxima / Cefiro	95-99	16.87	12.04	23.14	11.11
Peugeot	405	89-97	20.45	14.41	28.18	13.77
Peugeot	505	82-93	22.14	15.44	30.68	15.24
Peugeot	406	96-04	16.70	6.22	37.71	31.48
Saab	900 Series	82-92	22.64	16.65	30.01	13.36
Saab	900/9-3	94-02	20.97	13.37	31.34	17.97
Saab	9000	86-97	10.88	6.24	18.31	12.07
Toyota	Crown / Cressida / Mark II	82-85	23.34	19.69	27.44	7.75
Toyota	Crown / Cressida / Mark II	86-88	27.90	20.41	36.88	16.47
Toyota	Cressida / Mark II	89-93	20.27	15.85	25.55	9.70
Volvo	850/S70/V70/C70	92-04	20.41	14.89	27.32	12.44
Volvo	200 Series	82-93	21.21	17.18	25.88	8.70
Volvo	300 Series	84-88	29.14	16.31	46.46	30.15
Volvo	700/900 Series	84-92	15.54	11.43	20.76	9.33
Volvo	S40/V40	97-04	21.57	12.17	35.31	23.14
Volkswagen	Passat	98-04	4.69	0.66	26.74	26.08
Medium Cars			20.91	20.40	21.44	1.04
Daewoo	Espero	95-97	25.42	18.19	34.31	16.12
Daewoo	Leganza	97-04	22.72	14.07	34.55	20.47
Ford	Mondeo	95-01	15.96	12.13	20.72	8.59
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	21.15	19.53	22.86	3.33
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	20.29	18.18	22.58	4.39
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	22.30	19.71	25.11	5.40
Mazda	626	98-02	22.51	16.91	29.31	12.40
Holden	Camira	82-89	22.20	20.81	23.65	2.84
Holden	Vectra	97-03	15.08	11.65	19.30	7.65
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	22.12	20.55	23.77	3.22
Mitsubishi	Galant	95-96	21.16	16.87	26.18	9.31
Nissan	Pintara	86-88	22.28	19.54	25.29	5.75
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	22.98	20.94	25.16	4.22
Nissan	Bluebird	82-86	24.46	22.80	26.19	3.39
Nissan	Bluebird	93-97	21.58	17.50	26.32	8.82
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	22.85	20.72	25.12	4.39
Subaru	Liberty / Legacy	89-93	20.95	18.52	23.59	5.07
Subaru	Liberty / Legacy / Outback	94-98	20.05	15.96	24.87	8.91
Subaru	Liberty / Legacy / Outback	99-03	18.59	13.20	25.55	12.35
Toyota	Camry	83-86	22.80	19.71	26.22	6.51
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	22.00	20.70	23.37	2.67
Toyota	Corona	82-88	22.20	20.71	23.77	3.06
People Movers			22.13	20.87	23.45	2.58
Chrysler	Voyager	97-04	12.26	3.99	31.95	27.95
Honda	Odyssey	95-00	19.12	9.72	34.18	24.46
Kia	Carnival	99-04	9.97	3.21	26.99	23.78
Nissan	Prairie	84-86	22.93	15.70	32.21	16.51

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	19.81	14.77	26.04	11.26
Mitsubishi	Nimbus / Chariot	92-98	16.55	10.78	24.54	13.76
Mitsubishi	Starwagon / L300	83-86	27.94	24.60	31.54	6.94
Mitsubishi	Starwagon / Delica Starwagon	87-93	22.53	19.83	25.47	5.64
Mitsubishi	Starwagon / Delica Spacegear	95-98	19.65	14.25	26.47	12.22
Mitsubishi	Starwagon / Delica Spacegear	98-04	26.95	17.91	38.41	20.50
Toyota	Tarago	83-89	24.35	21.50	27.45	5.95
Toyota	Tarago / Previa / Estima	91-99	22.08	17.48	27.49	10.01
Light Cars			22.62	22.04	23.20	1.16
Daewoo	1.5i	94-95	16.07	8.61	28.01	19.40
Daewoo	Cielo	95-97	19.43	16.33	22.95	6.62
Daewoo	Lanos	97-03	25.27	21.64	29.27	7.63
Daewoo	Matiz	99-04	15.20	10.01	22.42	12.41
Daihatsu	Charade	82-86	27.09	23.80	30.66	6.85
Daihatsu	Charade	88-92	25.19	22.80	27.75	4.95
Daihatsu	Charade	93-00	25.91	22.94	29.11	6.17
Daihatsu	Mira	90-96	29.06	23.61	35.18	11.58
Daihatsu	Pyzar	97-01	21.32	10.86	37.60	26.74
Daihatsu	Sirion / Storia	98-04	21.36	15.45	28.76	13.31
Ford	Festiva WD/WH/WF	94-01	25.11	23.15	27.18	4.04
Ford	Ka	99-04	18.22	9.92	31.07	21.14
Holden / Suzuki	Barina / Swift / Cultus	86-88	25.19	22.69	27.86	5.18
Holden / Suzuki	Barina / Swift / Cultus	89-99	23.56	21.91	25.30	3.39
Holden	Barina SB	95-00	21.22	18.60	24.10	5.50
Holden	Barina XC	01-04	20.10	13.52	28.82	15.30
Honda	City	83-86	22.33	18.87	26.22	7.35
Hyundai	Excel	86-90	24.89	22.05	27.96	5.91
Hyundai	Excel	90-94	22.74	20.81	24.79	3.98
Hyundai	Excel / Accent	95-00	21.90	20.44	23.42	2.98
Hyundai	Getz	02-04	45.81	31.61	60.73	29.12
Hyundai	Accent	00-04	25.47	20.92	30.63	9.71
Kia	Rio	00-04	19.41	13.69	26.77	13.08
Ford / Mazda	Festiva WA / 121	87-90	23.98	21.65	26.47	4.81
Mazda	121 / Autozam Review	94-96	19.36	16.16	23.02	6.86
Mazda	121 Metro / Demio	97-02	20.10	15.89	25.10	9.22
Mitsubishi	Mirage / Colt	82-88	23.32	21.72	25.00	3.27
Nissan	Micra	95-97	29.56	22.45	37.83	15.37
Peugoet	205	87-94	20.14	11.28	33.33	22.05
Subaru	Sherpa / Fiori / 700 / Rex	89-92	22.97	18.45	28.21	9.76
Suzuki	Hatch / Alto	82-84	25.01	20.48	30.16	9.68
Suzuki	Alto	85-00	28.65	21.90	36.51	14.61
Suzuki	Ignis	00-02	17.32	8.54	31.96	23.42
Suzuki	Swift	82-85	28.88	18.71	41.74	23.02
Toyota	Echo	99-04	22.50	18.41	27.18	8.77
Toyota	Starlet	96-99	23.67	20.28	27.43	7.15
Volkswagen	Polo	96-00	16.66	8.53	29.99	21.46
Small Cars			21.21	20.77	21.66	0.89
Alfa Romeo	33	83-92	25.29	18.05	34.23	16.18
Chrysler	Neon	96-99	18.45	9.55	32.64	23.09
Daewoo	Nubira	97-03	20.63	16.30	25.75	9.46

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Daihatsu	Applause	89-99	20.78	17.34	24.70	7.36
Fiat	Regata	84-88	26.83	13.36	46.57	33.21
Ford / Mazda	Laser / 323 / Familia	82-88	22.62	21.70	23.56	1.86
Mazda	323 / Familia / Lantis	90-93	21.08	18.75	23.61	4.86
Mazda	323 / Familia / Lantis	95-98	23.33	19.81	27.26	7.45
Ford / Mazda	Laser / 323	99-03	20.16	16.62	24.22	7.60
Ford	Laser	91-94	21.34	19.71	23.07	3.36
Ford	Laser	95-97	23.11	19.83	26.76	6.93
Ford	Focus	02-04	18.87	10.40	31.80	21.40
Holden	Gemini	82-84	22.79	20.70	25.03	4.34
Holden	Gemini RB	86-87	20.79	16.22	26.24	10.02
Holden	Astra TR	96-98	17.32	12.16	24.07	11.92
Holden	Astra TS	98-04	19.41	16.09	23.22	7.12
Honda	Civic	82-83	22.88	19.14	27.11	7.98
Honda	Civic / Ballade / Shuttle	84-87	25.25	22.65	28.04	5.38
Honda	Civic / Shuttle	88-91	22.56	20.18	25.13	4.95
Honda	Civic	92-95	20.35	17.76	23.21	5.45
Honda	Civic	96-00	19.76	16.42	23.58	7.16
Honda	Civic	01-04	18.66	10.77	30.34	19.57
Honda	Concerto	89-93	23.47	17.66	30.49	12.83
Hyundai	Elantra	00-04	26.61	18.04	37.39	19.35
Hyundai	Lantra	91-95	22.53	18.31	27.39	9.07
Hyundai	Lantra	96-00	21.76	18.30	25.68	7.38
Hyundai	S Coupe	90-96	22.00	16.81	28.23	11.42
Mitsubishi	Cordia	83-87	24.24	20.84	27.99	7.15
Mitsubishi	Lancer / Mirage CA	89-90	21.71	19.30	24.33	5.02
Mitsubishi	Lancer / Mirage CB	91-92	21.24	17.03	26.17	9.14
Mitsubishi	Lancer / Mirage CC	93-95	22.32	19.87	24.97	5.10
Mitsubishi	Lancer / Mirage CE	96-03	21.76	19.79	23.86	4.08
Holden / Nissan	Astra / Pulsar / Langley	84-86	24.17	22.46	25.97	3.51
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	23.01	21.30	24.81	3.51
Nissan	Pulsar / Vector / Sentra	92-95	20.16	17.93	22.59	4.66
Nissan	Pulsar / Vector / Sentra	96-99	22.11	19.58	24.86	5.28
Nissan	Pulsar	00-04	24.78	20.60	29.49	8.89
Nissan	Stanza	82-83	19.83	13.16	28.76	15.61
Peugeot	306	94-01	10.89	6.87	16.83	9.96
Proton	Wira	95-96	22.51	16.80	29.46	12.66
Renault	19	91-96	17.74	8.67	32.90	24.23
Rover	Quintet	82-86	22.06	13.95	33.09	19.14
Subaru	Impreza	93-00	25.49	21.81	29.57	7.76
Subaru	Impreza	01-04	18.68	10.69	30.57	19.88
Suzuki	Baleno / Cultus Crescent	95-02	19.92	14.67	26.46	11.79
Toyota	Corolla	82-84	22.15	20.53	23.87	3.33
Toyota	Corolla	86-88	22.57	21.10	24.10	2.99
Toyota / Holden	Corolla / Nova	89-93	22.20	20.91	23.55	2.64
Toyota / Holden	Corolla / Nova	94-97	21.30	19.62	23.09	3.46
Toyota	Corolla	98-01	16.82	14.10	19.96	5.86
Toyota	Corolla	02-04	21.25	16.69	26.65	9.96
Toyota	Corolla 4WD Wagon	92-96	30.27	16.34	49.11	32.77
Toyota	Tercel	83-88	24.61	17.28	33.76	16.48
Volkswagen	Golf	82-94	33.29	20.51	49.12	28.61
Volkswagen	Golf	95-98	21.32	13.52	31.96	18.44
Volkswagen	Golf / Bora	99-04	16.09	9.58	25.76	16.17

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Sports Cars			22.05	21.08	23.05	1.97
Alfa Romeo	GTV	82-84	51.65	29.99	72.70	42.71
Ford	Capri	89-94	21.32	16.89	26.53	9.64
Holden	Calibra	94-97	17.04	10.01	27.50	17.49
Honda	CRX	87-91	27.23	22.24	32.87	10.63
Honda	CRX	92-98	28.46	17.93	42.01	24.08
Honda	Integra	86-88	23.02	18.74	27.93	9.19
Honda	Integra	90-92	16.10	11.20	22.59	11.40
Honda	Integra	93-01	17.81	12.17	25.31	13.14
Honda	Prelude	83-91	22.32	19.91	24.92	5.00
Honda	Prelude	92-96	27.89	22.18	34.43	12.25
Honda	Prelude	97-02	10.48	4.72	21.68	16.96
Hyundai	Coupe	96-00	31.62	23.51	41.03	17.53
Mazda	RX7	82-85	26.44	19.43	34.87	15.44
Mazda	RX7	86-91	25.22	17.33	35.17	17.84
Mazda	MX5 / Eunos Roadster	89-97	21.12	13.67	31.17	17.50
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	13.52	6.82	25.05	18.23
Mitsubishi	Starion	82-87	38.79	27.29	51.69	24.41
Nissan	300ZX / Fairlady Z	90-95	19.94	13.25	28.87	15.62
Nissan	Gazelle / Silvia	84-86	27.17	23.05	31.73	8.68
Nissan	Exa	83-86	27.67	20.31	36.47	16.16
Nissan	Exa	87-91	29.55	18.95	42.93	23.98
Nissan	NX/NX-R	91-96	30.67	23.07	39.50	16.43
Nissan	200SX / Silvia	94-02	22.26	14.85	31.98	17.14
Renault	Feugo	82-87	18.71	11.07	29.85	18.78
Toyota	Celica	81-85	18.89	15.78	22.45	6.68
Toyota	Celica	86-89	22.19	18.04	26.99	8.96
Toyota	Celica	90-93	22.98	18.67	27.93	9.26
Toyota	Celica	94-99	21.84	16.11	28.90	12.79
Toyota	Supra	82-90	29.16	20.44	39.73	19.28
Toyota	MR2	87-90	28.66	21.05	37.71	16.67
Toyota	MR2	91-00	17.51	10.06	28.71	18.65
Toyota	Paseo / Cynos	91-99	21.62	16.80	27.37	10.57

CRASHWORTHINESS RATINGS OF 1982-2004 MODELS OF CARS INVOLVED IN CRASHES DURING 1987-2004 with (1) 95 % CONFIDENCE LIMITS (2) 90 % CONFIDENCE LIMITS

CRASHWORTHINESS RATINGS

(WITH 95% CONFIDENCE LIMITS)

Victoria and NSW Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL MODEL AVERAGE			4.02			
Compact Four Wheel Drive Vehicles			3.88	3.60	4.18	0.57
Daihatsu	Feroza / Rocky	89-97	4.55	3.34	6.19	2.85
Daihatsu	Rocky / Rugger	85-98	6.45	4.73	8.80	4.07
Daihatsu	Terios	97-04	5.33	3.61	7.87	4.26
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	5.30	4.60	6.11	1.51
Lada	Niva	84-99	4.13	2.57	6.64	4.06
Honda	CR-V	97-01	2.30	1.58	3.37	1.79
Honda	CR-V	02-04	1.65	0.69	3.96	3.27
Honda	HR-V	99-02	4.29	2.36	7.78	5.42
Nissan	X-Trail	01-04	3.38	1.82	6.28	4.46
Subaru	Forester	97-02	2.25	1.51	3.36	1.85
Subaru	Forester	02-04	1.44	0.52	4.02	3.50
Suzuki	Vitara / Escudo	88-98	4.57	3.84	5.45	1.61
Toyota	RAV4	94-00	2.81	2.12	3.71	1.59
Toyota	RAV4	01-04	2.49	1.54	4.05	2.51
Medium Four Wheel Drive Vehicles			2.98	2.71	3.28	0.56
Holden / Isuzu	Jackaroo / Bighorn	82-91	2.88	2.01	4.12	2.11
Holden / Isuzu	Jackaroo / Bighorn	92-97	2.88	1.88	4.41	2.53
Holden / Isuzu	Jackaroo / Bighorn	98-02	3.22	1.82	5.68	3.86
Jeep	Cherokee XJ	96-00	2.99	2.10	4.25	2.16
Land Rover	Defender	92-04	2.91	1.63	5.22	3.59
Land Rover	Discovery	91-02	2.49	1.50	4.11	2.60
Mitsubishi	Pajero	82-90	4.28	3.49	5.24	1.75
Mitsubishi	Pajero	92-99	2.75	2.20	3.43	1.24
Mitsubishi	Pajero NM / NP	00-04	2.03	0.98	4.19	3.20
Mitsubishi	Challenger	98-04	2.89	1.43	5.83	4.39
Nissan	Pathfinder / Terrano	88-94	3.17	2.24	4.50	2.26
Nissan	Pathfinder / Terrano	95-02	2.19	1.28	3.75	2.47
Large Four Wheel Drive Vehicles			2.92	2.75	3.10	0.35
Ford	Explorer	00-01	4.16	2.52	6.86	4.34
Land Rover	Range Rover	82-94	2.39	1.65	3.45	1.80
Nissan	Patrol / Safari	82-87	3.18	2.38	4.24	1.86
Nissan / Ford	Patrol / Maverick / Safari	88-97	2.55	2.19	2.96	0.78
Nissan	Patrol / Safari	98-04	2.36	1.75	3.19	1.45
Toyota	Landcruiser	82-89	4.11	3.65	4.62	0.97
Toyota	Landcruiser	90-97	3.09	2.74	3.48	0.73

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Toyota	Landcruiser	98-04	2.36	1.91	2.91	1.00
Commercial Vehicles- Vans			4.17	3.92	4.44	0.52
Daihatsu	Handivan	82-90	8.69	6.70	11.28	4.57
Daihatsu	Hi-Jet	82-90	12.53	8.41	18.66	10.24
Ford	Falcon Panel Van	82-95	3.41	2.79	4.17	1.38
Ford	Falcon Panel Van	96-99	1.83	0.90	3.70	2.80
Ford	Transit	95-00	2.85	1.77	4.59	2.81
Holden / Suzuki	Scurry / Carry	82-00	9.73	7.32	12.93	5.61
Holden	Shuttle / WFR Van	82-87	6.35	4.35	9.27	4.92
Honda	Acty	83-86	3.63	2.16	6.10	3.95
Toyota	Hiace/Liteace	82-86	5.56	4.88	6.32	1.44
Toyota	Hiace/Liteace	87-89	4.73	3.94	5.69	1.76
Toyota	Hiace/Liteace	90-95	4.35	3.74	5.05	1.31
Toyota	Hiace/Liteace	96-04	3.19	2.50	4.07	1.57
Volkswagen	Caravelle / Transporter	95-04	1.86	0.96	3.59	2.63
Commercial Vehicles- Utes			3.58	3.45	3.71	0.27
Ford / Mazda	Courier / B-Series / Bounty	98-02	3.06	2.16	4.34	2.18
Ford / Nissan	Falcon Ute / XFN Ute	82-95	3.73	3.34	4.17	0.83
Ford	Falcon Ute	96-99	3.06	2.34	3.98	1.64
Ford	Falcon Ute AU	00-02	2.27	1.59	3.23	1.64
Ford	Falcon Ute BA	03-04	2.59	1.38	4.83	3.45
Ford	Ford F-Series	82-92	2.85	1.85	4.39	2.54
Holden	Commodore Ute VG/VP	90-93	4.07	3.16	5.24	2.08
Holden	Commodore Ute VR/VS	94-00	3.52	3.07	4.05	0.98
Holden	Commodore VU Ute	00-02	3.89	2.84	5.32	2.48
Holden	Commodore VY/VZ Ute	02-04	2.79	1.74	4.48	2.74
Holden / Isuzu	Rodeo / Pickup	82-85	4.44	3.11	6.34	3.23
Holden / Isuzu	Rodeo / Pickup	86-88	2.56	1.32	4.96	3.65
Holden / Isuzu	Rodeo / Pickup	89-95	4.13	3.60	4.73	1.13
Holden	Rodeo	96-98	3.19	2.53	4.01	1.49
Holden	Rodeo	99-02	3.07	2.35	4.01	1.65
Holden	Rodeo	03-04	1.66	0.77	3.56	2.79
Holden	WB Series	82-85	5.37	4.29	6.72	2.43
Kia	Ceres	92-00	5.05	3.48	7.35	3.87
Nissan	720 Ute	82-85	4.01	3.11	5.18	2.07
Nissan	Navara	86-91	3.87	3.28	4.57	1.29
Nissan	Navara	92-96	2.98	2.25	3.94	1.68
Nissan	Navara	97-04	2.34	1.49	3.69	2.20
Subaru	Brumby	82-92	6.42	5.37	7.66	2.29
Suzuki	Mighty Boy	85-88	9.31	6.87	12.63	5.76
Toyota	4Runner/Hilux	82-85	4.44	3.89	5.06	1.16
Toyota	4Runner/Hilux	86-88	4.08	3.56	4.67	1.12
Toyota	4Runner/Hilux	89-97	3.78	3.49	4.09	0.60
Toyota	Hilux	98-02	3.14	2.61	3.78	1.18
Large Cars			3.43	3.35	3.50	0.15
Ford	Falcon XE/XF	82-88	4.04	3.85	4.24	0.39

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	3.51	3.31	3.72	0.41
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	3.32	3.05	3.62	0.57
Ford	Falcon EF/EL	94-98	3.13	2.93	3.34	0.41
Ford	Falcon AU	98-02	2.83	2.54	3.15	0.61
Ford	Falcon BA	02-04	2.67	1.98	3.60	1.62
Ford	Taurus	96-98	2.68	1.47	4.86	3.38
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	3.91	3.72	4.11	0.39
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	3.20	3.01	3.40	0.39
Holden	Commodore VT/VX	97-02	2.84	2.61	3.08	0.47
Holden	Commodore VY/VZ	02-04	2.54	1.95	3.31	1.36
Holden	Commodore VB-VL	82-88	4.51	4.30	4.73	0.43
Hyundai	Sonata	98-01	3.12	1.92	5.07	3.15
Hyundai	Sonata	89-97	3.56	2.93	4.33	1.40
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	4.27	4.00	4.55	0.55
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	3.14	2.80	3.52	0.72
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	3.26	3.00	3.54	0.53
Nissan	Skyline	83-88	4.07	3.57	4.64	1.06
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	3.64	3.37	3.95	0.58
Toyota	Camry	98-02	3.07	2.70	3.49	0.79
Toyota	Camry	02-04	2.30	1.37	3.84	2.47
Toyota	Avalon	00-04	2.48	1.66	3.73	2.07
Luxury Cars			3.07	2.94	3.20	0.26
Audi	A4	95-01	2.47	1.34	4.55	3.21
BMW	3 Series E30	82-91	3.31	2.71	4.03	1.32
BMW	3 Series E36	92-98	3.10	2.53	3.81	1.28
BMW	3 Series E46	99-04	2.22	1.44	3.42	1.98
BMW	5 Series E28	82-88	2.90	1.88	4.47	2.60
BMW	5 Series E34	89-95	3.32	2.18	5.04	2.86
BMW	5 Series E39	96-03	1.92	0.98	3.77	2.79
Ford	Fairlane Z & LTD F	82-87	3.66	3.22	4.15	0.93
Ford	Fairlane N & LTD D	88-94	3.04	2.57	3.61	1.04
Ford	Fairlane N & LTD D	95-98	3.25	2.41	4.39	1.98
Ford	Fairlane & LTD AU	99-02	2.59	1.40	4.79	3.39
Holden	Statesman/Caprice WB	82-85	5.76	3.46	9.60	6.15
Holden	Stateman/Caprice VQ	90-93	4.06	2.94	5.61	2.67
Holden	Stateman/Caprice VR/VS	94-98	3.56	2.88	4.40	1.52
Holden	Statesman/Caprice WH	99-03	1.93	1.00	3.73	2.73
Honda	Accord	82-85	5.09	4.40	5.88	1.48
Honda	Accord	86-90	3.46	2.90	4.12	1.22
Honda	Accord	91-93	2.89	2.18	3.84	1.66
Honda	Accord	94-98	2.96	2.34	3.74	1.40
Honda	Accord	99-02	2.20	1.10	4.40	3.31
Honda	Legend	86-95	2.28	1.50	3.46	1.96
Jaguar	XJ6	82-86	5.16	2.93	9.12	6.19
Jaguar	XJ6	87-94	2.04	1.02	4.07	3.05
Lexus	ES300 / Windom	92-01	3.38	2.08	5.51	3.43
Mazda	929 / Luce	82-90	4.45	3.79	5.23	1.45

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mazda	929 / Sentia / Efini MS-9	92-96	1.69	0.61	4.67	4.06
Mercedes Benz	C-Class W201	87-93	3.88	2.57	5.86	3.29
Mercedes Benz	C-Class W202	95-00	2.51	1.64	3.85	2.21
Mercedes Benz	E-Class W123	82-85	3.07	1.58	5.95	4.37
Mercedes Benz	E-Class W124	86-94	2.38	1.54	3.67	2.13
Mercedes Benz	E-Class W210	96-02	2.30	1.29	4.11	2.83
Mercedes Benz	S-Class W126	82-92	3.22	2.03	5.12	3.08
Nissan	Maxima	90-94	3.15	2.26	4.39	2.13
Nissan	Maxima / Cefiro	95-99	2.83	1.96	4.07	2.11
Peugeot	405	89-97	3.21	2.15	4.79	2.65
Peugeot	505	82-93	2.64	1.76	3.98	2.22
Peugeot	406	96-04	1.30	0.45	3.81	3.36
Saab	900 Series	82-92	3.93	2.81	5.49	2.68
Saab	900/9-3	94-02	2.52	1.58	4.02	2.44
Saab	9000	86-97	1.74	0.99	3.07	2.08
Toyota	Crown / Cressida / Mark II	82-85	4.41	3.64	5.34	1.70
Toyota	Crown / Cressida / Mark II	86-88	4.17	2.97	5.85	2.88
Toyota	Cressida / Mark II	89-93	2.89	2.22	3.76	1.54
Volvo	850/S70/V70/C70	92-04	2.93	2.10	4.08	1.98
Volvo	200 Series	82-93	2.91	2.32	3.65	1.33
Volvo	300 Series	84-88	4.48	2.34	8.57	6.23
Volvo	700/900 Series	84-92	2.28	1.66	3.15	1.49
Volvo	S40/V40	97-04	3.05	1.70	5.49	3.79
Volkswagen	Passat	98-04	0.53	0.08	3.76	3.69
Medium Cars			3.86	3.76	3.97	0.22
Daewoo	Espero	95-97	5.65	3.98	8.04	4.06
Daewoo	Leganza	97-04	3.88	2.36	6.37	4.01
Ford	Mondeo	95-01	2.42	1.80	3.25	1.45
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	4.14	3.78	4.54	0.76
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	3.67	3.24	4.17	0.94
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	3.30	2.86	3.80	0.94
Mazda	626	98-02	3.54	2.60	4.83	2.24
Holden	Camira	82-89	5.14	4.79	5.52	0.73
Holden	Vectra	97-03	2.38	1.81	3.12	1.31
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	4.52	4.16	4.91	0.75
Mitsubishi	Galant	95-96	3.99	3.11	5.13	2.03
Nissan	Pintara	86-88	4.08	3.53	4.71	1.18
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	4.40	3.96	4.88	0.91
Nissan	Bluebird	82-86	5.09	4.70	5.51	0.80
Nissan	Bluebird	93-97	3.02	2.35	3.88	1.53
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	4.66	4.17	5.19	1.02
Subaru	Liberty / Legacy	89-93	3.49	3.03	4.02	0.99
Subaru	Liberty / Legacy / Outback	94-98	3.14	2.46	4.02	1.57
Subaru	Liberty / Legacy / Outback	99-03	2.49	1.74	3.55	1.81
Toyota	Camry	83-86	4.32	3.69	5.06	1.37
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	3.88	3.63	4.15	0.52
Toyota	Corona	82-88	4.56	4.22	4.92	0.69

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
People Movers			4.38	4.11	4.68	0.57
Chrysler	Voyager	97-04	1.52	0.50	4.58	4.08
Honda	Odyssey	95-00	2.50	1.26	4.94	3.68
Kia	Carnival	99-04	0.93	0.30	2.87	2.57
Nissan	Prairie	84-86	5.04	3.34	7.62	4.28
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	4.36	3.14	6.05	2.91
Mitsubishi	Nimbus / Chariot	92-98	2.85	1.82	4.48	2.66
Mitsubishi	Starwagon / L300	83-86	7.40	6.43	8.52	2.09
Mitsubishi	Starwagon / Delica Starwagon	87-93	5.10	4.43	5.86	1.43
Mitsubishi	Starwagon / Delica Spacegear	95-98	3.49	2.49	4.88	2.38
Mitsubishi	Starwagon / Delica Spacegear	98-04	4.90	3.18	7.55	4.37
Toyota	Tarago	83-89	5.52	4.83	6.31	1.48
Toyota	Tarago / Previa / Estima	91-99	2.87	2.24	3.68	1.44
Light Cars			5.19	5.04	5.33	0.29
Daewoo	1.5i	94-95	3.79	2.04	7.05	5.01
Daewoo	Cielo	95-97	4.23	3.52	5.09	1.57
Daewoo	Lanos	97-03	5.07	4.29	5.99	1.70
Daewoo	Matiz	99-04	4.25	2.76	6.53	3.77
Daihatsu	Charade	82-86	7.58	6.55	8.77	2.22
Daihatsu	Charade	88-92	6.09	5.47	6.79	1.32
Daihatsu	Charade	93-00	5.86	5.15	6.67	1.52
Daihatsu	Mira	90-96	9.93	7.93	12.45	4.53
Daihatsu	Pyzar	97-01	4.04	2.06	7.95	5.90
Daihatsu	Sirion / Storia	98-04	4.55	3.26	6.37	3.11
Ford	Festiva WD/WH/WF	94-01	5.82	5.33	6.36	1.03
Ford	Ka	99-04	3.68	1.96	6.88	4.92
Holden / Suzuki	Barina / Swift / Cultus	86-88	7.12	6.34	7.99	1.64
Holden / Suzuki	Barina / Swift / Cultus	89-99	5.59	5.16	6.04	0.88
Holden	Barina SB	95-00	4.70	4.08	5.40	1.32
Holden	Barina XC	01-04	4.17	2.77	6.28	3.51
Honda	City	83-86	7.10	5.67	8.90	3.23
Hyundai	Excel	86-90	6.16	5.38	7.05	1.66
Hyundai	Excel	90-94	5.15	4.68	5.67	0.99
Hyundai	Excel / Accent	95-00	4.93	4.58	5.31	0.73
Hyundai	Getz	02-04	9.12	6.16	13.50	7.34
Hyundai	Accent	00-04	4.81	3.91	5.92	2.01
Kia	Rio	00-04	3.88	2.70	5.58	2.88
Ford / Mazda	Festiva WA / 121	87-90	5.78	5.17	6.45	1.29
Mazda	121 / Autozam Review	94-96	4.29	3.55	5.19	1.65
Mazda	121 Metro / Demio	97-02	4.09	3.19	5.24	2.05
Mitsubishi	Mirage / Colt	82-88	5.64	5.22	6.10	0.88
Nissan	Micra	95-97	6.82	5.07	9.16	4.09
Peugoet	205	87-94	4.09	2.20	7.60	5.40
Subaru	Sherpa / Fiori / 700 / Rex	89-92	8.69	6.90	10.96	4.07
Suzuki	Hatch / Alto	82-84	9.26	7.50	11.44	3.95

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Suzuki	Alto	85-00	10.75	7.79	14.83	7.03
Suzuki	Ignis	00-02	4.38	2.12	9.02	6.90
Suzuki	Swift	82-85	8.22	5.21	12.99	7.79
Toyota	Echo	99-04	4.19	3.38	5.19	1.80
Toyota	Starlet	96-99	4.89	4.14	5.77	1.63
Volkswagen	Polo	96-00	2.92	1.50	5.70	4.21
Small Cars			4.27	4.17	4.37	0.20
Alfa Romeo	33	83-92	5.01	3.46	7.26	3.80
Chrysler	Neon	96-99	3.01	1.56	5.82	4.27
Daewoo	Nubira	97-03	3.57	2.78	4.59	1.81
Daihatsu	Applause	89-99	4.42	3.65	5.35	1.71
Fiat	Regata	84-88	4.14	2.03	8.44	6.41
Ford / Mazda	Laser / 323 / Familia	82-88	5.35	5.11	5.60	0.49
Mazda	323 / Familia / Lantis	90-93	4.10	3.58	4.70	1.12
Mazda	323 / Familia / Lantis	95-98	4.47	3.75	5.33	1.58
Ford / Mazda	Laser / 323	99-03	3.61	2.95	4.43	1.48
Ford	Laser	91-94	4.28	3.92	4.67	0.75
Ford	Laser	95-97	4.44	3.76	5.25	1.49
Ford	Focus	02-04	3.47	1.86	6.46	4.60
Holden	Gemini	82-84	5.22	4.69	5.80	1.11
Holden	Gemini RB	86-87	5.61	4.31	7.31	3.01
Holden	Astra TR	96-98	2.77	1.90	4.05	2.15
Holden	Astra TS	98-04	3.08	2.53	3.75	1.22
Honda	Civic	82-83	5.02	4.00	6.29	2.29
Honda	Civic / Ballade / Shuttle	84-87	5.93	5.21	6.75	1.54
Honda	Civic / Shuttle	88-91	4.56	4.02	5.18	1.17
Honda	Civic	92-95	3.94	3.40	4.58	1.18
Honda	Civic	96-00	3.59	2.96	4.37	1.41
Honda	Civic	01-04	2.51	1.42	4.45	3.02
Honda	Concerto	89-93	4.18	2.98	5.87	2.89
Hyundai	Elantra	00-04	4.56	3.06	6.81	3.76
Hyundai	Lantra	91-95	4.51	3.62	5.62	2.01
Hyundai	Lantra	96-00	3.93	3.27	4.72	1.46
Hyundai	S Coupe	90-96	5.11	3.85	6.78	2.93
Mitsubishi	Cordia	83-87	5.62	4.71	6.71	1.99
Mitsubishi	Lancer / Mirage CA	89-90	4.30	3.77	4.91	1.14
Mitsubishi	Lancer / Mirage CB	91-92	4.13	3.26	5.23	1.96
Mitsubishi	Lancer / Mirage CC	93-95	4.25	3.74	4.83	1.09
Mitsubishi	Lancer / Mirage CE	96-03	4.32	3.91	4.78	0.88
Holden / Nissan	Astra / Pulsar / Langley	84-86	5.72	5.27	6.21	0.94
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	4.78	4.39	5.20	0.81
Nissan	Pulsar / Vector / Sentra	92-95	3.65	3.20	4.15	0.95
Nissan	Pulsar / Vector / Sentra	96-99	4.42	3.88	5.03	1.15
Nissan	Pulsar	00-04	4.53	3.73	5.52	1.79
Nissan	Stanza	82-83	4.25	2.77	6.53	3.77
Peugeot	306	94-01	1.64	1.02	2.65	1.63
Proton	Wira	95-96	4.56	3.34	6.21	2.87
Renault	19	91-96	4.04	1.95	8.35	6.40
Rover	Quintet	82-86	4.88	2.96	8.04	5.08
Subaru	Impreza	93-00	4.54	3.83	5.38	1.56

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Subaru	Impreza	01-04	2.54	1.44	4.50	3.06
Suzuki	Baleno / Cultus Crescent	95-02	4.13	3.01	5.67	2.66
Toyota	Corolla	82-84	5.06	4.65	5.50	0.86
Toyota	Corolla	86-88	4.85	4.50	5.22	0.71
Toyota / Holden	Corolla / Nova	89-93	4.34	4.07	4.64	0.58
Toyota / Holden	Corolla / Nova	94-97	4.01	3.67	4.39	0.72
Toyota	Corolla	98-01	2.88	2.39	3.46	1.07
Toyota	Corolla	02-04	3.51	2.72	4.52	1.81
Toyota	Corolla 4WD Wagon	92-96	3.94	2.07	7.48	5.40
Toyota	Tercel	83-88	5.42	3.70	7.94	4.24
Volkswagen	Golf	82-94	6.93	4.02	11.93	7.91
Volkswagen	Golf	95-98	3.32	2.09	5.28	3.18
Volkswagen	Golf / Bora	99-04	2.07	1.22	3.49	2.27
Sports Cars			4.12	3.91	4.34	0.43
Alfa Romeo	GTV	82-84	7.84	4.14	14.88	10.74
Ford	Capri	89-94	5.16	4.03	6.61	2.58
Holden	Calibra	94-97	2.55	1.42	4.59	3.18
Honda	CRX	87-91	6.17	4.60	8.29	3.69
Honda	CRX	92-98	4.86	2.77	8.52	5.75
Honda	Integra	86-88	4.65	3.57	6.06	2.49
Honda	Integra	90-92	2.78	1.86	4.16	2.30
Honda	Integra	93-01	2.74	1.82	4.12	2.30
Honda	Prelude	83-91	4.11	3.57	4.72	1.15
Honda	Prelude	92-96	4.49	3.45	5.84	2.39
Honda	Prelude	97-02	1.71	0.77	3.80	3.04
Hyundai	Coupe	96-00	6.18	4.48	8.53	4.05
Mazda	RX7	82-85	5.51	3.90	7.77	3.87
Mazda	RX7	86-91	3.44	2.12	5.58	3.46
Mazda	MX5 / Eunos Roadster	89-97	4.48	2.85	7.03	4.18
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	2.48	1.24	4.97	3.73
Mitsubishi	Starion	82-87	9.97	6.46	15.39	8.93
Nissan	300ZX / Fairlady Z	90-95	3.58	2.29	5.59	3.30
Nissan	Gazelle / Silvia	84-86	5.72	4.38	7.46	3.07
Nissan	Exa	83-86	7.73	5.53	10.80	5.27
Nissan	Exa	87-91	5.17	3.13	8.53	5.40
Nissan	NX/NX-R	91-96	7.23	5.30	9.87	4.57
Nissan	200SX / Silvia	94-02	3.39	2.21	5.17	2.96
Renault	Feugo	82-87	3.23	1.84	5.70	3.87
Toyota	Celica	81-85	3.88	3.19	4.72	1.53
Toyota	Celica	86-89	4.02	3.21	5.03	1.82
Toyota	Celica	90-93	3.96	3.16	4.97	1.82
Toyota	Celica	94-99	4.18	3.03	5.76	2.73
Toyota	Supra	82-90	6.10	4.15	8.97	4.82
Toyota	MR2	87-90	7.34	4.95	10.89	5.95
Toyota	MR2	91-00	3.50	1.85	6.65	4.80
Toyota	Paseo / Cynos	91-99	4.56	3.48	5.97	2.49

CRASHWORTHINESS RATINGS

(WITH 90% CONFIDENCE LIMITS)

Victoria and NSW Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
ALL MODEL AVERAGE			4.02			
Compact Four Wheel Drive Vehicles			3.88	3.65	4.13	0.48
Daihatsu	Feroza / Rocky	89-97	4.55	3.51	5.88	2.37
Daihatsu	Rocky / Rugger	85-98	6.45	4.97	8.36	3.39
Daihatsu	Terios	97-04	5.33	3.85	7.39	3.54
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	5.30	4.71	5.97	1.26
Lada	Niva	84-99	4.13	2.78	6.14	3.36
Honda	CR-V	97-01	2.30	1.68	3.16	1.49
Honda	CR-V	02-04	1.65	0.80	3.43	2.64
Honda	HR-V	99-02	4.29	2.60	7.06	4.46
Nissan	X-Trail	01-04	3.38	2.02	5.68	3.66
Subaru	Forester	97-02	2.25	1.61	3.14	1.53
Subaru	Forester	02-04	1.44	0.61	3.40	2.79
Suzuki	Vitara / Escudo	88-98	4.57	3.95	5.30	1.35
Toyota	RAV4	94-00	2.81	2.22	3.55	1.32
Toyota	RAV4	01-04	2.49	1.66	3.74	2.08
Medium Four Wheel Drive Vehicles			2.98	2.76	3.23	0.47
Holden / Isuzu	Jackaroo / Bighorn	82-91	2.88	2.13	3.89	1.76
Holden / Isuzu	Jackaroo / Bighorn	92-97	2.88	2.02	4.11	2.10
Holden / Isuzu	Jackaroo / Bighorn	98-02	3.22	2.00	5.18	3.18
Jeep	Cherokee XJ	96-00	2.99	2.22	4.01	1.79
Land Rover	Defender	92-04	2.91	1.79	4.74	2.95
Land Rover	Discovery	91-02	2.49	1.63	3.79	2.15
Mitsubishi	Pajero	82-90	4.28	3.61	5.07	1.46
Mitsubishi	Pajero	92-99	2.75	2.28	3.31	1.03
Mitsubishi	Pajero NM / NP	00-04	2.03	1.10	3.72	2.61
Mitsubishi	Challenger	98-04	2.89	1.61	5.20	3.59
Nissan	Pathfinder / Terrano	88-94	3.17	2.37	4.25	1.88
Nissan	Pathfinder / Terrano	95-02	2.19	1.40	3.43	2.03
Large Four Wheel Drive Vehicles			2.92	2.78	3.07	0.30
Ford	Explorer	00-01	4.16	2.74	6.32	3.58
Land Rover	Range Rover	82-94	2.39	1.75	3.25	1.50
Nissan	Patrol / Safari	82-87	3.18	2.50	4.05	1.55
Nissan / Ford	Patrol / Maverick / Safari	88-97	2.55	2.24	2.89	0.65
Nissan	Patrol / Safari	98-04	2.36	1.84	3.04	1.20
Toyota	Landcruiser	82-89	4.11	3.72	4.53	0.81
Toyota	Landcruiser	90-97	3.09	2.80	3.41	0.61

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Toyota	Landcruiser	98-04	2.36	1.98	2.81	0.83
Commercial Vehicles- Vans			4.17	3.96	4.39	0.44
Daihatsu	Handivan	82-90	8.69	6.99	10.81	3.81
Daihatsu	Hi-Jet	82-90	12.53	8.98	17.48	8.50
Ford	Falcon Panel Van	82-95	3.41	2.88	4.03	1.15
Ford	Falcon Panel Van	96-99	1.83	1.01	3.30	2.29
Ford	Transit	95-00	2.85	1.92	4.24	2.33
Holden / Suzuki	Scurry / Carry	82-00	9.73	7.67	12.34	4.68
Holden	Shuttle / WFR Van	82-87	6.35	4.63	8.72	4.09
Honda	Acty	83-86	3.63	2.35	5.61	3.26
Toyota	Hiace/Liteace	82-86	5.56	4.99	6.19	1.20
Toyota	Hiace/Liteace	87-89	4.73	4.06	5.52	1.47
Toyota	Hiace/Liteace	90-95	4.35	3.83	4.93	1.10
Toyota	Hiace/Liteace	96-04	3.19	2.60	3.91	1.31
Volkswagen	Caravelle / Transporter	95-04	1.86	1.07	3.22	2.15
Commercial Vehicles- Utes			3.58	3.47	3.69	0.22
Ford / Mazda	Courier / B-Series / Bounty	98-02	3.06	2.29	4.10	1.81
Ford / Nissan	Falcon Ute / XFN Ute	82-95	3.73	3.40	4.10	0.70
Ford	Falcon Ute	96-99	3.06	2.45	3.81	1.36
Ford	Falcon Ute AU	00-02	2.27	1.68	3.05	1.37
Ford	Falcon Ute BA	03-04	2.59	1.53	4.36	2.83
Ford	Ford F-Series	82-92	2.85	1.98	4.09	2.11
Holden	Commodore Ute VG/VP	90-93	4.07	3.29	5.03	1.74
Holden	Commodore Ute VR/VS	94-00	3.52	3.14	3.96	0.82
Holden	Commodore VU Ute	00-02	3.89	2.99	5.06	2.07
Holden	Commodore VY/VZ Ute	02-04	2.79	1.88	4.15	2.27
Holden / Isuzu	Rodeo / Pickup	82-85	4.44	3.30	5.98	2.68
Holden / Isuzu	Rodeo / Pickup	86-88	2.56	1.47	4.46	2.99
Holden / Isuzu	Rodeo / Pickup	89-95	4.13	3.68	4.63	0.95
Holden	Rodeo	96-98	3.19	2.63	3.87	1.24
Holden	Rodeo	99-02	3.07	2.46	3.84	1.38
Holden	Rodeo	03-04	1.66	0.88	3.14	2.27
Holden	WB Series	82-85	5.37	4.45	6.48	2.03
Kia	Ceres	92-00	5.05	3.70	6.91	3.22
Nissan	720 Ute	82-85	4.01	3.24	4.97	1.73
Nissan	Navara	86-91	3.87	3.37	4.45	1.07
Nissan	Navara	92-96	2.98	2.36	3.76	1.40
Nissan	Navara	97-04	2.34	1.60	3.42	1.82
Subaru	Brumby	82-92	6.42	5.53	7.44	1.91
Suzuki	Mighty Boy	85-88	9.31	7.22	12.01	4.80
Toyota	4Runner/Hilux	82-85	4.44	3.98	4.95	0.97
Toyota	4Runner/Hilux	86-88	4.08	3.64	4.57	0.94
Toyota	4Runner/Hilux	89-97	3.78	3.54	4.04	0.50
Toyota	Hilux	98-02	3.14	2.69	3.67	0.98
Large Cars			3.43	3.36	3.49	0.13
Ford	Falcon XE/XF	82-88	4.04	3.88	4.20	0.32

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	3.51	3.34	3.68	0.34
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	3.32	3.10	3.57	0.47
Ford	Falcon EF/EL	94-98	3.13	2.96	3.31	0.34
Ford	Falcon AU	98-02	2.83	2.59	3.10	0.51
Ford	Falcon BA	02-04	2.67	2.08	3.43	1.35
Ford	Taurus	96-98	2.68	1.63	4.41	2.78
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	3.91	3.75	4.08	0.33
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	3.20	3.04	3.37	0.33
Holden	Commodore VT/VX	97-02	2.84	2.65	3.04	0.39
Holden	Commodore VY/VZ	02-04	2.54	2.04	3.17	1.13
Holden	Commodore VB-VL	82-88	4.51	4.33	4.69	0.36
Hyundai	Sonata	98-01	3.12	2.08	4.69	2.60
Hyundai	Sonata	89-97	3.56	3.02	4.20	1.17
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	4.27	4.04	4.50	0.46
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	3.14	2.85	3.45	0.60
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	3.26	3.04	3.49	0.45
Nissan	Skyline	83-88	4.07	3.65	4.54	0.89
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	3.64	3.41	3.90	0.49
Toyota	Camry	98-02	3.07	2.75	3.41	0.66
Toyota	Camry	02-04	2.30	1.49	3.53	2.04
Toyota	Avalon	00-04	2.48	1.77	3.49	1.72
Luxury Cars			3.07	2.96	3.18	0.21
Audi	A4	95-01	2.47	1.48	4.11	2.64
BMW	3 Series E30	82-91	3.31	2.80	3.90	1.10
BMW	3 Series E36	92-98	3.10	2.62	3.68	1.07
BMW	3 Series E46	99-04	2.22	1.54	3.19	1.64
BMW	5 Series E28	82-88	2.90	2.02	4.17	2.15
BMW	5 Series E34	89-95	3.32	2.34	4.71	2.37
BMW	5 Series E39	96-03	1.92	1.09	3.38	2.28
Ford	Fairlane Z & LTD F	82-87	3.66	3.29	4.07	0.78
Ford	Fairlane N & LTD D	88-94	3.04	2.64	3.51	0.87
Ford	Fairlane N & LTD D	95-98	3.25	2.53	4.18	1.65
Ford	Fairlane & LTD AU	99-02	2.59	1.55	4.34	2.79
Holden	Statesman/Caprice WB	82-85	5.76	3.76	8.84	5.08
Holden	Stateman/Caprice VQ	90-93	4.06	3.10	5.32	2.22
Holden	Stateman/Caprice VR/VS	94-98	3.56	2.98	4.25	1.27
Holden	Statesman/Caprice WH	99-03	1.93	1.12	3.35	2.23
Honda	Accord	82-85	5.09	4.51	5.74	1.24
Honda	Accord	86-90	3.46	2.98	4.00	1.02
Honda	Accord	91-93	2.89	2.28	3.66	1.38
Honda	Accord	94-98	2.96	2.43	3.60	1.17
Honda	Accord	99-02	2.20	1.23	3.93	2.70
Honda	Legend	86-95	2.28	1.60	3.23	1.63
Jaguar	XJ6	82-86	5.16	3.21	8.31	5.10
Jaguar	XJ6	87-94	2.04	1.14	3.64	2.50
Lexus	ES300 / Windom	92-01	3.38	2.25	5.09	2.83
Mazda	929 / Luce	82-90	4.45	3.89	5.10	1.21

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Mazda	929 / Sentia / Efini MS-9	92-96	1.69	0.72	3.96	3.24
Mercedes Benz	C-Class W201	87-93	3.88	2.75	5.48	2.73
Mercedes Benz	C-Class W202	95-00	2.51	1.76	3.59	1.83
Mercedes Benz	E-Class W123	82-85	3.07	1.76	5.34	3.58
Mercedes Benz	E-Class W124	86-94	2.38	1.66	3.42	1.76
Mercedes Benz	E-Class W210	96-02	2.30	1.42	3.74	2.33
Mercedes Benz	S-Class W126	82-92	3.22	2.19	4.74	2.55
Nissan	Maxima	90-94	3.15	2.38	4.16	1.77
Nissan	Maxima / Cefiro	95-99	2.83	2.08	3.84	1.75
Peugeot	405	89-97	3.21	2.29	4.49	2.20
Peugeot	505	82-93	2.64	1.88	3.72	1.84
Peugeot	406	96-04	1.30	0.53	3.20	2.67
Saab	900 Series	82-92	3.93	2.97	5.20	2.23
Saab	900/9-3	94-02	2.52	1.70	3.72	2.02
Saab	9000	86-97	1.74	1.08	2.80	1.72
Toyota	Crown / Cressida / Mark II	82-85	4.41	3.76	5.17	1.42
Toyota	Crown / Cressida / Mark II	86-88	4.17	3.14	5.53	2.40
Toyota	Cressida / Mark II	89-93	2.89	2.31	3.60	1.29
Volvo	850/S70/V70/C70	92-04	2.93	2.22	3.87	1.65
Volvo	200 Series	82-93	2.91	2.41	3.52	1.11
Volvo	300 Series	84-88	4.48	2.60	7.71	5.11
Volvo	700/900 Series	84-92	2.28	1.75	2.99	1.24
Volvo	S40/V40	97-04	3.05	1.87	4.99	3.12
Volkswagen	Passat	98-04	0.53	0.10	2.74	2.63
Medium Cars			3.86	3.78	3.96	0.18
Daewoo	Espero	95-97	5.65	4.21	7.59	3.38
Daewoo	Leganza	97-04	3.88	2.56	5.87	3.31
Ford	Mondeo	95-01	2.42	1.89	3.09	1.21
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	4.14	3.84	4.47	0.63
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	3.67	3.30	4.09	0.78
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	3.30	2.93	3.71	0.78
Mazda	626	98-02	3.54	2.73	4.59	1.86
Holden	Camira	82-89	5.14	4.84	5.46	0.61
Holden	Vectra	97-03	2.38	1.90	2.99	1.09
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	4.52	4.21	4.84	0.63
Mitsubishi	Galant	95-96	3.99	3.24	4.93	1.69
Nissan	Pintara	86-88	4.08	3.61	4.60	0.99
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	4.40	4.03	4.80	0.76
Nissan	Bluebird	82-86	5.09	4.76	5.44	0.67
Nissan	Bluebird	93-97	3.02	2.45	3.73	1.28
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	4.66	4.25	5.10	0.85
Subaru	Liberty / Legacy	89-93	3.49	3.10	3.93	0.83
Subaru	Liberty / Legacy / Outback	94-98	3.14	2.56	3.86	1.31
Subaru	Liberty / Legacy / Outback	99-03	2.49	1.85	3.35	1.50
Toyota	Camry	83-86	4.32	3.78	4.93	1.14
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	3.88	3.67	4.10	0.44
Toyota	Corona	82-88	4.56	4.28	4.86	0.58

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
People Movers			4.38	4.15	4.63	0.47
Chrysler	Voyager	97-04	1.52	0.60	3.83	3.22
Honda	Odyssey	95-00	2.50	1.41	4.42	3.01
Kia	Carnival	99-04	0.93	0.36	2.39	2.03
Nissan	Prairie	84-86	5.04	3.57	7.13	3.55
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	4.36	3.31	5.74	2.43
Mitsubishi	Nimbus / Chariot	92-98	2.85	1.96	4.16	2.20
Mitsubishi	Starwagon / L300	83-86	7.40	6.58	8.33	1.74
Mitsubishi	Starwagon / Delica Starwagon	87-93	5.10	4.54	5.73	1.19
Mitsubishi	Starwagon / Delica Spacegear	95-98	3.49	2.64	4.62	1.98
Mitsubishi	Starwagon / Delica Spacegear	98-04	4.90	3.42	7.04	3.62
Toyota	Tarago	83-89	5.52	4.94	6.18	1.24
Toyota	Tarago / Previa / Estima	91-99	2.87	2.33	3.53	1.20
Light Cars			5.19	5.06	5.31	0.25
Daewoo	1.5i	94-95	3.79	2.26	6.37	4.11
Daewoo	Cielo	95-97	4.23	3.62	4.94	1.31
Daewoo	Lanos	97-03	5.07	4.41	5.83	1.42
Daewoo	Matiz	99-04	4.25	2.96	6.09	3.12
Daihatsu	Charade	82-86	7.58	6.71	8.56	1.85
Daihatsu	Charade	88-92	6.09	5.57	6.67	1.10
Daihatsu	Charade	93-00	5.86	5.26	6.53	1.27
Daihatsu	Mira	90-96	9.93	8.22	12.00	3.78
Daihatsu	Pyzar	97-01	4.04	2.30	7.12	4.83
Daihatsu	Sirion / Storia	98-04	4.55	3.44	6.03	2.59
Ford	Festiva WD/WH/WF	94-01	5.82	5.41	6.27	0.87
Ford	Ka	99-04	3.68	2.18	6.21	4.04
Holden / Suzuki	Barina / Swift / Cultus	86-88	7.12	6.46	7.84	1.37
Holden / Suzuki	Barina / Swift / Cultus	89-99	5.59	5.23	5.97	0.73
Holden	Barina SB	95-00	4.70	4.18	5.28	1.10
Holden	Barina XC	01-04	4.17	2.96	5.87	2.92
Honda	City	83-86	7.10	5.88	8.57	2.70
Hyundai	Excel	86-90	6.16	5.50	6.89	1.39
Hyundai	Excel	90-94	5.15	4.76	5.59	0.83
Hyundai	Excel / Accent	95-00	4.93	4.64	5.24	0.61
Hyundai	Getz	02-04	9.12	6.57	12.67	6.09
Hyundai	Accent	00-04	4.81	4.04	5.72	1.68
Kia	Rio	00-04	3.88	2.87	5.26	2.39
Ford / Mazda	Festiva WA / 121	87-90	5.78	5.26	6.34	1.08
Mazda	121 / Autozam Review	94-96	4.29	3.66	5.03	1.38
Mazda	121 Metro / Demio	97-02	4.09	3.32	5.03	1.71
Mitsubishi	Mirage / Colt	82-88	5.64	5.29	6.02	0.74
Nissan	Micra	95-97	6.82	5.32	8.73	3.41
Peugoet	205	87-94	4.09	2.43	6.87	4.44
Subaru	Sherpa / Fiori / 700 / Rex	89-92	8.69	7.16	10.56	3.39
Suzuki	Hatch / Alto	82-84	9.26	7.76	11.06	3.29

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Suzuki	Alto	85-00	10.75	8.21	14.07	5.85
Suzuki	Ignis	00-02	4.38	2.39	8.02	5.63
Suzuki	Swift	82-85	8.22	5.61	12.06	6.45
Toyota	Echo	99-04	4.19	3.50	5.01	1.51
Toyota	Starlet	96-99	4.89	4.26	5.62	1.36
Volkswagen	Polo	96-00	2.92	1.67	5.11	3.44
Small Cars			4.27	4.18	4.35	0.17
Alfa Romeo	33	83-92	5.01	3.67	6.83	3.16
Chrysler	Neon	96-99	3.01	1.73	5.23	3.50
Daewoo	Nubira	97-03	3.57	2.90	4.41	1.51
Daihatsu	Applause	89-99	4.42	3.77	5.19	1.42
Fiat	Regata	84-88	4.14	2.28	7.51	5.23
Ford / Mazda	Laser / 323 / Familia	82-88	5.35	5.15	5.56	0.41
Mazda	323 / Familia / Lantis	90-93	4.10	3.66	4.60	0.94
Mazda	323 / Familia / Lantis	95-98	4.47	3.86	5.18	1.32
Ford / Mazda	Laser / 323	99-03	3.61	3.05	4.29	1.24
Ford	Laser	91-94	4.28	3.98	4.61	0.63
Ford	Laser	95-97	4.44	3.87	5.11	1.24
Ford	Focus	02-04	3.47	2.06	5.83	3.78
Holden	Gemini	82-84	5.22	4.77	5.70	0.93
Holden	Gemini RB	86-87	5.61	4.50	7.00	2.51
Holden	Astra TR	96-98	2.77	2.02	3.81	1.78
Holden	Astra TS	98-04	3.08	2.61	3.63	1.02
Honda	Civic	82-83	5.02	4.15	6.06	1.91
Honda	Civic / Ballade / Shuttle	84-87	5.93	5.32	6.61	1.29
Honda	Civic / Shuttle	88-91	4.56	4.10	5.08	0.98
Honda	Civic	92-95	3.94	3.48	4.47	0.99
Honda	Civic	96-00	3.59	3.05	4.23	1.18
Honda	Civic	01-04	2.51	1.56	4.05	2.49
Honda	Concerto	89-93	4.18	3.15	5.55	2.40
Hyundai	Elantra	00-04	4.56	3.26	6.38	3.12
Hyundai	Lantra	91-95	4.51	3.75	5.42	1.67
Hyundai	Lantra	96-00	3.93	3.37	4.58	1.22
Hyundai	S Coupe	90-96	5.11	4.03	6.48	2.44
Mitsubishi	Cordia	83-87	5.62	4.85	6.52	1.67
Mitsubishi	Lancer / Mirage CA	89-90	4.30	3.85	4.80	0.95
Mitsubishi	Lancer / Mirage CB	91-92	4.13	3.39	5.03	1.64
Mitsubishi	Lancer / Mirage CC	93-95	4.25	3.81	4.73	0.91
Mitsubishi	Lancer / Mirage CE	96-03	4.32	3.97	4.71	0.73
Holden / Nissan	Astra / Pulsar / Langley	84-86	5.72	5.34	6.13	0.79
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	4.78	4.45	5.13	0.68
Nissan	Pulsar / Vector / Sentra	92-95	3.65	3.27	4.07	0.79
Nissan	Pulsar / Vector / Sentra	96-99	4.42	3.96	4.93	0.96
Nissan	Pulsar	00-04	4.53	3.85	5.35	1.50
Nissan	Stanza	82-83	4.25	2.97	6.09	3.12
Peugeot	306	94-01	1.64	1.10	2.45	1.35
Proton	Wira	95-96	4.56	3.52	5.91	2.39
Renault	19	91-96	4.04	2.20	7.42	5.22
Rover	Quintet	82-86	4.88	3.21	7.41	4.20
Subaru	Impreza	93-00	4.54	3.93	5.24	1.30

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Subaru	Impreza	01-04	2.54	1.58	4.10	2.52
Suzuki	Baleno / Cultus Crescent	95-02	4.13	3.17	5.38	2.21
Toyota	Corolla	82-84	5.06	4.71	5.43	0.72
Toyota	Corolla	86-88	4.85	4.56	5.15	0.60
Toyota / Holden	Corolla / Nova	89-93	4.34	4.11	4.59	0.48
Toyota / Holden	Corolla / Nova	94-97	4.01	3.73	4.32	0.60
Toyota	Corolla	98-01	2.88	2.46	3.36	0.90
Toyota	Corolla	02-04	3.51	2.83	4.34	1.51
Toyota	Corolla 4WD Wagon	92-96	3.94	2.30	6.73	4.43
Toyota	Tercel	83-88	5.42	3.94	7.46	3.52
Volkswagen	Golf	82-94	6.93	4.39	10.92	6.53
Volkswagen	Golf	95-98	3.32	2.26	4.89	2.64
Volkswagen	Golf / Bora	99-04	2.07	1.33	3.21	1.88
Sports Cars			4.12	3.95	4.30	0.36
Alfa Romeo	GTV	82-84	7.84	4.59	13.40	8.81
Ford	Capri	89-94	5.16	4.20	6.35	2.15
Holden	Calibra	94-97	2.55	1.56	4.17	2.61
Honda	CRX	87-91	6.17	4.83	7.90	3.07
Honda	CRX	92-98	4.86	3.04	7.77	4.73
Honda	Integra	86-88	4.65	3.73	5.80	2.08
Honda	Integra	90-92	2.78	1.99	3.90	1.91
Honda	Integra	93-01	2.74	1.95	3.85	1.91
Honda	Prelude	83-91	4.11	3.65	4.61	0.96
Honda	Prelude	92-96	4.49	3.60	5.59	1.99
Honda	Prelude	97-02	1.71	0.87	3.34	2.47
Hyundai	Coupe	96-00	6.18	4.72	8.09	3.37
Mazda	RX7	82-85	5.51	4.13	7.35	3.22
Mazda	RX7	86-91	3.44	2.30	5.16	2.86
Mazda	MX5 / Eunos Roadster	89-97	4.48	3.07	6.54	3.46
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	2.48	1.39	4.44	3.05
Mitsubishi	Starion	82-87	9.97	6.93	14.34	7.40
Nissan	300ZX / Fairlady Z	90-95	3.58	2.46	5.20	2.74
Nissan	Gazelle / Silvia	84-86	5.72	4.58	7.14	2.56
Nissan	Exa	83-86	7.73	5.84	10.22	4.38
Nissan	Exa	87-91	5.17	3.40	7.86	4.46
Nissan	NX/NX-R	91-96	7.23	5.58	9.38	3.80
Nissan	200SX / Silvia	94-02	3.39	2.37	4.83	2.45
Renault	Feugo	82-87	3.23	2.01	5.20	3.18
Toyota	Celica	81-85	3.88	3.30	4.58	1.28
Toyota	Celica	86-89	4.02	3.33	4.85	1.52
Toyota	Celica	90-93	3.96	3.28	4.79	1.52
Toyota	Celica	94-99	4.18	3.19	5.46	2.27
Toyota	Supra	82-90	6.10	4.42	8.42	4.00
Toyota	MR2	87-90	7.34	5.28	10.21	4.94
Toyota	MR2	91-00	3.50	2.05	5.99	3.94
Toyota	Paseo / Cynos	91-99	4.56	3.63	5.71	2.08

APPENDIX 5

AGGRESSIVITY INJURY RISK AGGRESSIVITY INJURY SEVERITY AND RATINGS OF VEHICLE AGGRESSIVITY (with 95% and 90% CONFIDENCE LIMITS), TOWARDS OTHER VEHICLE DRIVERS AND UNPROTECTED ROAD USERS

AGGRESSIVITY INJURY RISK RATINGS

NSW Data (1987-2004), Queensland and Western Australia Data (1991-2004)

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			16.47			
Compact Four Wheel Drive Vehicles			15.21	14.41	16.06	1.65
Daihatsu	Feroza / Rocky	89-97	18.25	14.68	22.47	7.79
Daihatsu	Rocky / Rugger	85-98	19.80	14.60	26.29	11.69
Daihatsu	Terios	97-04	13.78	9.08	20.37	11.30
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	16.45	14.68	18.38	3.70
Honda	CR-V	97-01	15.54	12.59	19.02	6.43
Honda	CR-V	02-04	17.87	12.38	25.11	12.73
Honda	HR-V	99-02	18.13	12.32	25.87	13.55
Kia	Sportage	98-03	19.12	13.59	26.22	12.63
Lada	Niva	84-99	17.48	13.03	23.04	10.01
Subaru	Forester	97-02	12.01	9.06	15.75	6.69
Suzuki	Vitara / Escudo	88-98	16.88	14.92	19.05	4.13
Toyota	RAV4	94-00	16.43	13.94	19.27	5.33
Toyota	RAV4	01-04	14.62	10.49	20.02	9.53
Medium Four Wheel Drive Vehicles			19.46	18.38	20.58	2.20
Holden / Isuzu	Jackaroo / Bighorn	82-91	24.08	19.75	29.01	9.26
Holden / Isuzu	Jackaroo / Bighorn	92-97	19.31	15.04	24.46	9.42
Holden / Isuzu	Jackaroo / Bighorn	98-02	22.69	17.02	29.59	12.56
Jeep	Cherokee XJ	96-00	20.27	16.96	24.05	7.09
Land Rover	Defender	92-04	24.00	17.20	32.42	15.22
Land Rover	Discovery	91-02	23.29	16.91	31.19	14.28
Mitsubishi	Pajero	82-90	21.54	18.68	24.71	6.03
Mitsubishi	Pajero	92-99	20.16	18.01	22.49	4.49
Nissan	Pathfinder / Terrano	88-94	24.21	18.69	30.75	12.05
Nissan	Pathfinder / Terrano	95-02	16.41	11.81	22.34	10.53
Large Four Wheel Drive Vehicles			20.98	20.34	21.64	1.29
Ford	Explorer	00-01	17.11	11.56	24.57	13.00
Land Rover	Range Rover	82-94	24.09	19.93	28.79	8.86
Nissan	Patrol / Safari	82-87	23.28	20.20	26.67	6.47
Nissan / Ford	Patrol / Maverick / Safari	88-97	21.12	19.69	22.63	2.95
Nissan	Patrol / Safari	98-04	23.29	20.39	26.46	6.07
Toyota	Landcruiser	82-89	23.51	22.06	25.02	2.95
Toyota	Landcruiser	90-97	23.05	21.77	24.39	2.61
Toyota	Landcruiser	98-04	21.34	19.15	23.71	4.56
Commercial Vehicles- Vans			20.17	19.41	20.95	1.53
Daihatsu	Handivan	82-90	8.11	5.42	11.97	6.55
Ford	Falcon Panel Van	82-95	17.83	16.04	19.78	3.73
Ford	Falcon Panel Van	96-99	17.41	13.12	22.74	9.62

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Transit	95-00	22.37	18.40	26.90	8.50
Holden / Suzuki	Scurry / Carry	82-00	13.22	8.83	19.31	10.48
Holden	Shuttle / WFR Van	82-87	22.41	17.29	28.53	11.24
Honda	Acty	83-86	13.22	8.24	20.54	12.30
Mercedes Benz	Vito	99-04	27.25	19.57	36.56	16.99
Toyota	Hiace/Liteace	82-86	22.91	20.78	25.19	4.41
Toyota	Hiace/Liteace	87-89	22.61	19.91	25.56	5.64
Toyota	Hiace/Liteace	90-95	24.98	23.02	27.05	4.03
Toyota	Hiace/Liteace	96-04	24.02	21.81	26.37	4.56
Volkswagen	Caravelle / Transporter	95-04	24.62	20.10	29.79	9.69
Commercial Vehicles- Utes			18.36	17.94	18.79	0.86
Ford / Mazda	Courier / B-Series / Bounty	98-02	17.31	14.15	21.00	6.85
Ford / Nissan	Falcon Ute / XFN Ute	82-95	20.08	18.83	21.40	2.56
Ford	Falcon Ute	96-99	19.49	16.94	22.32	5.38
Ford	Falcon Ute AU	00-02	22.73	19.55	26.26	6.71
Ford	Ford F-Series	82-92	26.09	21.99	30.65	8.66
Holden	Commodore Ute VG/VP	90-93	16.50	13.65	19.80	6.15
Holden	Commodore Ute VR/VS	94-00	18.58	17.09	20.17	3.07
Holden	Commodore VU Ute	00-02	17.34	14.08	21.16	7.08
Holden	Commodore VY/VZ Ute	02-04	20.92	15.93	26.97	11.04
Holden / Isuzu	Rodeo / Pickup	82-85	17.09	12.98	22.17	9.20
Holden / Isuzu	Rodeo / Pickup	86-88	18.37	13.64	24.29	10.66
Holden / Isuzu	Rodeo / Pickup	89-95	19.90	18.43	21.45	3.02
Holden	Rodeo	96-98	20.66	18.30	23.23	4.93
Holden	Rodeo	99-02	20.36	17.69	23.31	5.62
Holden	Rodeo	03-04	19.43	14.01	26.30	12.29
Holden	WB Series	82-85	21.02	18.01	24.38	6.37
Kia	Ceres	92-00	14.65	11.15	19.01	7.86
Nissan	720 Ute	82-85	21.13	17.67	25.05	7.37
Nissan	Navara	86-91	18.97	17.05	21.05	4.00
Nissan	Navara	92-96	20.41	17.64	23.50	5.87
Nissan	Navara	97-04	22.74	18.80	27.24	8.45
Subaru	Brumby	82-92	15.54	12.59	19.03	6.44
Suzuki	Mighty Boy	85-88	10.19	6.23	16.24	10.01
Toyota	4Runner/Hilux	82-85	20.72	18.80	22.79	3.99
Toyota	4Runner/Hilux	86-88	20.27	18.31	22.37	4.05
Toyota	4Runner/Hilux	89-97	19.88	18.89	20.91	2.02
Toyota	Hilux	98-02	20.10	18.16	22.20	4.04
Toyota	Hilux	03-04	28.15	20.57	37.20	16.63
Large Cars			16.15	15.92	16.38	0.46
Ford	Falcon XE/XF	82-88	18.18	17.61	18.76	1.15
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	17.70	17.10	18.32	1.23
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	18.08	17.21	18.98	1.77
Ford	Falcon EF/EL	94-98	18.36	17.71	19.02	1.31
Ford	Falcon AU	98-02	18.64	17.65	19.66	2.01
Ford	Taurus	96-98	16.49	11.50	23.09	11.60
Ford	Falcon BA	02-04	18.29	15.70	21.21	5.50
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	16.26	15.71	16.83	1.11
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	16.08	15.49	16.69	1.20
Holden	Commodore VT/VX	97-02	18.75	17.96	19.57	1.61

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Holden	Commodore VY/VZ	02-04	18.10	15.79	20.67	4.88
Holden	Commodore VB-VL	82-88	17.16	16.59	17.75	1.16
Hyundai	Sonata	98-01	14.98	11.53	19.25	7.72
Hyundai	Sonata	89-97	16.29	14.48	18.27	3.79
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	16.85	16.11	17.61	1.50
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	17.93	16.86	19.05	2.19
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	17.35	16.57	18.15	1.58
Nissan	Skyline	83-88	18.23	16.59	20.00	3.41
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	16.93	16.18	17.70	1.52
Toyota	Camry	98-02	17.63	16.57	18.75	2.19
Toyota	Avalon	00-04	21.03	17.74	24.74	7.00
Toyota	Camry	02-04	13.66	10.37	17.79	7.43
Luxury Cars			15.20	14.77	15.63	0.86
Audi	A4	95-01	15.52	10.23	22.85	12.62
BMW	3 Series E30	82-91	15.46	13.37	17.80	4.43
BMW	3 Series E36	92-98	13.77	12.14	15.59	3.44
BMW	3 Series E46	99-04	16.71	13.69	20.24	6.55
BMW	5 Series E28	82-88	18.15	13.93	23.31	9.38
BMW	5 Series E34	89-95	13.71	10.05	18.43	8.38
BMW	5 Series E39	96-03	16.18	11.97	21.51	9.54
Ford	Fairlane Z & LTD F	82-87	16.92	15.60	18.33	2.73
Ford	Fairlane N & LTD D	88-94	17.36	15.35	19.56	4.20
Ford	Fairlane N & LTD D	95-98	20.43	16.98	24.37	7.39
Ford	Fairlane & LTD AU	99-02	15.96	12.10	20.75	8.65
Holden	Stateman/Caprice VQ	90-93	15.94	12.45	20.18	7.73
Holden	Stateman/Caprice VR/VS	94-98	15.35	13.29	17.65	4.36
Holden	Statesman/Caprice WH	99-03	17.69	13.05	23.53	10.48
Honda	Accord	82-85	14.48	12.17	17.15	4.99
Honda	Accord	86-90	14.86	12.66	17.37	4.70
Honda	Accord	91-93	14.56	11.89	17.72	5.83
Honda	Accord	94-98	17.64	15.47	20.04	4.57
Honda	Accord	99-02	17.34	12.61	23.35	10.74
Honda	Legend	86-95	21.30	17.06	26.27	9.21
Jaguar	XJ6	82-86	26.47	18.13	36.91	18.79
Jaguar	XJ6	87-94	24.29	17.61	32.49	14.88
Lexus	ES300 / Windom	92-01	19.02	13.80	25.62	11.82
Mazda	929 / Luce	82-90	18.59	16.49	20.90	4.42
Mercedes Benz	C-Class W201	87-93	12.96	8.98	18.34	9.36
Mercedes Benz	C-Class W202	95-00	10.92	8.26	14.30	6.04
Mercedes Benz	E-Class W124	86-94	16.97	13.65	20.90	7.26
Mercedes Benz	E-Class W210	96-02	19.34	14.64	25.10	10.46
Mercedes Benz	S-Class W126	82-92	15.77	11.92	20.59	8.68
Nissan	Maxima	90-94	17.73	13.69	22.64	8.96
Nissan	Maxima / Cefiro	95-99	16.98	13.58	21.03	7.45
Peugeot	405	89-97	12.76	8.67	18.39	9.72
Peugeot	505	82-93	14.86	10.70	20.27	9.57
Saab	900 Series	82-92	14.49	10.94	18.93	7.99
Saab	900/9-3	94-02	17.77	14.14	22.08	7.93
Saab	9000	86-97	18.35	14.62	22.77	8.16

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Toyota	Crown / Cressida / Mark II	82-85	17.18	14.75	19.92	5.16
Toyota	Crown / Cressida / Mark II	86-88	14.44	11.16	18.49	7.34
Toyota	Cressida / Mark II	89-93	15.31	13.01	17.94	4.92
Volvo	850/S70/V70/C70	92-04	18.46	15.55	21.77	6.22
Volvo	200 Series	82-93	15.99	13.95	18.28	4.33
Volvo	700/900 Series	84-92	16.65	14.05	19.62	5.57
Volvo	S40/V40	97-04	17.28	12.67	23.12	10.45
Medium Cars			14.95	14.66	15.25	0.59
Daewoo	Espero	95-97	16.17	12.40	20.83	8.43
Daewoo	Leganza	97-04	17.78	13.24	23.45	10.21
Ford	Cortina	82-82	17.21	15.46	19.11	3.65
Ford	Mondeo	95-01	16.82	14.24	19.77	5.52
Holden	Camira	82-89	17.25	16.30	18.23	1.93
Holden	Vectra	97-03	16.06	13.87	18.53	4.67
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	15.49	14.30	16.77	2.47
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	15.34	13.80	17.02	3.22
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	13.88	12.45	15.45	3.01
Mazda	626	98-02	12.79	10.14	16.02	5.88
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	15.53	14.65	16.46	1.81
Mitsubishi	Galant	95-96	15.78	12.94	19.11	6.17
Nissan	Pintara	86-88	17.05	15.43	18.80	3.37
Nissan	Bluebird	82-86	15.19	14.16	16.27	2.11
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	16.37	15.18	17.64	2.46
Nissan	Bluebird	93-97	15.72	12.96	18.93	5.98
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	14.93	13.44	16.56	3.12
Subaru	Liberty / Legacy	89-93	16.39	14.71	18.21	3.50
Subaru	Liberty / Legacy / Outback	94-98	15.31	12.99	17.96	4.97
Subaru	Liberty / Legacy / Outback	99-03	15.40	12.69	18.56	5.87
Toyota	Camry	83-86	16.79	15.12	18.60	3.48
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	17.64	16.94	18.37	1.43
Toyota	Corona	82-88	15.29	14.55	16.06	1.51
People Movers			18.25	17.46	19.06	1.60
Chrysler	Voyager	97-04	29.09	22.43	36.78	14.35
Honda	Odyssey	95-00	18.38	13.72	24.18	10.46
Kia	Carnival	99-04	20.35	14.36	28.01	13.65
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	13.87	9.65	19.55	9.90
Mitsubishi	Nimbus / Chariot	92-98	15.17	11.51	19.73	8.23
Mitsubishi	Starwagon / L300	83-86	23.18	20.52	26.06	5.53
Mitsubishi	Starwagon / Delica Starwagon	87-93	20.94	18.95	23.08	4.13
Mitsubishi	Starwagon / Delica Spacegear	95-98	22.45	19.34	25.90	6.56
Mitsubishi	Starwagon / Delica Spacegear	98-04	20.42	15.46	26.46	10.99
Nissan	Prairie	84-86	15.38	10.17	22.60	12.43
Toyota	Tarago	83-89	17.82	16.10	19.67	3.58
Toyota	Tarago / Previa / Estima	91-99	17.83	15.70	20.18	4.48

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Light Cars			12.50	12.22	12.78	0.55
Daewoo	Cielo	95-97	13.37	11.71	15.24	3.53
Daewoo	Lanos	97-03	16.33	14.55	18.29	3.75
Daewoo	Matiz	99-04	13.29	9.71	17.93	8.22
Daihatsu	Charade	82-86	13.29	11.03	15.94	4.91
Daihatsu	Charade	88-92	11.68	10.56	12.90	2.34
Daihatsu	Charade	93-00	13.42	12.14	14.81	2.66
Daihatsu	Mira	90-96	10.71	7.79	14.54	6.75
Daihatsu	Pyzar	97-01	8.30	4.60	14.51	9.91
Daihatsu	Sirion / Storia	98-04	10.50	8.04	13.60	5.56
Ford	Festiva WD/WH/WF	94-01	13.85	12.91	14.86	1.95
Holden	Barina SB	95-00	13.28	12.01	14.67	2.66
Holden	Barina XC	01-04	12.27	8.98	16.54	7.57
Honda	City	83-86	11.99	7.07	19.61	12.54
Hyundai	Accent	00-04	15.60	13.70	17.71	4.01
Hyundai	Excel	86-90	16.56	14.73	18.55	3.82
Hyundai	Excel	90-94	14.10	13.13	15.13	2.00
Hyundai	Excel / Accent	95-00	14.10	13.39	14.85	1.46
Hyundai	Getz	02-04	14.51	10.06	20.47	10.40
Kia	Rio	00-04	15.28	12.15	19.03	6.88
Ford / Mazda	Festiva WA / 121	87-90	14.10	12.82	15.49	2.67
Mazda	121 / Autozam Review	94-96	11.59	9.96	13.46	3.50
Mazda	121 Metro / Demio	97-02	11.76	9.89	13.92	4.04
Mitsubishi	Mirage / Colt	82-88	14.22	13.27	15.22	1.95
Nissan	Micra	95-97	11.90	8.95	15.66	6.71
Subaru	Sherpa / Fiori / 700 / Rex	89-92	11.84	8.62	16.05	7.43
Holden / Suzuki	Barina / Swift / Cultus	86-88	13.87	12.27	15.65	3.38
Holden / Suzuki	Barina / Swift / Cultus	89-99	12.45	11.65	13.30	1.65
Suzuki	Hatch / Alto	82-84	13.60	10.23	17.86	7.63
Toyota	Echo	99-04	10.69	8.98	12.68	3.70
Toyota	Starlet	96-99	12.74	11.20	14.47	3.27
Volkswagen	Polo	96-00	13.20	9.17	18.65	9.48
Small Cars			13.03	12.81	13.26	0.45
Alfa Romeo	33	83-92	5.13	2.70	9.54	6.84
Chrysler	Neon	96-99	14.85	10.73	20.21	9.49
Daewoo	Nubira	97-03	13.80	11.70	16.20	4.50
Daihatsu	Applause	89-99	14.95	13.09	17.03	3.94
Ford / Mazda	Laser / 323 / Familia	82-88	14.49	13.94	15.06	1.12
Mazda	323 / Familia / Lantis	90-93	13.90	12.15	15.86	3.71
Mazda	323 / Familia / Lantis	95-98	13.40	11.80	15.18	3.38
Ford / Mazda	Laser / 323	99-03	13.65	12.00	15.48	3.47
Ford	Laser	91-94	14.15	13.22	15.13	1.91
Ford	Laser	95-97	12.63	11.07	14.37	3.30
Ford	Escort	82-82	16.02	14.01	18.26	4.25
Ford	Focus	02-04	15.60	10.22	23.07	12.85
Holden	Gemini	82-84	13.37	12.09	14.76	2.67
Holden	Gemini RB	86-87	13.06	10.13	16.69	6.55
Holden	Astra TR	96-98	15.82	12.58	19.70	7.11
Holden	Astra TS	98-04	12.96	11.51	14.55	3.04
Honda	Civic	82-83	10.13	6.98	14.49	7.51

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Honda	Civic / Ballade / Shuttle	84-87	14.96	12.88	17.31	4.43
Honda	Civic / Shuttle	88-91	14.85	13.24	16.61	3.37
Honda	Civic	92-95	14.25	12.71	15.93	3.22
Honda	Civic	96-00	16.53	14.88	18.33	3.45
Honda	Civic	01-04	13.00	9.16	18.14	8.99
Honda	Concerto	89-93	10.97	7.34	16.09	8.75
Hyundai	Elantra	00-04	15.28	11.92	19.39	7.47
Hyundai	S Coupe	90-96	13.83	11.04	17.19	6.15
Hyundai	Lantra	91-95	15.76	13.52	18.30	4.77
Hyundai	Lantra	96-00	15.14	13.51	16.93	3.42
Mitsubishi	Lancer / Mirage CA	89-90	13.27	11.77	14.93	3.16
Mitsubishi	Lancer / Mirage CB	91-92	14.22	12.30	16.38	4.07
Mitsubishi	Lancer / Mirage CC	93-95	13.05	11.75	14.48	2.73
Mitsubishi	Lancer / Mirage CE	96-03	13.83	12.96	14.74	1.79
Mitsubishi	Cordia	83-87	17.63	14.79	20.88	6.09
Holden / Nissan	Astra / Pulsar / Langley	84-86	13.69	12.65	14.81	2.16
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	14.41	13.48	15.38	1.90
Nissan	Pulsar / Vector / Sentra	92-95	15.04	13.67	16.52	2.85
Nissan	Pulsar / Vector / Sentra	96-99	14.97	13.71	16.31	2.60
Nissan	Pulsar	00-04	13.28	11.62	15.14	3.52
Nissan	Stanza	82-83	17.29	12.58	23.30	10.72
Peugeot	306	94-01	12.56	9.51	16.41	6.90
Proton	Wira	95-96	15.24	12.22	18.86	6.64
Subaru	Impreza	93-00	14.19	12.45	16.13	3.68
Subaru	Impreza	01-04	15.51	11.57	20.46	8.89
Suzuki	Baleno / Cultus Crescent	95-02	11.40	9.09	14.21	5.12
Toyota	Corolla	82-84	13.30	12.36	14.30	1.94
Toyota	Corolla	86-88	13.98	13.17	14.84	1.67
Toyota / Holden	Corolla / Nova	89-93	14.42	13.71	15.15	1.44
Toyota / Holden	Corolla / Nova	94-97	13.17	12.36	14.03	1.67
Toyota	Corolla	98-01	13.58	12.19	15.10	2.91
Toyota	Corolla	02-04	15.98	13.78	18.45	4.67
Toyota	Tercel	83-88	15.96	11.30	22.06	10.76
Volkswagen	Golf	95-98	12.67	9.66	16.44	6.77
Volkswagen	Golf / Bora	99-04	15.10	11.94	18.91	6.97
Sports Cars			15.45	14.82	16.11	1.29
Ford	Capri	89-94	15.15	12.53	18.20	5.66
Holden	Calibra	94-97	18.44	12.72	25.98	13.26
Holden	Monaro	01-04	22.47	16.38	30.02	13.64
Honda	CRX	87-91	17.61	11.40	26.21	14.81
Honda	Integra	86-88	14.55	10.66	19.55	8.89
Honda	Integra	90-92	17.93	13.46	23.49	10.03
Honda	Integra	93-01	14.31	10.83	18.67	7.84
Honda	Prelude	83-91	15.21	13.26	17.40	4.14
Honda	Prelude	92-96	14.70	11.75	18.25	6.50
Honda	Prelude	97-02	13.83	9.58	19.57	9.99
Hyundai	Coupe	96-00	15.79	11.99	20.51	8.52
Mazda	RX7	82-85	12.24	7.83	18.65	10.82
Mazda	RX7	86-91	16.36	10.22	25.14	14.92
Mazda	MX5 / Eunos Roadster	89-97	16.35	11.96	21.96	10.00
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	12.85	8.32	19.30	10.98

Make	Model of Car	Years of Manufacture	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Nissan	300ZX / Fairlady Z	90-95	22.19	16.19	29.63	13.44
Nissan	Gazelle / Silvia	84-86	15.78	10.62	22.82	12.20
Nissan	Exa	83-86	22.19	16.41	29.30	12.89
Nissan	Exa	87-91	13.29	8.17	20.90	12.74
Nissan	NX/NX-R	91-96	19.48	15.03	24.88	9.85
Nissan	200SX / Silvia	94-02	16.13	11.86	21.55	9.69
Renault	Feugo	82-87	11.43	6.39	19.60	13.21
Toyota	Celica	81-85	19.13	16.92	21.54	4.62
Toyota	Celica	86-89	17.56	15.16	20.26	5.11
Toyota	Celica	90-93	18.04	15.51	20.88	5.37
Toyota	Celica	94-99	18.42	15.06	22.33	7.28
Toyota	Celica	00-04	15.46	12.94	18.36	5.42
Toyota	Paseo / Cynos	91-99	13.30	10.72	16.38	5.66
Toyota	Supra	82-90	28.32	21.71	36.03	14.32

AGGRESSIVITY INJURY SEVERITY RATINGS

NSW and Victoria Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			23.71			
Compact Four Wheel Drive Vehicles			23.64	21.95	25.42	3.47
Daihatsu	Feroza / Rocky	89-97	22.29	15.46	31.04	15.58
Daihatsu	Rocky / Rugger	85-98	32.78	22.61	44.88	22.27
Daihatsu	Terios	97-04	13.70	6.85	25.53	18.69
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	23.86	20.03	28.18	8.15
Honda	CR-V	97-01	19.08	13.98	25.47	11.49
Honda	CR-V	02-04	27.76	17.30	41.38	24.08
Honda	HR-V	99-02	39.19	25.24	55.16	29.92
Kia	Sportage	98-03	22.95	13.89	35.48	21.59
Lada	Niva	84-99	27.22	17.89	39.10	21.22
Subaru	Forester	97-02	17.22	11.91	24.24	12.33
Suzuki	Vitara / Escudo	88-98	26.32	22.06	31.08	9.02
Toyota	RAV4	94-00	28.44	23.66	33.75	10.09
Toyota	RAV4	01-04	27.37	18.70	38.16	19.46
Medium Four Wheel Drive Vehicles			24.24	22.58	25.97	3.40
Holden / Isuzu	Jackaroo / Bighorn	82-91	27.08	21.11	34.01	12.91
Holden / Isuzu	Jackaroo / Bighorn	92-97	28.58	21.22	37.29	16.07
Holden / Isuzu	Jackaroo / Bighorn	98-02	24.91	15.61	37.29	21.68
Jeep	Cherokee XJ	96-00	24.17	18.15	31.41	13.25
Land Rover	Defender	92-04	22.21	12.99	35.33	22.34
Land Rover	Discovery	91-02	19.90	14.38	26.86	12.48
Mitsubishi	Pajero	82-90	27.75	23.59	32.33	8.74
Mitsubishi	Pajero	92-99	26.08	22.13	30.45	8.32
Nissan	Pathfinder / Terrano	88-94	23.79	19.27	28.98	9.70
Nissan	Pathfinder / Terrano	95-02	30.61	22.96	39.52	16.56
Large Four Wheel Drive Vehicles			29.03	27.83	30.25	2.42
Ford	Explorer	00-01	16.51	8.74	28.99	20.26
Land Rover	Range Rover	82-94	31.12	23.73	39.62	15.89
Nissan	Patrol / Safari	82-87	30.35	25.10	36.16	11.06
Nissan / Ford	Patrol / Maverick / Safari	88-97	27.64	24.97	30.47	5.51
Nissan	Patrol / Safari	98-04	29.99	25.42	35.00	9.58
Toyota	Landcruiser	82-89	32.34	29.62	35.19	5.56
Toyota	Landcruiser	90-97	31.23	28.85	33.71	4.86
Toyota	Landcruiser	98-04	29.51	25.70	33.62	7.92
Commercial Vehicles- Vans			24.89	23.68	26.14	2.46
Daihatsu	Handivan	82-90	30.09	21.01	41.06	20.06
Ford	Falcon Panel Van	82-95	23.74	20.07	27.85	7.78

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Falcon Panel Van	96-99	24.50	15.09	37.21	22.11
Ford	Transit	95-00	21.81	15.39	29.96	14.57
Holden / Suzuki	Scurry / Carry	82-00	24.38	15.85	35.55	19.70
Holden	Shuttle / WFR Van	82-87	19.13	12.08	28.94	16.86
Honda	Acty	83-86	14.84	7.04	28.61	21.57
Mercedes Benz	Vito	99-04	27.42	15.92	42.98	27.05
Toyota	Hiace/Liteace	82-86	28.78	25.97	31.75	5.78
Toyota	Hiace/Liteace	87-89	27.14	23.76	30.81	7.05
Toyota	Hiace/Liteace	90-95	25.36	22.75	28.16	5.41
Toyota	Hiace/Liteace	96-04	25.37	21.73	29.40	7.67
Volkswagen	Caravelle / Transporter	95-04	28.37	19.57	39.18	19.61
Commercial Vehicles- Utes			25.85	25.04	26.67	1.63
Ford / Mazda	Courier / B-Series / Bounty	98-02	24.17	17.54	32.32	14.78
Ford / Nissan	Falcon Ute / XFN Ute	82-95	25.07	22.69	27.61	4.92
Ford	Falcon Ute	96-99	26.31	20.92	32.52	11.60
Ford	Falcon Ute AU	00-02	23.93	18.99	29.67	10.68
Ford	Ford F-Series	82-92	30.30	23.39	38.23	14.84
Holden	Commodore Ute VG/VP	90-93	20.16	15.13	26.35	11.23
Holden	Commodore Ute VR/VS	94-00	27.31	24.04	30.84	6.80
Holden	Commodore VU Ute	00-02	34.20	26.04	43.41	17.37
Holden	Commodore VY/VZ Ute	02-04	35.82	25.30	47.90	22.60
Holden / Isuzu	Rodeo / Pickup	82-85	31.45	23.77	40.30	16.53
Holden / Isuzu	Rodeo / Pickup	86-88	20.58	11.51	34.03	22.52
Holden / Isuzu	Rodeo / Pickup	89-95	30.01	27.00	33.21	6.20
Holden	Rodeo	96-98	26.36	21.92	31.34	9.42
Holden	Rodeo	99-02	27.28	22.30	32.89	10.59
Holden	Rodeo	03-04	23.14	13.43	36.89	23.45
Holden	WB Series	82-85	25.78	20.37	32.04	11.67
Kia	Ceres	92-00	26.12	16.75	38.33	21.58
Nissan	720 Ute	82-85	19.62	15.00	25.26	10.26
Nissan	Navara	86-91	27.27	23.95	30.87	6.92
Nissan	Navara	92-96	25.62	21.14	30.68	9.55
Nissan	Navara	97-04	26.35	20.50	33.18	12.68
Subaru	Brumby	82-92	27.72	21.47	34.97	13.50
Suzuki	Mighty Boy	85-88	20.70	11.04	35.45	24.41
Toyota	4Runner/Hilux	82-85	30.24	26.87	33.83	6.96
Toyota	4Runner/Hilux	86-88	27.77	24.63	31.14	6.51
Toyota	4Runner/Hilux	89-97	26.87	25.14	28.67	3.53
Toyota	Hilux	98-02	27.92	24.15	32.03	7.88
Toyota	Hilux	03-04	29.30	16.93	45.75	28.82
Large Cars			23.19	22.73	23.66	0.92
Ford	Falcon XE/XF	82-88	24.78	23.70	25.88	2.18
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	24.87	23.66	26.12	2.47
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	24.43	22.68	26.26	3.58
Ford	Falcon EF/EL	94-98	23.92	22.66	25.24	2.58
Ford	Falcon AU	98-02	23.32	21.55	25.19	3.64
Ford	Taurus	96-98	26.92	17.27	39.39	22.12
Ford	Falcon BA	02-04	25.77	20.88	31.35	10.48
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	23.68	22.53	24.87	2.34
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	24.60	23.27	25.97	2.70

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Holden	Commodore VT/VX	97-02	24.87	23.29	26.52	3.23
Holden	Commodore VY/VZ	02-04	23.79	19.23	29.04	9.80
Holden	Commodore VB-VL	82-88	24.36	23.18	25.59	2.41
Hyundai	Sonata	98-01	18.59	11.02	29.64	18.62
Hyundai	Sonata	89-97	25.75	21.54	30.46	8.92
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	24.16	22.65	25.74	3.09
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	22.34	20.24	24.60	4.35
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	23.25	21.68	24.90	3.22
Nissan	Skyline	83-88	22.58	19.77	25.67	5.90
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	24.36	22.63	26.18	3.55
Toyota	Camry	98-02	25.74	23.33	28.32	4.99
Toyota	Avalon	00-04	28.53	21.95	36.16	14.21
Toyota	Camry	02-04	26.11	16.52	38.70	22.18
Luxury Cars			22.25	21.41	23.11	1.70
Audi	A4	95-01	25.60	16.22	37.94	21.72
BMW	3 Series E30	82-91	23.31	19.47	27.63	8.16
BMW	3 Series E36	92-98	25.59	21.63	29.99	8.36
BMW	3 Series E46	99-04	23.24	17.06	30.81	13.75
BMW	5 Series E28	82-88	26.54	19.02	35.73	16.71
BMW	5 Series E34	89-95	26.08	19.26	34.29	15.02
BMW	5 Series E39	96-03	19.22	11.83	29.68	17.85
Ford	Fairlane Z & LTD F	82-87	24.44	21.58	27.55	5.97
Ford	Fairlane N & LTD D	88-94	23.83	20.38	27.66	7.28
Ford	Fairlane N & LTD D	95-98	24.89	19.39	31.34	11.96
Ford	Fairlane & LTD AU	99-02	22.39	14.52	32.89	18.37
Holden	Stateman/Caprice VQ	90-93	30.90	22.52	40.76	18.24
Holden	Stateman/Caprice VR/VS	94-98	25.96	21.40	31.11	9.71
Holden	Statesman/Caprice WH	99-03	21.21	14.00	30.82	16.82
Honda	Accord	82-85	19.25	15.91	23.10	7.19
Honda	Accord	86-90	24.51	20.97	28.43	7.46
Honda	Accord	91-93	17.09	12.65	22.69	10.04
Honda	Accord	94-98	20.63	16.55	25.40	8.85
Honda	Accord	99-02	18.93	11.16	30.26	19.09
Honda	Legend	86-95	25.18	18.61	33.13	14.52
Jaguar	XJ6	82-86	29.26	18.86	42.40	23.55
Jaguar	XJ6	87-94	19.18	10.80	31.74	20.94
Lexus	ES300 / Windom	92-01	18.92	11.95	28.62	16.67
Mazda	929 / Luce	82-90	20.41	17.06	24.22	7.16
Mercedes Benz	C-Class W201	87-93	22.85	15.00	33.20	18.20
Mercedes Benz	C-Class W202	95-00	23.17	16.15	32.07	15.92
Mercedes Benz	E-Class W124	86-94	27.15	20.33	35.25	14.92
Mercedes Benz	E-Class W210	96-02	23.89	15.69	34.61	18.92
Mercedes Benz	S-Class W126	82-92	21.48	14.08	31.35	17.28
Nissan	Maxima	90-94	23.72	18.16	30.36	12.19
Nissan	Maxima / Cefiro	95-99	18.17	13.28	24.35	11.08
Peugeot	405	89-97	23.28	16.71	31.47	14.76
Peugeot	505	82-93	25.64	16.83	37.00	20.16
Saab	900 Series	82-92	14.11	8.43	22.69	14.26
Saab	900/9-3	94-02	22.45	15.54	31.28	15.74

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Saab	9000	86-97	17.36	11.29	25.74	14.44
Toyota	Crown / Cressida / Mark II	82-85	27.22	22.71	32.26	9.55
Toyota	Crown / Cressida / Mark II	86-88	28.65	20.85	37.98	17.14
Toyota	Cressida / Mark II	89-93	20.81	16.07	26.50	10.43
Volvo	850/S70/V70/C70	92-04	28.76	22.63	35.77	13.13
Volvo	200 Series	82-93	23.37	19.08	28.30	9.22
Volvo	700/900 Series	84-92	25.10	19.67	31.45	11.77
Volvo	S40/V40	97-04	21.73	11.10	38.18	27.09
Medium Cars			21.95	21.36	22.55	1.19
Daewoo	Espero	95-97	22.67	14.82	33.06	18.25
Daewoo	Leganza	97-04	24.82	15.07	38.05	22.98
Ford	Cortina	82-82	22.67	18.97	26.86	7.89
Ford	Mondeo	95-01	22.98	18.30	28.42	10.12
Holden	Camira	82-89	23.50	21.65	25.45	3.80
Holden	Vectra	97-03	23.33	19.10	28.18	9.07
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	22.90	20.96	24.97	4.01
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	25.23	22.66	27.99	5.32
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	22.00	19.30	24.96	5.66
Mazda	626	98-02	29.79	23.24	37.30	14.07
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	23.48	21.59	25.47	3.88
Mitsubishi	Galant	95-96	22.49	17.68	28.15	10.47
Nissan	Pintara	86-88	24.81	21.52	28.41	6.90
Nissan	Bluebird	82-86	22.25	20.28	24.35	4.07
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	23.95	21.51	26.58	5.06
Nissan	Bluebird	93-97	19.30	15.46	23.84	8.38
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	20.66	18.06	23.53	5.47
Subaru	Liberty / Legacy	89-93	22.62	19.79	25.73	5.93
Subaru	Liberty / Legacy / Outback	94-98	26.33	21.29	32.07	10.79
Subaru	Liberty / Legacy / Outback	99-03	23.34	17.57	30.31	12.74
Toyota	Camry	83-86	21.52	18.13	25.36	7.23
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	22.10	20.69	23.57	2.88
Toyota	Corona	82-88	23.93	22.14	25.82	3.67
People Movers			24.24	22.87	25.67	2.80
Chrysler	Voyager	97-04	24.15	14.07	38.22	24.14
Honda	Odyssey	95-00	27.25	17.65	39.57	21.93
Kia	Carnival	99-04	27.33	16.26	42.15	25.89
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	21.86	15.62	29.71	14.09
Mitsubishi	Nimbus / Chariot	92-98	23.80	16.24	33.47	17.23
Mitsubishi	Starwagon / L300	83-86	25.94	22.45	29.77	7.32
Mitsubishi	Starwagon / Delica Starwagon	87-93	26.03	23.10	29.18	6.08
Mitsubishi	Starwagon / Delica Spacegear	95-98	22.56	17.38	28.74	11.36
Mitsubishi	Starwagon / Delica Spacegear	98-04	26.87	18.17	37.83	19.66
Nissan	Prairie	84-86	28.25	19.43	39.12	19.69
Toyota	Tarago	83-89	26.30	22.84	30.08	7.24
Toyota	Tarago / Previa / Estima	91-99	23.37	19.22	28.12	8.90

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Light Cars			21.30	20.58	22.03	1.45
Daewoo	Cielo	95-97	20.35	16.12	25.35	9.23
Daewoo	Lanos	97-03	21.51	17.68	25.92	8.25
Daewoo	Matiz	99-04	16.79	8.42	30.70	22.28
Daihatsu	Charade	82-86	22.52	17.99	27.80	9.81
Daihatsu	Charade	88-92	21.45	18.25	25.04	6.79
Daihatsu	Charade	93-00	21.24	17.51	25.52	8.01
Daihatsu	Mira	90-96	25.85	18.50	34.86	16.35
Daihatsu	Pyzar	97-01	20.11	9.11	38.73	29.62
Daihatsu	Sirion / Storia	98-04	20.37	12.26	31.91	19.65
Ford	Festiva WD/WH/WF	94-01	20.79	18.39	23.42	5.04
Holden	Barina SB	95-00	23.36	19.70	27.47	7.77
Holden	Barina XC	01-04	17.30	10.76	26.64	15.88
Honda	City	83-86	22.60	16.59	30.00	13.41
Hyundai	Accent	00-04	18.24	14.07	23.31	9.23
Hyundai	Excel	86-90	22.77	18.97	27.09	8.12
Hyundai	Excel	90-94	22.81	20.11	25.76	5.64
Hyundai	Excel / Accent	95-00	23.73	21.79	25.78	3.99
Hyundai	Getz	02-04	34.86	20.92	51.98	31.06
Kia	Rio	00-04	31.21	22.22	41.86	19.64
Ford / Mazda	Festiva WA / 121	87-90	20.47	17.38	23.95	6.57
Mazda	121 / Autozam Review	94-96	21.71	16.70	27.71	11.01
Mazda	121 Metro / Demio	97-02	16.75	12.05	22.80	10.75
Mitsubishi	Mirage / Colt	82-88	23.10	20.86	25.49	4.63
Nissan	Micra	95-97	23.84	14.46	36.70	22.24
Subaru	Sherpa / Fiori / 700 / Rex	89-92	21.99	15.40	30.39	14.99
Holden / Suzuki	Barina / Swift / Cultus	86-88	20.85	17.51	24.65	7.14
Holden / Suzuki	Barina / Swift / Cultus	89-99	22.91	20.61	25.38	4.77
Suzuki	Hatch / Alto	82-84	27.70	19.79	37.31	17.52
Toyota	Echo	99-04	24.37	19.00	30.68	11.68
Toyota	Starlet	96-99	23.49	19.05	28.60	9.55
Volkswagen	Polo	96-00	18.64	10.11	31.80	21.69
Small Cars			21.87	21.36	22.39	1.03
Alfa Romeo	33	83-92	26.58	17.48	38.21	20.73
Chrysler	Neon	96-99	14.70	7.64	26.42	18.77
Daewoo	Nubira	97-03	21.62	16.47	27.85	11.39
Daihatsu	Applause	89-99	20.43	16.11	25.54	9.43
Ford / Mazda	Laser / 323 / Familia	82-88	22.50	21.41	23.64	2.24
Mazda	323 / Familia / Lantis	90-93	19.20	16.55	22.16	5.61
Mazda	323 / Familia / Lantis	95-98	21.03	17.13	25.53	8.40
Ford / Mazda	Laser / 323	99-03	21.72	17.63	26.45	8.82
Ford	Laser	91-94	23.18	21.08	25.42	4.34
Ford	Laser	95-97	25.66	21.49	30.33	8.84
Ford	Escort	82-82	12.93	7.61	21.12	13.51
Ford	Focus	02-04	29.87	17.14	46.73	29.58
Holden	Gemini	82-84	22.75	19.67	26.14	6.47
Holden	Gemini RB	86-87	24.37	17.20	33.34	16.14
Holden	Astra TR	96-98	23.87	16.73	32.85	16.12
Holden	Astra TS	98-04	23.86	20.07	28.12	8.06
Honda	Civic	82-83	22.52	16.70	29.64	12.94

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Honda	Civic / Ballade / Shuttle	84-87	22.21	18.61	26.29	7.68
Honda	Civic / Shuttle	88-91	21.18	18.07	24.67	6.60
Honda	Civic	92-95	25.44	21.99	29.22	7.23
Honda	Civic	96-00	15.76	12.54	19.61	7.08
Honda	Civic	01-04	22.61	13.62	35.12	21.50
Honda	Concerto	89-93	27.05	19.03	36.91	17.88
Hyundai	Elantra	00-04	20.67	12.33	32.54	20.20
Hyundai	S Coupe	90-96	16.49	10.60	24.74	14.14
Hyundai	Lantra	91-95	21.84	16.22	28.73	12.52
Hyundai	Lantra	96-00	22.76	18.82	27.26	8.44
Mitsubishi	Lancer / Mirage CA	89-90	23.07	20.05	26.40	6.35
Mitsubishi	Lancer / Mirage CB	91-92	23.22	18.12	29.25	11.12
Mitsubishi	Lancer / Mirage CC	93-95	21.50	18.48	24.88	6.40
Mitsubishi	Lancer / Mirage CE	96-03	22.59	20.23	25.15	4.92
Mitsubishi	Cordia	83-87	28.12	23.98	32.66	8.69
Holden / Nissan	Astra / Pulsar / Langley	84-86	26.38	23.91	29.01	5.10
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	25.04	22.87	27.34	4.47
Nissan	Pulsar / Vector / Sentra	92-95	23.69	20.87	26.76	5.89
Nissan	Pulsar / Vector / Sentra	96-99	20.80	17.85	24.08	6.22
Nissan	Pulsar	00-04	26.11	20.73	32.33	11.60
Nissan	Stanza	82-83	32.32	21.38	45.62	24.23
Peugeot	306	94-01	25.07	18.17	33.50	15.32
Proton	Wira	95-96	28.13	19.81	38.29	18.48
Subaru	Impreza	93-00	28.18	23.81	33.02	9.21
Subaru	Impreza	01-04	15.39	7.88	27.87	19.99
Suzuki	Baleno / Cultus Crescent	95-02	12.67	7.41	20.81	13.40
Toyota	Corolla	82-84	21.43	19.43	23.57	4.14
Toyota	Corolla	86-88	23.69	21.81	25.67	3.86
Toyota / Holden	Corolla / Nova	89-93	23.49	21.91	25.16	3.25
Toyota / Holden	Corolla / Nova	94-97	22.13	20.04	24.37	4.33
Toyota	Corolla	98-01	25.34	21.44	29.67	8.24
Toyota	Corolla	02-04	21.89	16.97	27.76	10.79
Toyota	Tercel	83-88	18.35	9.97	31.32	21.36
Volkswagen	Golf	95-98	28.25	19.23	39.44	20.22
Volkswagen	Golf / Bora	99-04	19.07	12.76	27.52	14.75
Sports Cars			22.72	21.52	23.97	2.45
Ford	Capri	89-94	18.23	13.30	24.47	11.17
Holden	Calibra	94-97	27.87	19.12	38.71	19.59
Holden	Monaro	01-04	38.35	23.91	55.19	31.28
Honda	CRX	87-91	23.39	17.22	30.94	13.71
Honda	Integra	86-88	16.48	11.51	23.04	11.54
Honda	Integra	90-92	26.90	19.74	35.52	15.78
Honda	Integra	93-01	19.95	13.90	27.78	13.88
Honda	Prelude	83-91	23.00	19.98	26.33	6.35
Honda	Prelude	92-96	21.35	15.96	27.97	12.01
Honda	Prelude	97-02	23.45	14.39	35.81	21.42
Hyundai	Coupe	96-00	19.40	11.87	30.08	18.20
Mazda	RX7	82-85	33.25	22.74	45.75	23.01
Mazda	RX7	86-91	19.14	11.05	31.08	20.04
Mazda	MX5 / Eunos Roadster	89-97	19.66	11.67	31.19	19.53
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	26.94	14.32	44.85	30.53

Make	Model of Car	Years of Manufacture	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Nissan	300ZX / Fairlady Z	90-95	27.88	18.83	39.19	20.36
Nissan	Gazelle / Silvia	84-86	27.17	19.78	36.09	16.30
Nissan	Exa	83-86	28.30	19.09	39.76	20.67
Nissan	Exa	87-91	36.83	23.52	52.51	28.99
Nissan	NX/NX-R	91-96	25.63	17.60	35.73	18.13
Nissan	200SX / Silvia	94-02	27.10	18.30	38.15	19.85
Renault	Feugo	82-87	13.10	5.81	26.94	21.14
Toyota	Celica	81-85	22.74	18.85	27.16	8.31
Toyota	Celica	86-89	25.79	21.03	31.19	10.15
Toyota	Celica	90-93	25.42	20.63	30.88	10.25
Toyota	Celica	94-99	22.53	16.20	30.44	14.23
Toyota	Celica	00-04	23.33	15.39	33.75	18.36
Toyota	Paseo / Cynos	91-99	26.38	19.04	35.31	16.27
Toyota	Supra	82-90	28.92	20.14	39.62	19.48

AGGRESSIVITY RATINGS

(WITH 95% CONFIDENCE LIMITS)

NSW and Victoria Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			4.08			
Compact Four Wheel Drive Vehicles			3.60	3.28	3.94	0.66
Daihatsu	Feroza / Rocky	89-97	4.07	2.70	6.13	3.43
Daihatsu	Rocky / Rugger	85-98	6.49	4.12	10.22	6.09
Daihatsu	Terios	97-04	1.89	0.87	4.11	3.25
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	3.92	3.20	4.82	1.62
Honda	CR-V	97-01	2.96	2.06	4.27	2.21
Honda	CR-V	02-04	4.96	2.82	8.73	5.91
Honda	HR-V	99-02	7.11	4.13	12.21	8.07
Kia	Sportage	98-03	4.39	2.47	7.81	5.34
Lada	Niva	84-99	4.76	2.93	7.74	4.81
Subaru	Forester	97-02	2.07	1.32	3.25	1.93
Suzuki	Vitara / Escudo	88-98	4.44	3.60	5.49	1.89
Toyota	RAV4	94-00	4.67	3.67	5.94	2.27
Toyota	RAV4	01-04	4.00	2.47	6.49	4.02
Medium Four Wheel Drive Vehicles			4.72	4.31	5.16	0.85
Holden / Isuzu	Jackaroo / Bighorn	82-91	6.52	4.80	8.86	4.07
Holden / Isuzu	Jackaroo / Bighorn	92-97	5.52	3.80	8.02	4.22
Holden / Isuzu	Jackaroo / Bighorn	98-02	5.65	3.36	9.50	6.13
Jeep	Cherokee XJ	96-00	4.90	3.54	6.79	3.25
Land Rover	Defender	92-04	5.33	2.94	9.68	6.74
Land Rover	Discovery	91-02	4.63	2.99	7.19	4.20
Mitsubishi	Pajero	82-90	5.98	4.84	7.38	2.54
Mitsubishi	Pajero	92-99	5.26	4.33	6.39	2.06
Nissan	Pathfinder / Terrano	88-94	5.76	4.17	7.95	3.78
Nissan	Pathfinder / Terrano	95-02	5.02	3.30	7.65	4.34
Large Four Wheel Drive Vehicles			6.09	5.78	6.42	0.63
Ford	Explorer	00-01	2.82	1.38	5.77	4.38
Land Rover	Range Rover	82-94	7.50	5.46	10.28	4.82
Nissan	Patrol / Safari	82-87	7.06	5.62	8.89	3.27
Nissan / Ford	Patrol / Maverick / Safari	88-97	5.84	5.17	6.59	1.42
Nissan	Patrol / Safari	98-04	6.99	5.68	8.59	2.91
Toyota	Landcruiser	82-89	7.60	6.83	8.46	1.62
Toyota	Landcruiser	90-97	7.20	6.54	7.93	1.39
Toyota	Landcruiser	98-04	6.30	5.30	7.48	2.17

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Commercial Vehicles- Vans			5.02	4.72	5.34	0.63
Daihatsu	Handivan	82-90	2.44	1.45	4.11	2.66
Ford	Falcon Panel Van	82-95	4.23	3.49	5.14	1.66
Ford	Falcon Panel Van	96-99	4.27	2.51	7.26	4.75
Ford	Transit	95-00	4.88	3.32	7.17	3.85
Holden / Suzuki	Scurry / Carry	82-00	3.22	1.83	5.67	3.84
Holden	Shuttle / WFR Van	82-87	4.29	2.59	7.11	4.53
Honda	Acty	83-86	1.96	0.84	4.57	3.72
Mercedes Benz	Vito	99-04	7.47	4.14	13.49	9.36
Toyota	Hiace/Liteace	82-86	6.59	5.74	7.58	1.84
Toyota	Hiace/Liteace	87-89	6.14	5.12	7.35	2.22
Toyota	Hiace/Liteace	90-95	6.33	5.54	7.24	1.70
Toyota	Hiace/Liteace	96-04	6.09	5.10	7.29	2.19
Volkswagen	Caravelle / Transporter	95-04	6.98	4.68	10.42	5.74
Commercial Vehicles- Utes			4.75	4.56	4.94	0.37
Ford / Mazda	Courier / B-Series / Bounty	98-02	4.18	2.91	6.03	3.12
Ford / Nissan	Falcon Ute / XFN Ute	82-95	5.04	4.48	5.66	1.18
Ford	Falcon Ute	96-99	5.13	3.95	6.65	2.70
Ford	Falcon Ute AU	00-02	5.44	4.16	7.11	2.95
Ford	Ford F-Series	82-92	7.91	5.87	10.64	4.77
Holden	Commodore Ute VG/VP	90-93	3.33	2.38	4.65	2.27
Holden	Commodore Ute VR/VS	94-00	5.07	4.37	5.89	1.52
Holden	Commodore VU Ute	00-02	5.93	4.27	8.23	3.95
Holden	Commodore VY/VZ Ute	02-04	7.49	4.95	11.35	6.40
Holden / Isuzu	Rodeo / Pickup	82-85	5.37	3.69	7.84	4.15
Holden / Isuzu	Rodeo / Pickup	86-88	3.78	2.04	7.02	4.98
Holden / Isuzu	Rodeo / Pickup	89-95	5.97	5.25	6.79	1.54
Holden	Rodeo	96-98	5.45	4.39	6.75	2.36
Holden	Rodeo	99-02	5.55	4.37	7.05	2.67
Holden	Rodeo	03-04	4.50	2.47	8.19	5.72
Holden	WB Series	82-85	5.42	4.12	7.12	2.99
Kia	Ceres	92-00	3.83	2.33	6.28	3.95
Nissan	720 Ute	82-85	4.15	3.03	5.68	2.65
Nissan	Navara	86-91	5.17	4.39	6.10	1.71
Nissan	Navara	92-96	5.23	4.13	6.62	2.49
Nissan	Navara	97-04	5.99	4.42	8.13	3.71
Subaru	Brumby	82-92	4.31	3.13	5.93	2.81
Suzuki	Mighty Boy	85-88	2.11	0.99	4.52	3.53
Toyota	4Runner/Hilux	82-85	6.27	5.39	7.28	1.89
Toyota	4Runner/Hilux	86-88	5.63	4.82	6.57	1.74
Toyota	4Runner/Hilux	89-97	5.34	4.91	5.80	0.89
Toyota	Hilux	98-02	5.61	4.72	6.68	1.96
Toyota	Hilux	03-04	8.25	4.60	14.78	10.18
Large Cars			3.74	3.65	3.84	0.18
Ford	Falcon XE/XF	82-88	4.50	4.27	4.75	0.49
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	4.40	4.14	4.68	0.53

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	4.42	4.04	4.82	0.78
Ford	Falcon EF/EL	94-98	4.39	4.12	4.69	0.57
Ford	Falcon AU	98-02	4.35	3.95	4.78	0.83
Ford	Taurus	96-98	4.44	2.58	7.64	5.06
Ford	Falcon BA	02-04	4.71	3.66	6.07	2.41
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	3.85	3.63	4.09	0.46
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	3.96	3.70	4.23	0.52
Holden	Commodore VT/VX	97-02	4.66	4.31	5.04	0.73
Holden	Commodore VY/VZ	02-04	4.31	3.37	5.51	2.14
Holden	Commodore VB-VL	82-88	4.18	3.94	4.44	0.50
Hyundai	Sonata	98-01	2.79	1.59	4.88	3.29
Hyundai	Sonata	89-97	4.19	3.40	5.17	1.76
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	4.07	3.77	4.40	0.63
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	4.01	3.57	4.49	0.92
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	4.03	3.71	4.38	0.67
Nissan	Skyline	83-88	4.12	3.51	4.83	1.33
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	4.12	3.78	4.49	0.71
Toyota	Camry	98-02	4.54	4.05	5.09	1.05
Toyota	Avalon	00-04	6.00	4.44	8.10	3.66
Toyota	Camry	02-04	3.57	2.15	5.92	3.77
Luxury Cars			3.38	3.22	3.55	0.32
Audi	A4	95-01	3.97	2.21	7.15	4.95
BMW	3 Series E30	82-91	3.60	2.87	4.52	1.64
BMW	3 Series E36	92-98	3.52	2.87	4.33	1.46
BMW	3 Series E46	99-04	3.88	2.72	5.54	2.82
BMW	5 Series E28	82-88	4.82	3.20	7.25	4.04
BMW	5 Series E34	89-95	3.57	2.35	5.44	3.09
BMW	5 Series E39	96-03	3.11	1.80	5.38	3.58
Ford	Fairlane Z & LTD F	82-87	4.14	3.57	4.79	1.22
Ford	Fairlane N & LTD D	88-94	4.14	3.40	5.03	1.62
Ford	Fairlane N & LTD D	95-98	5.08	3.76	6.87	3.11
Ford	Fairlane & LTD AU	99-02	3.57	2.18	5.84	3.66
Holden	Stateman/Caprice VQ	90-93	4.93	3.36	7.23	3.87
Holden	Stateman/Caprice VR/VS	94-98	3.98	3.15	5.04	1.89
Holden	Statesman/Caprice WH	99-03	3.75	2.29	6.15	3.87
Honda	Accord	82-85	2.79	2.16	3.59	1.43
Honda	Accord	86-90	3.64	2.92	4.54	1.61
Honda	Accord	91-93	2.49	1.75	3.55	1.80
Honda	Accord	94-98	3.64	2.83	4.67	1.84
Honda	Accord	99-02	3.28	1.82	5.92	4.10
Honda	Legend	86-95	5.36	3.74	7.70	3.96
Jaguar	XJ6	82-86	7.74	4.50	13.32	8.82
Jaguar	XJ6	87-94	4.66	2.50	8.70	6.20
Lexus	ES300 / Windom	92-01	3.60	2.10	6.16	4.06
Mazda	929 / Luce	82-90	3.80	3.07	4.69	1.62
Mercedes Benz	C-Class W201	87-93	2.96	1.73	5.06	3.33
Mercedes Benz	C-Class W202	95-00	2.53	1.63	3.93	2.30

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mercedes Benz	E-Class W124	86-94	4.61	3.25	6.53	3.28
Mercedes Benz	E-Class W210	96-02	4.62	2.86	7.47	4.62
Mercedes Benz	S-Class W126	82-92	3.39	2.08	5.51	3.43
Nissan	Maxima	90-94	4.21	2.93	6.03	3.10
Nissan	Maxima / Cefiro	95-99	3.08	2.12	4.49	2.37
Peugeot	405	89-97	2.97	1.82	4.86	3.05
Peugeot	505	82-93	3.81	2.29	6.34	4.05
Saab	900 Series	82-92	2.04	1.16	3.61	2.45
Saab	900/9-3	94-02	3.99	2.63	6.05	3.41
Saab	9000	86-97	3.18	1.99	5.09	3.10
Toyota	Crown / Cressida / Mark II	82-85	4.68	3.71	5.89	2.18
Toyota	Crown / Cressida / Mark II	86-88	4.14	2.79	6.13	3.34
Toyota	Cressida / Mark II	89-93	3.19	2.37	4.29	1.92
Volvo	850/S70/V70/C70	92-04	5.31	3.99	7.06	3.06
Volvo	200 Series	82-93	3.74	2.94	4.75	1.81
Volvo	700/900 Series	84-92	4.18	3.13	5.58	2.44
Volvo	S40/V40	97-04	3.76	1.88	7.52	5.65
Medium Cars			3.28	3.17	3.39	0.22
Daewoo	Espero	95-97	3.67	2.27	5.92	3.66
Daewoo	Leganza	97-04	4.41	2.55	7.63	5.08
Ford	Cortina	82-82	3.90	3.18	4.78	1.60
Ford	Mondeo	95-01	3.87	2.94	5.09	2.15
Holden	Camira	82-89	4.05	3.67	4.47	0.80
Holden	Vectra	97-03	3.75	2.94	4.78	1.84
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	3.55	3.15	3.99	0.84
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	3.87	3.34	4.49	1.16
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	3.05	2.58	3.61	1.03
Mazda	626	98-02	3.81	2.74	5.30	2.56
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	3.65	3.30	4.03	0.74
Mitsubishi	Galant	95-96	3.55	2.62	4.81	2.19
Nissan	Pintara	86-88	4.23	3.56	5.02	1.45
Nissan	Bluebird	82-86	3.38	3.01	3.79	0.78
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	3.92	3.44	4.46	1.02
Nissan	Bluebird	93-97	3.03	2.27	4.05	1.77
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	3.09	2.61	3.65	1.04
Subaru	Liberty / Legacy	89-93	3.71	3.13	4.39	1.26
Subaru	Liberty / Legacy / Outback	94-98	4.03	3.10	5.24	2.13
Subaru	Liberty / Legacy / Outback	99-03	3.59	2.58	5.01	2.44
Toyota	Camry	83-86	3.61	2.97	4.40	1.44
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	3.90	3.61	4.21	0.60
Toyota	Corona	82-88	3.66	3.34	4.01	0.67
People Movers			4.42	4.11	4.76	0.64
Chrysler	Voyager	97-04	7.02	4.01	12.32	8.31
Honda	Odyssey	95-00	5.01	3.05	8.22	5.17
Kia	Carnival	99-04	5.56	3.10	9.99	6.90

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	3.03	1.88	4.90	3.02
Mitsubishi	Nimbus / Chariot	92-98	3.61	2.30	5.68	3.38
Mitsubishi	Starwagon / L300	83-86	6.01	5.00	7.23	2.24
Mitsubishi	Starwagon / Delica Starwagon	87-93	5.45	4.68	6.35	1.67
Mitsubishi	Starwagon / Delica Spacegear	95-98	5.06	3.78	6.78	2.99
Mitsubishi	Starwagon / Delica Spacegear	98-04	5.49	3.48	8.66	5.18
Nissan	Prairie	84-86	4.34	2.55	7.40	4.86
Toyota	Tarago	83-89	4.69	3.95	5.56	1.61
Toyota	Tarago / Previa / Estima	91-99	4.17	3.32	5.24	1.92
Light Cars			2.66	2.56	2.77	0.22
Daewoo	Cielo	95-97	2.72	2.09	3.54	1.44
Daewoo	Lanos	97-03	3.51	2.81	4.39	1.58
Daewoo	Matiz	99-04	2.23	1.08	4.60	3.51
Daihatsu	Charade	82-86	2.99	2.25	3.98	1.73
Daihatsu	Charade	88-92	2.50	2.08	3.02	0.94
Daihatsu	Charade	93-00	2.85	2.30	3.53	1.22
Daihatsu	Mira	90-96	2.77	1.77	4.32	2.55
Daihatsu	Pyzar	97-01	1.67	0.66	4.25	3.59
Daihatsu	Sirion / Storia	98-04	2.14	1.24	3.70	2.47
Ford	Festiva WD/WH/WF	94-01	2.88	2.50	3.31	0.81
Holden	Barina SB	95-00	3.10	2.56	3.77	1.21
Holden	Barina XC	01-04	2.12	1.23	3.68	2.45
Honda	City	83-86	2.71	1.50	4.90	3.40
Hyundai	Accent	00-04	2.85	2.14	3.78	1.64
Hyundai	Excel	86-90	3.77	3.05	4.66	1.61
Hyundai	Excel	90-94	3.22	2.79	3.71	0.92
Hyundai	Excel / Accent	95-00	3.35	3.03	3.69	0.66
Hyundai	Getz	02-04	5.06	2.83	9.04	6.21
Kia	Rio	00-04	4.77	3.23	7.04	3.81
Ford / Mazda	Festiva WA / 121	87-90	2.89	2.40	3.48	1.08
Mazda	121 / Autozam Review	94-96	2.52	1.87	3.38	1.51
Mazda	121 Metro / Demio	97-02	1.97	1.37	2.83	1.46
Mitsubishi	Mirage / Colt	82-88	3.28	2.91	3.71	0.80
Nissan	Micra	95-97	2.84	1.64	4.90	3.26
Subaru	Sherpa / Fiori / 700 / Rex	89-92	2.60	1.64	4.13	2.49
Holden / Suzuki	Barina / Swift / Cultus	86-88	2.89	2.34	3.57	1.22
Holden / Suzuki	Barina / Swift / Cultus	89-99	2.85	2.52	3.23	0.71
Suzuki	Hatch / Alto	82-84	3.77	2.47	5.75	3.29
Toyota	Echo	99-04	2.60	1.94	3.50	1.56
Toyota	Starlet	96-99	2.99	2.35	3.81	1.45
Volkswagen	Polo	96-00	2.46	1.25	4.85	3.61
Small Cars			2.85	2.77	2.93	0.17
Alfa Romeo	33	83-92	1.36	0.65	2.87	2.23
Chrysler	Neon	96-99	2.18	1.08	4.41	3.32
Daewoo	Nubira	97-03	2.98	2.19	4.07	1.88
Daihatsu	Applause	89-99	3.05	2.34	3.98	1.64
Ford / Mazda	Laser / 323 / Familia	82-88	3.26	3.06	3.47	0.41
Mazda	323 / Familia / Lantis	90-93	2.67	2.19	3.25	1.06

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Mazda	323 / Familia / Lantis	95-98	2.82	2.22	3.57	1.34
Ford / Mazda	Laser / 323	99-03	2.96	2.33	3.77	1.43
Ford	Laser	91-94	3.28	2.92	3.68	0.76
Ford	Laser	95-97	3.24	2.61	4.02	1.41
Ford	Escort	82-82	2.07	1.22	3.52	2.30
Ford	Focus	02-04	4.66	2.43	8.93	6.50
Holden	Gemini	82-84	3.04	2.56	3.62	1.06
Holden	Gemini RB	86-87	3.18	2.10	4.83	2.72
Holden	Astra TR	96-98	3.78	2.51	5.67	3.15
Holden	Astra TS	98-04	3.09	2.52	3.80	1.28
Honda	Civic	82-83	2.28	1.43	3.63	2.20
Honda	Civic / Ballade / Shuttle	84-87	3.32	2.65	4.17	1.53
Honda	Civic / Shuttle	88-91	3.15	2.59	3.81	1.22
Honda	Civic	92-95	3.62	3.02	4.35	1.32
Honda	Civic	96-00	2.60	2.03	3.33	1.30
Honda	Civic	01-04	2.94	1.63	5.29	3.66
Honda	Concerto	89-93	2.97	1.77	4.97	3.20
Hyundai	Elantra	00-04	3.16	1.83	5.45	3.62
Hyundai	S Coupe	90-96	2.28	1.41	3.69	2.27
Hyundai	Lantra	91-95	3.44	2.49	4.76	2.27
Hyundai	Lantra	96-00	3.45	2.77	4.28	1.51
Mitsubishi	Lancer / Mirage CA	89-90	3.06	2.55	3.67	1.12
Mitsubishi	Lancer / Mirage CB	91-92	3.30	2.50	4.37	1.87
Mitsubishi	Lancer / Mirage CC	93-95	2.81	2.34	3.37	1.03
Mitsubishi	Lancer / Mirage CE	96-03	3.12	2.75	3.55	0.79
Mitsubishi	Cordia	83-87	4.96	3.93	6.25	2.32
Holden / Nissan	Astra / Pulsar / Langley	84-86	3.61	3.19	4.09	0.90
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	3.61	3.23	4.03	0.80
Nissan	Pulsar / Vector / Sentra	92-95	3.56	3.05	4.16	1.12
Nissan	Pulsar / Vector / Sentra	96-99	3.11	2.62	3.70	1.08
Nissan	Pulsar	00-04	3.47	2.68	4.49	1.82
Nissan	Stanza	82-83	5.59	3.42	9.13	5.71
Peugeot	306	94-01	3.15	2.09	4.75	2.66
Proton	Wira	95-96	4.29	2.89	6.37	3.49
Subaru	Impreza	93-00	4.00	3.25	4.93	1.68
Subaru	Impreza	01-04	2.39	1.19	4.80	3.61
Suzuki	Baleno / Cultus Crescent	95-02	1.44	0.82	2.54	1.72
Toyota	Corolla	82-84	2.85	2.53	3.22	0.69
Toyota	Corolla	86-88	3.31	2.99	3.66	0.67
Toyota / Holden	Corolla / Nova	89-93	3.39	3.11	3.69	0.58
Toyota / Holden	Corolla / Nova	94-97	2.91	2.59	3.28	0.68
Toyota	Corolla	98-01	3.44	2.83	4.18	1.35
Toyota	Corolla	02-04	3.50	2.63	4.66	2.03
Toyota	Tercel	83-88	2.93	1.50	5.71	4.21
Volkswagen	Golf	95-98	3.58	2.29	5.60	3.32
Volkswagen	Golf / Bora	99-04	2.88	1.84	4.51	2.68
Sports Cars			3.51	3.28	3.76	0.48
Ford	Capri	89-94	2.76	1.93	3.95	2.02
Holden	Calibra	94-97	5.14	3.11	8.51	5.41
Holden	Monaro	01-04	8.62	5.13	14.49	9.36

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Honda	CRX	87-91	4.12	2.47	6.87	4.40
Honda	Integra	86-88	2.40	1.51	3.81	2.30
Honda	Integra	90-92	4.82	3.22	7.24	4.02
Honda	Integra	93-01	2.85	1.83	4.44	2.60
Honda	Prelude	83-91	3.50	2.88	4.25	1.36
Honda	Prelude	92-96	3.14	2.20	4.49	2.29
Honda	Prelude	97-02	3.24	1.81	5.81	4.00
Hyundai	Coupe	96-00	3.06	1.79	5.26	3.47
Mazda	RX7	82-85	4.07	2.33	7.12	4.80
Mazda	RX7	86-91	3.13	1.57	6.24	4.67
Mazda	MX5 / Eunos Roadster	89-97	3.21	1.80	5.75	3.95
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	3.46	1.69	7.08	5.39
Nissan	300ZX / Fairlady Z	90-95	6.19	3.84	9.97	6.13
Nissan	Gazelle / Silvia	84-86	4.29	2.63	6.99	4.36
Nissan	Exa	83-86	6.28	3.93	10.04	6.12
Nissan	Exa	87-91	4.90	2.63	9.12	6.49
Nissan	NX/NX-R	91-96	4.99	3.23	7.73	4.50
Nissan	200SX / Silvia	94-02	4.37	2.72	7.03	4.31
Renault	Feugo	82-87	1.50	0.57	3.91	3.34
Toyota	Celica	81-85	4.35	3.49	5.41	1.92
Toyota	Celica	86-89	4.53	3.54	5.79	2.24
Toyota	Celica	90-93	4.59	3.57	5.89	2.33
Toyota	Celica	94-99	4.15	2.86	6.03	3.17
Toyota	Celica	00-04	3.61	2.34	5.56	3.21
Toyota	Paseo / Cynos	91-99	3.51	2.41	5.11	2.70
Toyota	Supra	82-90	8.19	5.36	12.52	7.16

AGGRESSIVITY RATINGS

(WITH 90% CONFIDENCE LIMITS)

NSW and Victoria Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
ALL VEHICLE AVERAGE			4.08			
Compact Four Wheel Drive Vehicles			3.60	3.33	3.88	0.55
Daihatsu	Feroza / Rocky	89-97	4.07	2.89	5.73	2.85
Daihatsu	Rocky / Rugger	85-98	6.49	4.44	9.49	5.05
Daihatsu	Terios	97-04	1.89	0.98	3.62	2.64
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99	3.92	3.31	4.66	1.35
Honda	CR-V	97-01	2.96	2.18	4.02	1.84
Honda	CR-V	02-04	4.96	3.09	7.96	4.87
Honda	HR-V	99-02	7.11	4.52	11.18	6.66
Kia	Sportage	98-03	4.39	2.71	7.11	4.40
Lada	Niva	84-99	4.76	3.17	7.15	3.98
Subaru	Forester	97-02	2.07	1.42	3.02	1.60
Suzuki	Vitara / Escudo	88-98	4.44	3.73	5.30	1.58
Toyota	RAV4	94-00	4.67	3.82	5.71	1.89
Toyota	RAV4	01-04	4.00	2.67	6.00	3.32
Medium Four Wheel Drive Vehicles			4.72	4.37	5.09	0.71
Holden / Isuzu	Jackaroo / Bighorn	82-91	6.52	5.04	8.43	3.39
Holden / Isuzu	Jackaroo / Bighorn	92-97	5.52	4.04	7.54	3.50
Holden / Isuzu	Jackaroo / Bighorn	98-02	5.65	3.66	8.72	5.06
Jeep	Cherokee XJ	96-00	4.90	3.73	6.43	2.70
Land Rover	Defender	92-04	5.33	3.24	8.78	5.54
Land Rover	Discovery	91-02	4.63	3.21	6.69	3.48
Mitsubishi	Pajero	82-90	5.98	5.01	7.13	2.12
Mitsubishi	Pajero	92-99	5.26	4.47	6.19	1.72
Nissan	Pathfinder / Terrano	88-94	5.76	4.40	7.54	3.14
Nissan	Pathfinder / Terrano	95-02	5.02	3.54	7.14	3.60
Large Four Wheel Drive Vehicles			6.09	5.83	6.36	0.53
Ford	Explorer	00-01	2.82	1.55	5.13	3.58
Land Rover	Range Rover	82-94	7.50	5.75	9.77	4.01
Nissan	Patrol / Safari	82-87	7.06	5.83	8.56	2.73
Nissan / Ford	Patrol / Maverick / Safari	88-97	5.84	5.27	6.46	1.19
Nissan	Patrol / Safari	98-04	6.99	5.88	8.30	2.43
Toyota	Landcruiser	82-89	7.60	6.95	8.31	1.36
Toyota	Landcruiser	90-97	7.20	6.64	7.80	1.16
Toyota	Landcruiser	98-04	6.30	5.45	7.27	1.82

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Commercial Vehicles- Vans			5.02	4.77	5.29	0.52
Daihatsu	Handivan	82-90	2.44	1.58	3.77	2.19
Ford	Falcon Panel Van	82-95	4.23	3.60	4.98	1.38
Ford	Falcon Panel Van	96-99	4.27	2.74	6.66	3.92
Ford	Transit	95-00	4.88	3.54	6.73	3.19
Holden / Suzuki	Scurry / Carry	82-00	3.22	2.01	5.17	3.16
Holden	Shuttle / WFR Van	82-87	4.29	2.81	6.55	3.74
Honda	Acty	83-86	1.96	0.97	3.98	3.01
Mercedes Benz	Vito	99-04	7.47	4.56	12.25	7.70
Toyota	Hiace/Liteace	82-86	6.59	5.87	7.41	1.54
Toyota	Hiace/Liteace	87-89	6.14	5.28	7.14	1.86
Toyota	Hiace/Liteace	90-95	6.33	5.66	7.08	1.42
Toyota	Hiace/Liteace	96-04	6.09	5.25	7.08	1.83
Volkswagen	Caravelle / Transporter	95-04	6.98	5.00	9.76	4.77
Commercial Vehicles- Utes			4.75	4.59	4.90	0.31
Ford / Mazda	Courier / B-Series / Bounty	98-02	4.18	3.08	5.68	2.59
Ford / Nissan	Falcon Ute / XFN Ute	82-95	5.04	4.57	5.55	0.99
Ford	Falcon Ute	96-99	5.13	4.12	6.38	2.25
Ford	Falcon Ute AU	00-02	5.44	4.35	6.80	2.46
Ford	Ford F-Series	82-92	7.91	6.17	10.14	3.97
Holden	Commodore Ute VG/VP	90-93	3.33	2.51	4.40	1.89
Holden	Commodore Ute VR/VS	94-00	5.07	4.48	5.75	1.27
Holden	Commodore VU Ute	00-02	5.93	4.51	7.80	3.29
Holden	Commodore VY/VZ Ute	02-04	7.49	5.29	10.61	5.31
Holden / Isuzu	Rodeo / Pickup	82-85	5.37	3.92	7.37	3.45
Holden / Isuzu	Rodeo / Pickup	86-88	3.78	2.25	6.35	4.09
Holden / Isuzu	Rodeo / Pickup	89-95	5.97	5.36	6.65	1.29
Holden	Rodeo	96-98	5.45	4.55	6.52	1.97
Holden	Rodeo	99-02	5.55	4.55	6.78	2.23
Holden	Rodeo	03-04	4.50	2.72	7.43	4.70
Holden	WB Series	82-85	5.42	4.31	6.81	2.50
Kia	Ceres	92-00	3.83	2.53	5.79	3.26
Nissan	720 Ute	82-85	4.15	3.19	5.39	2.20
Nissan	Navara	86-91	5.17	4.51	5.94	1.43
Nissan	Navara	92-96	5.23	4.29	6.37	2.07
Nissan	Navara	97-04	5.99	4.64	7.73	3.09
Subaru	Brumby	82-92	4.31	3.29	5.63	2.34
Suzuki	Mighty Boy	85-88	2.11	1.12	3.99	2.87
Toyota	4Runner/Hilux	82-85	6.27	5.53	7.10	1.58
Toyota	4Runner/Hilux	86-88	5.63	4.95	6.40	1.46
Toyota	4Runner/Hilux	89-97	5.34	4.98	5.73	0.74
Toyota	Hilux	98-02	5.61	4.85	6.49	1.63
Toyota	Hilux	03-04	8.25	5.06	13.44	8.38
Large Cars			3.74	3.67	3.82	0.15
Ford	Falcon XE/XF	82-88	4.50	4.30	4.71	0.41
Ford	Falcon EA / Falcon EB Series I	88-Mar 92	4.40	4.18	4.63	0.45

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Ford	Falcon EB Series II / Falcon ED	Apr 92-94	4.42	4.10	4.75	0.65
Ford	Falcon EF/EL	94-98	4.39	4.16	4.64	0.48
Ford	Falcon AU	98-02	4.35	4.01	4.70	0.69
Ford	Taurus	96-98	4.44	2.82	6.99	4.17
Ford	Falcon BA	02-04	4.71	3.81	5.83	2.01
Holden / Toyota	Commodore VN/VP / Lexcen	89-93	3.85	3.66	4.05	0.39
Holden / Toyota	Commodore VR/VS / Lexcen	93-97	3.96	3.74	4.18	0.44
Holden	Commodore VT/VX	97-02	4.66	4.37	4.98	0.61
Holden	Commodore VY/VZ	02-04	4.31	3.50	5.29	1.79
Holden	Commodore VB-VL	82-88	4.18	3.98	4.40	0.42
Hyundai	Sonata	98-01	2.79	1.74	4.45	2.71
Hyundai	Sonata	89-97	4.19	3.52	4.99	1.47
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90	4.07	3.81	4.34	0.53
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03	4.01	3.64	4.41	0.77
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96	4.03	3.76	4.32	0.56
Nissan	Skyline	83-88	4.12	3.60	4.71	1.11
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97	4.12	3.84	4.43	0.59
Toyota	Camry	98-02	4.54	4.12	5.00	0.88
Toyota	Avalon	00-04	6.00	4.67	7.71	3.05
Toyota	Camry	02-04	3.57	2.33	5.45	3.12
Luxury Cars			3.38	3.25	3.52	0.27
Audi	A4	95-01	3.97	2.43	6.50	4.07
BMW	3 Series E30	82-91	3.60	2.98	4.35	1.37
BMW	3 Series E36	92-98	3.52	2.97	4.19	1.22
BMW	3 Series E46	99-04	3.88	2.88	5.23	2.34
BMW	5 Series E28	82-88	4.82	3.42	6.78	3.36
BMW	5 Series E34	89-95	3.57	2.52	5.08	2.56
BMW	5 Series E39	96-03	3.11	1.97	4.92	2.95
Ford	Fairlane Z & LTD F	82-87	4.14	3.66	4.68	1.02
Ford	Fairlane N & LTD D	88-94	4.14	3.51	4.87	1.36
Ford	Fairlane N & LTD D	95-98	5.08	3.95	6.54	2.59
Ford	Fairlane & LTD AU	99-02	3.57	2.37	5.39	3.03
Holden	Stateman/Caprice VQ	90-93	4.93	3.57	6.79	3.22
Holden	Stateman/Caprice VR/VS	94-98	3.98	3.27	4.85	1.58
Holden	Statesman/Caprice WH	99-03	3.75	2.48	5.68	3.20
Honda	Accord	82-85	2.79	2.25	3.45	1.19
Honda	Accord	86-90	3.64	3.03	4.38	1.35
Honda	Accord	91-93	2.49	1.85	3.35	1.50
Honda	Accord	94-98	3.64	2.95	4.49	1.54
Honda	Accord	99-02	3.28	2.00	5.37	3.37
Honda	Legend	86-95	5.36	3.97	7.26	3.29
Jaguar	XJ6	82-86	7.74	4.92	12.19	7.27
Jaguar	XJ6	87-94	4.66	2.76	7.86	5.09
Lexus	ES300 / Windom	92-01	3.60	2.29	5.64	3.35
Mazda	929 / Luce	82-90	3.80	3.18	4.53	1.35
Mercedes Benz	C-Class W201	87-93	2.96	1.89	4.64	2.75
Mercedes Benz	C-Class W202	95-00	2.53	1.75	3.66	1.91

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Mercedes Benz	E-Class W124	86-94	4.61	3.44	6.17	2.73
Mercedes Benz	E-Class W210	96-02	4.62	3.09	6.91	3.82
Mercedes Benz	S-Class W126	82-92	3.39	2.25	5.09	2.84
Nissan	Maxima	90-94	4.21	3.11	5.69	2.57
Nissan	Maxima / Cefiro	95-99	3.08	2.25	4.22	1.97
Peugeot	405	89-97	2.97	1.97	4.49	2.52
Peugeot	505	82-93	3.81	2.49	5.83	3.35
Saab	900 Series	82-92	2.04	1.27	3.29	2.02
Saab	900/9-3	94-02	3.99	2.82	5.65	2.83
Saab	9000	86-97	3.18	2.15	4.72	2.57
Toyota	Crown / Cressida / Mark II	82-85	4.68	3.86	5.68	1.82
Toyota	Crown / Cressida / Mark II	86-88	4.14	2.98	5.75	2.77
Toyota	Cressida / Mark II	89-93	3.19	2.48	4.09	1.60
Volvo	850/S70/V70/C70	92-04	5.31	4.18	6.74	2.55
Volvo	200 Series	82-93	3.74	3.06	4.57	1.51
Volvo	700/900 Series	84-92	4.18	3.28	5.32	2.04
Volvo	S40/V40	97-04	3.76	2.10	6.72	4.62
Medium Cars			3.28	3.19	3.37	0.18
Daewoo	Espero	95-97	3.67	2.45	5.48	3.02
Daewoo	Leganza	97-04	4.41	2.79	6.98	4.19
Ford	Cortina	82-82	3.90	3.29	4.63	1.34
Ford	Mondeo	95-01	3.87	3.07	4.86	1.79
Holden	Camira	82-89	4.05	3.73	4.40	0.67
Holden	Vectra	97-03	3.75	3.06	4.59	1.53
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86	3.55	3.21	3.92	0.70
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91	3.87	3.42	4.38	0.97
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97	3.05	2.65	3.52	0.86
Mazda	626	98-02	3.81	2.89	5.02	2.13
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84	3.65	3.35	3.97	0.62
Mitsubishi	Galant	95-96	3.55	2.75	4.58	1.82
Nissan	Pintara	86-88	4.23	3.67	4.88	1.21
Nissan	Bluebird	82-86	3.38	3.07	3.72	0.65
Nissan / Ford	Pintara / Corsair / Bluebird	89-92	3.92	3.52	4.37	0.85
Nissan	Bluebird	93-97	3.03	2.38	3.86	1.48
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93	3.09	2.68	3.55	0.87
Subaru	Liberty / Legacy	89-93	3.71	3.22	4.27	1.05
Subaru	Liberty / Legacy / Outback	94-98	4.03	3.24	5.02	1.78
Subaru	Liberty / Legacy / Outback	99-03	3.59	2.72	4.75	2.03
Toyota	Camry	83-86	3.61	3.06	4.26	1.20
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92	3.90	3.66	4.16	0.50
Toyota	Corona	82-88	3.66	3.39	3.95	0.56
People Movers			4.42	4.16	4.70	0.54
Chrysler	Voyager	97-04	7.02	4.39	11.24	6.85
Honda	Odyssey	95-00	5.01	3.31	7.58	4.28
Kia	Carnival	99-04	5.56	3.41	9.08	5.67

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91	3.03	2.03	4.53	2.50
Mitsubishi	Nimbus / Chariot	92-98	3.61	2.47	5.27	2.80
Mitsubishi	Starwagon / L300	83-86	6.01	5.15	7.02	1.87
Mitsubishi	Starwagon / Delica Starwagon	87-93	5.45	4.80	6.19	1.40
Mitsubishi	Starwagon / Delica Spacegear	95-98	5.06	3.97	6.46	2.49
Mitsubishi	Starwagon / Delica Spacegear	98-04	5.49	3.74	8.04	4.29
Nissan	Prairie	84-86	4.34	2.78	6.79	4.01
Toyota	Tarago	83-89	4.69	4.06	5.40	1.34
Toyota	Tarago / Previa / Estima	91-99	4.17	3.44	5.04	1.60
Light Cars			2.66	2.57	2.75	0.18
Daewoo	Cielo	95-97	2.72	2.18	3.39	1.20
Daewoo	Lanos	97-03	3.51	2.92	4.24	1.32
Daewoo	Matiz	99-04	2.23	1.22	4.09	2.87
Daihatsu	Charade	82-86	2.99	2.36	3.80	1.44
Daihatsu	Charade	88-92	2.50	2.14	2.93	0.79
Daihatsu	Charade	93-00	2.85	2.39	3.41	1.02
Daihatsu	Mira	90-96	2.77	1.91	4.02	2.11
Daihatsu	Pyzar	97-01	1.67	0.76	3.65	2.88
Daihatsu	Sirion / Storia	98-04	2.14	1.35	3.39	2.03
Ford	Festiva WD/WH/WF	94-01	2.88	2.56	3.24	0.68
Holden	Barina SB	95-00	3.10	2.64	3.65	1.01
Holden	Barina XC	01-04	2.12	1.34	3.36	2.02
Honda	City	83-86	2.71	1.65	4.45	2.80
Hyundai	Accent	00-04	2.85	2.25	3.61	1.36
Hyundai	Excel	86-90	3.77	3.16	4.50	1.35
Hyundai	Excel	90-94	3.22	2.85	3.62	0.77
Hyundai	Excel / Accent	95-00	3.35	3.08	3.63	0.55
Hyundai	Getz	02-04	5.06	3.11	8.22	5.11
Kia	Rio	00-04	4.77	3.44	6.60	3.16
Ford / Mazda	Festiva WA / 121	87-90	2.89	2.47	3.37	0.90
Mazda	121 / Autozam Review	94-96	2.52	1.97	3.22	1.25
Mazda	121 Metro / Demio	97-02	1.97	1.45	2.67	1.21
Mitsubishi	Mirage / Colt	82-88	3.28	2.97	3.63	0.67
Nissan	Micra	95-97	2.84	1.80	4.48	2.69
Subaru	Sherpa / Fiori / 700 / Rex	89-92	2.60	1.77	3.83	2.06
Holden / Suzuki	Barina / Swift / Cultus	86-88	2.89	2.43	3.45	1.02
Holden / Suzuki	Barina / Swift / Cultus	89-99	2.85	2.57	3.16	0.59
Suzuki	Hatch / Alto	82-84	3.77	2.64	5.37	2.73
Toyota	Echo	99-04	2.60	2.03	3.34	1.30
Toyota	Starlet	96-99	2.99	2.45	3.66	1.21
Volkswagen	Polo	96-00	2.46	1.39	4.34	2.95
Small Cars			2.85	2.78	2.92	0.14
Alfa Romeo	33	83-92	1.36	0.73	2.55	1.81
Chrysler	Neon	96-99	2.18	1.21	3.93	2.71
Daewoo	Nubira	97-03	2.98	2.30	3.87	1.56
Daihatsu	Applause	89-99	3.05	2.45	3.81	1.37
Ford / Mazda	Laser / 323 / Familia	82-88	3.26	3.09	3.44	0.34
Mazda	323 / Familia / Lantis	90-93	2.67	2.26	3.15	0.89

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Mazda	323 / Familia / Lantis	95-98	2.82	2.31	3.43	1.12
Ford / Mazda	Laser / 323	99-03	2.96	2.43	3.62	1.20
Ford	Laser	91-94	3.28	2.98	3.61	0.63
Ford	Laser	95-97	3.24	2.70	3.88	1.18
Ford	Escort	82-82	2.07	1.33	3.23	1.90
Ford	Focus	02-04	4.66	2.70	8.03	5.33
Holden	Gemini	82-84	3.04	2.63	3.52	0.89
Holden	Gemini RB	86-87	3.18	2.25	4.51	2.26
Holden	Astra TR	96-98	3.78	2.69	5.30	2.62
Holden	Astra TS	98-04	3.09	2.60	3.67	1.07
Honda	Civic	82-83	2.28	1.55	3.37	1.82
Honda	Civic / Ballade / Shuttle	84-87	3.32	2.75	4.02	1.27
Honda	Civic / Shuttle	88-91	3.15	2.68	3.70	1.02
Honda	Civic	92-95	3.62	3.11	4.22	1.10
Honda	Civic	96-00	2.60	2.12	3.20	1.08
Honda	Civic	01-04	2.94	1.80	4.81	3.01
Honda	Concerto	89-93	2.97	1.93	4.57	2.64
Hyundai	Elantra	00-04	3.16	2.00	4.99	2.99
Hyundai	S Coupe	90-96	2.28	1.53	3.41	1.88
Hyundai	Lantra	91-95	3.44	2.62	4.51	1.89
Hyundai	Lantra	96-00	3.45	2.87	4.13	1.26
Mitsubishi	Lancer / Mirage CA	89-90	3.06	2.63	3.57	0.94
Mitsubishi	Lancer / Mirage CB	91-92	3.30	2.61	4.17	1.56
Mitsubishi	Lancer / Mirage CC	93-95	2.81	2.41	3.27	0.86
Mitsubishi	Lancer / Mirage CE	96-03	3.12	2.81	3.47	0.66
Mitsubishi	Cordia	83-87	4.96	4.08	6.02	1.93
Holden / Nissan	Astra / Pulsar / Langley	84-86	3.61	3.25	4.01	0.76
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90	3.61	3.29	3.96	0.67
Nissan	Pulsar / Vector / Sentra	92-95	3.56	3.13	4.06	0.93
Nissan	Pulsar / Vector / Sentra	96-99	3.11	2.69	3.60	0.90
Nissan	Pulsar	00-04	3.47	2.79	4.31	1.52
Nissan	Stanza	82-83	5.59	3.71	8.43	4.72
Peugeot	306	94-01	3.15	2.23	4.44	2.21
Proton	Wira	95-96	4.29	3.08	5.97	2.89
Subaru	Impreza	93-00	4.00	3.36	4.76	1.40
Subaru	Impreza	01-04	2.39	1.33	4.28	2.95
Suzuki	Baleno / Cultus Crescent	95-02	1.44	0.90	2.32	1.42
Toyota	Corolla	82-84	2.85	2.58	3.15	0.58
Toyota	Corolla	86-88	3.31	3.04	3.60	0.56
Toyota / Holden	Corolla / Nova	89-93	3.39	3.15	3.64	0.48
Toyota / Holden	Corolla / Nova	94-97	2.91	2.64	3.21	0.57
Toyota	Corolla	98-01	3.44	2.92	4.05	1.13
Toyota	Corolla	02-04	3.50	2.75	4.44	1.69
Toyota	Tercel	83-88	2.93	1.67	5.12	3.45
Volkswagen	Golf	95-98	3.58	2.46	5.21	2.75
Volkswagen	Golf / Bora	99-04	2.88	1.98	4.19	2.22
Sports Cars			3.51	3.32	3.72	0.40
Ford	Capri	89-94	2.76	2.05	3.73	1.68
Holden	Calibra	94-97	5.14	3.37	7.84	4.47
Holden	Monaro	01-04	8.62	5.58	13.31	7.73

Make	Model of Car	Years of Manufacture	Serious injury rate per 100 drivers involved	Lower 90% Confidence Limit	Upper 90% Confidence Limit	Width of Confidence Interval
Honda	CRX	87-91	4.12	2.69	6.32	3.63
Honda	Integra	86-88	2.40	1.63	3.53	1.90
Honda	Integra	90-92	4.82	3.44	6.77	3.34
Honda	Integra	93-01	2.85	1.97	4.13	2.16
Honda	Prelude	83-91	3.50	2.98	4.11	1.14
Honda	Prelude	92-96	3.14	2.33	4.23	1.91
Honda	Prelude	97-02	3.24	1.99	5.28	3.29
Hyundai	Coupe	96-00	3.06	1.95	4.81	2.86
Mazda	RX7	82-85	4.07	2.55	6.50	3.95
Mazda	RX7	86-91	3.13	1.76	5.58	3.82
Mazda	MX5 / Eunos Roadster	89-97	3.21	1.98	5.23	3.25
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97	3.46	1.90	6.30	4.40
Nissan	300ZX / Fairlady Z	90-95	6.19	4.15	9.22	5.07
Nissan	Gazelle / Silvia	84-86	4.29	2.85	6.45	3.60
Nissan	Exa	83-86	6.28	4.24	9.30	5.06
Nissan	Exa	87-91	4.90	2.91	8.24	5.33
Nissan	NX/NX-R	91-96	4.99	3.47	7.19	3.73
Nissan	200SX / Silvia	94-02	4.37	2.94	6.50	3.57
Renault	Feugo	82-87	1.50	0.67	3.34	2.67
Toyota	Celica	81-85	4.35	3.62	5.22	1.60
Toyota	Celica	86-89	4.53	3.69	5.56	1.87
Toyota	Celica	90-93	4.59	3.72	5.66	1.94
Toyota	Celica	94-99	4.15	3.04	5.67	2.63
Toyota	Celica	00-04	3.61	2.51	5.18	2.67
Toyota	Paseo / Cynos	91-99	3.51	2.56	4.80	2.24
Toyota	Supra	82-90	8.19	5.74	11.68	5.94

APPENDIX 6

PRESENTATION OF CRASHWORTHINESS AND AGGRESSIVITY RATINGS FOR CONSUMER INFORMATION

CRASHWORTHINESS AND AGGRESSIVITY RATINGS

Victoria and NSW Data (1987-2004), Queensland, Western Australia and New Zealand Data (1991-2004)

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Compact Four Wheel Drive Vehicles								+
Daihatsu	Feroza / Rocky	89-97						o
Daihatsu	Rocky / Rugger	85-98						x
Daihatsu	Terios	97-04						+
Holden / Suzuki	Drover / Sierra / Samurai / SJ410 / SJ413	82-99						o
Honda	CR-V	97-01						+
Honda	CR-V	02-04						o
Honda	HR-V	99-02						x
Lada	Niva	84-99						o
Nissan	X-Trail	01-04						
Subaru	Forester	97-02						++
Subaru	Forester	02-04						
Suzuki	Vitara / Escudo	88-98						o
Toyota	RAV4	94-00						o
Toyota	RAV4	01-04						o
Medium Four Wheel Drive Vehicles								x
Holden / Isuzu	Jackaroo / Bighorn	82-91						xx
Holden / Isuzu	Jackaroo / Bighorn	92-97						o
Holden / Isuzu	Jackaroo / Bighorn	98-02						o
Jeep	Cherokee XJ	96-00						o
Land Rover	Defender	92-04						o
Land Rover	Discovery	91-02						o
Mitsubishi	Pajero	82-90						xx
Mitsubishi	Pajero	92-99						x
Mitsubishi	Pajero NM / NP	00-04						
Mitsubishi	Challenger	98-04						
Nissan	Pathfinder / Terrano	88-94						x
Nissan	Pathfinder / Terrano	95-02						o
Large Four Wheel Drive Vehicle								xx
Ford	Explorer	00-01						o
Land Rover	Range Rover	82-94						xx
Nissan	Patrol / Safari	82-87						xx
Nissan / Ford	Patrol / Maverick / Safari	88-97						xx

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Nissan	Patrol / Safari	98-04						xx
Toyota	Landcruiser	82-89						xx
Toyota	Landcruiser	90-97						xx
Toyota	Landcruiser	98-04						xx
Commercial Vehicles- Vans								xx
Daihatsu	Handivan	82-90						+
Daihatsu	Hi-Jet	82-90						
Ford	Falcon Panel Van	82-95						o
Ford	Falcon Panel Van	96-99						o
Ford	Transit	95-00						o
Holden	Shuttle / WFR Van	82-87						o
Holden / Suzuki	Scurry / Carry	82-00						o
Honda	Acty	83-86						+
Toyota	Hiace/Liteace	82-86						xx
Toyota	Hiace/Liteace	87-89						xx
Toyota	Hiace/Liteace	90-95						xx
Toyota	Hiace/Liteace	96-04						xx
Volkswagen	Caravelle / Transporter	95-04						xx
Commercial Vehicles- Utes								x
Ford / Mazda	Courier / B-Series / Bounty	98-02						o
Ford / Nissan	Falcon Ute / XFN Ute	82-95						x
Ford	Falcon Ute	96-99						x
Ford	Falcon Ute AU	00-02						x
Ford	Falcon Ute BA	03-04						
Ford	Ford F-Series	82-92						xx
Holden	Commodore Ute VG/VP	90-93						o
Holden	Commodore Ute VR/VS	94-00						x
Holden	Commodore VU Ute	00-02						x
Holden	Commodore VY/VZ Ute	02-04						xx
Holden / Isuzu	Rodeo / Pickup	82-85						o
Holden / Isuzu	Rodeo / Pickup	86-88						o
Holden / Isuzu	Rodeo / Pickup	89-95						xx
Holden	Rodeo	96-98						x
Holden	Rodeo	99-02						x
Holden	Rodeo	03-04						o
Holden	WB Series	82-85						x
Kia	Ceres	92-00						o
Nissan	720 Ute	82-85						o
Nissan	Navara	86-91						x
Nissan	Navara	92-96						x
Nissan	Navara	97-04						x
Subaru	Brumby	82-92						o
Suzuki	Mighty Boy	85-88						+

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Toyota	4Runner/Hilux	82-85						xx
Toyota	4Runner/Hilux	86-88						xx
Toyota	4Runner/Hilux	89-97						xx
Toyota	Hilux	98-02						xx
Large Cars								+
Ford	Falcon XE/XF	82-88						x
Ford	Falcon EA / Falcon EB Series I	88-Mar 92						x
Ford	Falcon EB Series II / Falcon ED	Apr 92-94						x
Ford	Falcon EF/EL	94-98						x
Ford	Falcon AU	98-02						o
Ford	Falcon BA	02-04						o
Ford	Taurus	96-98						o
Holden / Toyota	Commodore VN/VP / Lexcen	89-93						+
Holden / Toyota	Commodore VR/VS / Lexcen	93-97						o
Holden	Commodore VT/VX	97-02						x
Holden	Commodore VY/VZ	02-04						o
Holden	Commodore VB-VL	82-88						o
Hyundai	Sonata	98-01						o
Hyundai	Sonata	89-97						o
Mitsubishi	Magna TM/TN/TP / Sigma / V3000	85-90						o
Mitsubishi	Magna TE/TF/TH/TJ / Verada KE/KF/KH/KJ / Diamante	96-03						o
Mitsubishi	Magna TR/TS / Verada KR/KS / V3000 / Diamante	91-96						o
Nissan	Skyline	83-88						o
Holden / Toyota	Apollo JM/JP / Camry / Sceptor	93-97						o
Toyota	Camry	98-02						x
Toyota	Camry	02-04						o
Toyota	Avalon	00-04						x
Luxury Cars								+
Audi	A4	95-01						o
BMW	3 Series E30	82-91						o
BMW	3 Series E36	92-98						o
BMW	3 Series E46	99-04						o
BMW	5 Series E28	82-88						o
BMW	5 Series E34	89-95						o
BMW	5 Series E39	96-03						o
Ford	Fairlane Z & LTD F	82-87						o

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Ford	Fairlane N & LTD D	88-94						o
Ford	Fairlane N & LTD D	95-98						o
Ford	Fairlane & LTD AU	99-02						o
Holden	Statesman/Caprice WB	82-85						
Holden	Stateman/Caprice VQ	90-93						o
Holden	Stateman/Caprice VR/VS	94-98						o
Holden	Statesman/Caprice WH	99-03						o
Honda	Legend	86-95						o
Honda	Accord	82-85						++
Honda	Accord	86-90						o
Honda	Accord	91-93						++
Honda	Accord	94-98						o
Honda	Accord	99-02						o
Jaguar	XJ6	82-86						xx
Jaguar	XJ6	87-94						o
Lexus	ES300 / Windom	92-01						o
Mazda	929 / Luce	82-90						o
Mazda	929 / Sentia / Efini MS-9	92-96						
Mercedes Benz	C-Class W201	87-93						o
Mercedes Benz	C-Class W202	95-00						+
Mercedes Benz	E-Class W123	82-85						
Mercedes Benz	E-Class W124	86-94						o
Mercedes Benz	E-Class W210	96-02						o
Mercedes Benz	S-Class W126	82-92						o
Nissan	Maxima	90-94						o
Nissan	Maxima / Cefiro	95-99						o
Peugeot	405	89-97						o
Peugeot	505	82-93						o
Peugeot	406	96-04						
Saab	900 Series	82-92						++
Saab	900/9-3	94-02						o
Saab	9000	86-97						o
Toyota	Crown / Cressida / Mark II	82-85						o
Toyota	Crown / Cressida / Mark II	86-88						o
Toyota	Cressida / Mark II	89-93						o
Volkswagen	Passat	98-04						
Volvo	850/S70/V70/C70	92-04						x
Volvo	200 Series	82-93						o
Volvo	300 Series	84-88						
Volvo	700/900 Series	84-92						o
Volvo	S40/V40	97-04						o
Medium Cars								++
Daewoo	Espero	95-97						o
Daewoo	Leganza	97-04						o
Ford	Mondeo	95-01						o

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Ford / Mazda	Telstar / 626 / MX6 / Capella	83-86						+
Ford / Mazda	Telstar / 626 / MX6 / Capella	88-91						o
Ford / Mazda	Telstar / 626 / MX6 / Capella / Cronos	92-97						+
Mazda	626	98-02						o
Holden	Camira	82-89						o
Holden	Vectra	97-03						o
Mitsubishi	Sigma / Galant / Sapporo / Lambda	82-84						+
Mitsubishi	Galant	95-96						o
Nissan	Pintara	86-88						o
Nissan / Ford	Pintara / Corsair / Bluebird	89-92						o
Nissan	Bluebird	82-86						+
Nissan	Bluebird	93-97						+
Subaru	1800 / Leone / Omega / 4WD Wagon	82-93						+
Subaru	Liberty / Legacy	89-93						o
Subaru	Liberty / Legacy / Outback	94-98						o
Subaru	Liberty / Legacy / Outback	99-03						o
Toyota	Camry	83-86						o
Holden / Toyota	Apollo JK/JL / Camry / Vista	88-92						o
Toyota	Corona	82-88						+
People Movers								x
Chrysler	Voyager	97-04						x
Honda	Odyssey	95-00						o
Kia	Carnival	99-04						o
Mitsubishi	Nimbus / Chariot / Spacewagon	85-91						o
Mitsubishi	Nimbus / Chariot	92-98						o
Mitsubishi	Starwagon / L300	83-86						xx
Mitsubishi	Starwagon / Delica Starwagon	87-93						xx
Mitsubishi	Starwagon / Delica Spacegear	95-98						o
Mitsubishi	Starwagon / Delica Spacegear	98-04						o
Nissan	Prairie	84-86						o
Toyota	Tarago	83-89						o
Toyota	Tarago / Previa / Estima	91-99						o
Light Cars								++
Daewoo	1.5i	94-95						
Daewoo	Cielo	95-97						++

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Daewoo	Lanos	97-03						o
Daewoo	Matiz	99-04						o
Daihatsu	Charade	82-86						+
Daihatsu	Charade	88-92						++
Daihatsu	Charade	93-00						++
Daihatsu	Mira	90-96						+
Daihatsu	Pyzar	97-01						+
Daihatsu	Sirion / Storia	98-04						++
Ford	Festiva WD/WH/WF	94-01						++
Ford	Ka	99-04						
Holden	Barina XC	01-04						++
Holden	Barina SB	95-00						+
Honda	City	83-86						o
Hyundai	Excel	86-90						o
Hyundai	Excel	90-94						+
Hyundai	Excel / Accent	95-00						+
Hyundai	Getz	02-04						o
Hyundai	Accent	00-04						+
Kia	Rio	00-04						o
Mitsubishi	Mirage / Colt	82-88						+
Ford / Mazda	Festiva WA / 121	87-90						++
Mazda	121 / Autozam Review	94-96						++
Mazda	121 Metro / Demio	97-02						++
Nissan	Micra	95-97						o
Peugoet	205	87-94						
Subaru	Sherpa / Fiori / 700 / Rex	89-92						+
Suzuki	Swift	82-85						
Holden / Suzuki	Barina / Swift / Cultus	86-88						++
Holden / Suzuki	Barina / Swift / Cultus	89-99						++
Suzuki	Hatch / Alto	82-84						o
Suzuki	Alto	85-00						
Suzuki	Ignis	00-02						
Toyota	Starlet	96-99						+
Toyota	Echo	99-04						++
Volkswagen	Polo	96-00						o
Small Cars								++
Alfa Romeo	33	83-92						++
Chrysler	Neon	96-99						+
Daewoo	Nubira	97-03						+
Daihatsu	Applause	89-99						+
Fiat	Regata	84-88						
Ford	Focus	02-04						o
Ford / Mazda	Laser / 323 / Familia	82-88						++
Mazda	323 / Familia / Lantis	90-93						++
Mazda	323 / Familia / Lantis	95-98						++

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Ford / Mazda	Laser / 323	99-03						+
Ford	Laser	91-94						+
Ford	Laser	95-97						+
Holden	Gemini	82-84						+
Holden	Gemini RB	86-87						o
Holden	Astra TR	96-98						o
Holden	Astra TS	98-04						+
Holden / Nissan	Astra / Pulsar / Langley	84-86						+
Holden / Nissan	Astra / Pulsar / Vector / Sentra	88-90						+
Honda	Civic	82-83						++
Honda	Civic / Ballade / Shuttle	84-87						+
Honda	Civic / Shuttle	88-91						+
Honda	Civic	92-95						o
Honda	Civic	96-00						++
Honda	Civic	01-04						o
Honda	Concerto	89-93						o
Hyundai	Elantra	00-04						o
Hyundai	S Coupe	90-96						++
Hyundai	Lantra	91-95						o
Hyundai	Lantra	96-00						o
Nissan	Pulsar / Vector / Sentra	92-95						+
Nissan	Pulsar / Vector / Sentra	96-99						+
Nissan	Stanza	82-83						o
Nissan	Pulsar	00-04						o
Mitsubishi	Lancer / Mirage CA	89-90						+
Mitsubishi	Lancer / Mirage CB	91-92						o
Mitsubishi	Lancer / Mirage CC	93-95						++
Mitsubishi	Lancer / Mirage CE	96-03						+
Mitsubishi	Cordia	83-87						x
Peugeot	306	94-01						o
Proton	Wira	95-96						o
Renault	19	91-96						
Rover	Quintet	82-86						
Subaru	Impreza	93-00						o
Subaru	Impreza	01-04						o
Suzuki	Baleno / Cultus Crescent	95-02						++
Toyota	Corolla	82-84						++
Toyota	Corolla	86-88						+
Toyota / Holden	Corolla / Nova	89-93						+
Toyota / Holden	Corolla / Nova	94-97						++
Toyota	Corolla	98-01						+
Toyota	Corolla	02-04						o
Toyota	Corolla 4WD Wagon	92-96						
Toyota	Tercel	83-88						o
Volkswagen	Golf	82-94						
Volkswagen	Golf	95-98						o

Make	Model of Car	Years of Manufacture	CRASHWORTHINESS					AGGRESSIVITY
			Significantly less than 15% better than average	Significantly better than average but not significantly less than 15% better than average	Not significantly different from average	Significantly worse than average but not significantly greater than 15% worse than average	Significantly greater than 15% worse than average	++ = Much better than average + = Better than average o = Average x = Worse than average xx = Much worse than average
Volkswagen	Golf / Bora	99-04						o
Sports Cars								+
Alfa Romeo	GTV	82-84						
Ford	Capri	89-94						+
Holden	Calibra	94-97						o
Honda	CRX	87-91						o
Honda	CRX	92-98						
Honda	Integra	86-88						+
Honda	Integra	90-92						o
Honda	Integra	93-01						o
Honda	Prelude	83-91						o
Honda	Prelude	92-96						o
Honda	Prelude	97-02						o
Hyundai	Coupe	96-00						o
Mazda	RX7	82-85						o
Mazda	RX7	86-91						o
Mazda	MX5 / Eunos Roadster	89-97						o
Mazda	Eunos 30X / Presso / MX-3 / Autozam AZ-3	90-97						o
Mitsubishi	Starion	82-87						
Nissan	300ZX / Fairlady Z	90-95						x
Nissan	Gazelle / Silvia	84-86						o
Nissan	Exa	83-86						x
Nissan	Exa	87-91						o
Nissan	NX/NX-R	91-96						o
Nissan	200SX / Silvia	94-02						o
Renault	Feugo	82-87						++
Toyota	Celica	81-85						o
Toyota	Celica	86-89						o
Toyota	Celica	90-93						o
Toyota	Celica	94-99						o
Toyota	MR2	87-90						
Toyota	MR2	91-00						
Toyota	Paseo / Cynos	91-99						o
Toyota	Supra	82-90						xx

APPENDIX 7

CRASHWORTHINESS, INJURY RISK AND INJURY SEVERITY ESTIMATES BY YEAR OF VEHICLE MANUFACTURE FOR THE AUSTRALIAN VEHICLE FLEET

INJURY RISK BY YEAR OF VEHICLE MANUFACTURE

Year of Manufacture	Coefficient of Car Year	Standard Error of Coefficient	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**-1.5456**		**17.57**			
1964	0.3457	0.0496	23.15	21.46	24.92	3.46
1965	0.3998	0.0560	24.13	22.17	26.19	4.02
1966	0.2651	0.0493	21.75	20.15	23.44	3.29
1967	0.3060	0.0395	22.45	21.13	23.83	2.70
1968	0.2909	0.0349	22.19	21.03	23.39	2.36
1969	0.2935	0.0311	22.23	21.20	23.30	2.11
1970	0.2911	0.0236	22.19	21.40	23.00	1.60
1971	0.2290	0.0211	21.14	20.46	21.84	1.38
1972	0.2571	0.0204	21.61	20.94	22.30	1.35
1973	0.2776	0.0186	21.96	21.34	22.59	1.25
1974	0.2358	0.0148	21.25	20.77	21.74	0.97
1975	0.1417	0.0148	19.72	19.26	20.18	0.92
1976	0.1400	0.0132	19.69	19.29	20.10	0.82
1977	0.0806	0.0134	18.77	18.37	19.17	0.80
1978	0.0730	0.0118	18.65	18.31	19.01	0.70
1979	0.0147	0.0109	17.79	17.48	18.10	0.62
1980	0.0547	0.0105	18.38	18.07	18.69	0.62
1981	0.0363	0.00988	18.10	17.82	18.39	0.57
1982	0.0246	0.00935	17.93	17.66	18.20	0.54
1983	0.0428	0.00954	18.20	17.92	18.48	0.56
1984	-0.0142	0.0087	17.37	17.12	17.61	0.49
1985	-0.00035	0.00818	17.57	17.34	17.80	0.46
1986	-0.0572	0.00913	16.76	16.51	17.01	0.50
1987	-0.0776	0.00957	16.48	16.22	16.74	0.52
1988	-0.0879	0.00882	16.33	16.10	16.57	0.47
1989	-0.1269	0.00841	15.81	15.59	16.03	0.44
1990	-0.1185	0.00859	15.92	15.70	16.15	0.45
1991	-0.1398	0.00925	15.64	15.40	15.88	0.48
1992	-0.1524	0.00918	15.47	15.24	15.71	0.47
1993	-0.1957	0.00929	14.91	14.68	15.15	0.46
1994	-0.1789	0.00907	15.13	14.90	15.36	0.46
1995	-0.2265	0.00944	14.53	14.30	14.76	0.46
1996	-0.1744	0.0099	15.19	14.94	15.44	0.50
1997	-0.1912	0.00998	14.97	14.72	15.22	0.50
1998	-0.1913	0.0101	14.97	14.72	15.22	0.50
1999	-0.2136	0.0112	14.69	14.42	14.97	0.55
2000	-0.2772	0.0125	13.91	13.62	14.21	0.59
2001	-0.3130	0.0149	13.49	13.15	13.83	0.68
2002	-0.3172	0.0176	13.44	13.04	13.84	0.80
2003	-0.3492	0.0228	13.07	12.57	13.59	1.02
2004	-0.3971	0.0437	12.53	11.63	13.50	1.88

INJURY SEVERITY BY YEAR OF VEHICLE MANUFACTURE

Year of Manufacture	Coefficient of Car Year	Standard Error of Coefficient	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**-1.2584**		**22.13**			
1964	0.2309	0.0852	26.36	23.25	29.72	6.48
1965	-0.00171	0.1004	22.10	18.89	25.67	6.77
1966	0.0527	0.0845	23.05	20.24	26.11	5.87
1967	0.1710	0.0667	25.21	22.83	27.76	4.93
1968	0.1152	0.0600	24.17	22.08	26.39	4.31
1969	0.3534	0.0507	28.80	26.81	30.88	4.07
1970	0.2095	0.0398	25.94	24.47	27.47	3.00
1971	0.1957	0.0364	25.68	24.34	27.06	2.72
1972	0.1917	0.0349	25.60	24.32	26.93	2.61
1973	0.2088	0.0315	25.93	24.76	27.13	2.37
1974	0.1098	0.0265	24.07	23.14	25.04	1.90
1975	0.1607	0.026	25.02	24.07	25.99	1.91
1976	0.0670	0.0241	23.30	22.47	24.16	1.69
1977	0.1143	0.0247	24.16	23.28	25.06	1.77
1978	0.0443	0.0221	22.90	22.14	23.67	1.53
1979	0.0708	0.0205	23.37	22.66	24.10	1.44
1980	0.00919	0.0202	22.28	21.61	22.98	1.37
1981	0.0404	0.0191	22.83	22.18	23.50	1.32
1982	0.0397	0.0181	22.82	22.20	23.45	1.25
1983	0.00994	0.0187	22.30	21.67	22.94	1.27
1984	0.00698	0.0172	22.25	21.67	22.83	1.17
1985	0.0150	0.0163	22.38	21.83	22.94	1.11
1986	0.0119	0.0182	22.33	21.72	22.96	1.24
1987	-0.0112	0.0193	21.93	21.29	22.59	1.30
1988	-0.0221	0.0181	21.75	21.15	22.36	1.21
1989	-0.0227	0.0175	21.74	21.16	22.33	1.17
1990	-0.0547	0.0181	21.20	20.61	21.80	1.19
1991	-0.0578	0.0199	21.15	20.50	21.80	1.30
1992	-0.0828	0.0202	20.73	20.09	21.39	1.30
1993	-0.0585	0.0205	21.13	20.47	21.81	1.34
1994	-0.1233	0.0204	20.07	19.44	20.72	1.28
1995	-0.1363	0.0213	19.87	19.21	20.54	1.33
1996	-0.1712	0.0228	19.32	18.63	20.02	1.39
1997	-0.1356	0.023	19.88	19.17	20.61	1.44
1998	-0.2023	0.0242	18.84	18.12	19.57	1.45
1999	-0.1607	0.0268	19.48	18.67	20.32	1.65
2000	-0.2224	0.0298	18.53	17.67	19.43	1.76
2001	-0.1923	0.0334	18.99	18.00	20.02	2.01
2002	-0.2005	0.0401	18.86	17.69	20.10	2.41
2003	-0.3098	0.0522	17.25	15.84	18.76	2.92
2004	-0.2631	0.0947	17.92	15.35	20.82	5.46

CRASHWORTHINESS BY YEAR OF VEHICLE MANUFACTURE

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Overall rank order	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**17.57**	**22.13**	**3.89**				
1964	23.15	26.36	6.10	40	5.28	7.05	1.76
1965	24.13	22.10	5.33	33	4.48	6.35	1.87
1966	21.75	23.05	5.01	31	4.32	5.81	1.49
1967	22.45	25.21	5.66	37	5.05	6.35	1.30
1968	22.19	24.17	5.36	34	4.83	5.95	1.12
1969	22.23	28.80	6.40	41	5.88	6.97	1.09
1970	22.19	25.94	5.76	39	5.38	6.16	0.78
1971	21.14	25.68	5.43	35	5.10	5.78	0.68
1972	21.61	25.60	5.53	36	5.21	5.87	0.66
1973	21.96	25.93	5.69	38	5.40	6.01	0.61
1974	21.25	24.07	5.12	32	4.89	5.35	0.47
1975	19.72	25.02	4.93	30	4.72	5.16	0.44
1976	19.69	23.30	4.59	29	4.40	4.78	0.38
1977	18.77	24.16	4.53	28	4.35	4.73	0.39
1978	18.65	22.90	4.27	27	4.11	4.44	0.33
1979	17.79	23.37	4.16	26	4.01	4.31	0.29
1980	18.38	22.28	4.10	24	3.95	4.24	0.29
1981	18.10	22.83	4.13	25	4.00	4.27	0.27
1982	17.93	22.82	4.09	23	3.97	4.22	0.26
1983	18.20	22.30	4.06	22	3.93	4.19	0.26
1984	17.37	22.25	3.86	20	3.75	3.98	0.23
1985	17.57	22.38	3.93	21	3.82	4.04	0.22
1986	16.76	22.33	3.74	19	3.63	3.86	0.24
1987	16.48	21.93	3.61	18	3.49	3.74	0.24
1988	16.33	21.75	3.55	17	3.44	3.67	0.22
1989	15.81	21.74	3.44	16	3.33	3.54	0.21
1990	15.92	21.20	3.37	15	3.27	3.48	0.21
1991	15.64	21.15	3.31	14	3.20	3.42	0.23
1992	15.47	20.73	3.21	13	3.10	3.32	0.22
1993	14.91	21.13	3.15	12	3.04	3.27	0.22
1994	15.13	20.07	3.04	11	2.93	3.15	0.21
1995	14.53	19.87	2.89	8	2.78	2.99	0.21
1996	15.19	19.32	2.93	9	2.82	3.05	0.23
1997	14.97	19.88	2.98	10	2.86	3.10	0.24
1998	14.97	18.84	2.82	6	2.70	2.94	0.24
1999	14.69	19.48	2.86	7	2.73	3.00	0.26
2000	13.91	18.53	2.58	5	2.45	2.72	0.27
2001	13.49	18.99	2.56	4	2.41	2.72	0.30
2002	13.44	18.86	2.53	3	2.36	2.72	0.36
2003	13.07	17.25	2.25	2	2.05	2.47	0.42
2004	12.53	17.92	2.25	1	1.90	2.66	0.77

APPENDIX 8

CRASHWORTHINESS, INJURY RISK AND INJURY SEVERITY ESTIMATES BY YEAR OF VEHICLE MANUFACTURE BY MARKET GROUP FOR THE AUSTRALIAN VEHICLE FLEET

CRASHWORTHINESS BY YEAR OF VEHICLE MANUFACTURE BY MARKET GROUP

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Compact Four Wheel Drive Vehicles						
1982	30.08	13.37	4.02	3.22	5.02	1.81
1983	29.04	26.12	7.59	6.66	8.64	1.98
1984	28.33	24.55	6.95	6.38	7.58	1.21
1985	32.01	18.35	5.87	5.54	6.23	0.69
1986	27.06	21.20	5.73	4.96	6.63	1.67
1987	27.06	29.92	8.10	7.25	9.04	1.80
1988	24.14	16.87	4.07	3.59	4.63	1.04
1989	25.17	22.68	5.71	5.45	5.98	0.53
1990	21.83	21.01	4.59	4.37	4.81	0.44
1991	23.24	21.32	4.95	4.66	5.27	0.61
1992	22.77	23.02	5.24	4.95	5.55	0.60
1993	21.21	29.34	6.22	5.87	6.60	0.72
1994	18.74	19.67	3.69	3.40	3.99	0.59
1995	17.40	13.23	2.30	1.95	2.72	0.77
1996	17.82	18.37	3.27	2.97	3.61	0.63
1997	17.29	17.99	3.11	2.86	3.38	0.52
1998	16.98	22.86	3.88	3.71	4.06	0.34
1999	14.08	19.33	2.72	2.57	2.89	0.32
2000	15.11	19.07	2.88	2.68	3.10	0.43
2001	13.03	22.34	2.91	2.68	3.16	0.49
2002	15.17	16.57	2.51	2.32	2.72	0.41
2003	15.67	20.61	3.23	2.89	3.61	0.73
2004	13.19	26.55	3.50	2.74	4.48	1.74
Medium Four Wheel Drive Vehicles						
1982	32.35	32.13	10.39	7.95	13.59	5.65
1983	21.17	30.36	6.43	4.89	8.44	3.55
1984	19.52	11.64	2.27	1.52	3.39	1.86
1985	21.40	32.73	7.00	6.48	7.57	1.09
1986	16.46	12.95	2.13	1.42	3.20	1.78
1987	19.08	23.14	4.41	3.19	6.10	2.91
1988	15.37	40.89	6.29	5.53	7.15	1.63
1989	17.19	15.04	2.58	2.29	2.91	0.62
1990	16.47	16.02	2.64	2.29	3.05	0.76
1991	21.27	16.54	3.52	2.69	4.60	1.92
1992	13.72	16.64	2.28	2.06	2.53	0.48
1993	14.50	24.08	3.49	3.26	3.74	0.48
1994	11.96	20.56	2.46	2.22	2.72	0.51
1995	12.20	24.15	2.95	2.66	3.26	0.59
1996	12.80	28.92	3.70	3.44	3.98	0.54
1997	12.71	24.12	3.07	2.87	3.28	0.41
1998	15.93	21.61	3.44	3.14	3.78	0.65
1999	14.73	20.69	3.05	2.69	3.46	0.77
2000	13.99	8.92	1.25	0.83	1.87	1.04

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
2001	9.70	14.87	1.44	1.09	1.91	0.81
2002	12.42	30.41	3.78	3.24	4.41	1.16
Large Four Wheel Drive Vehicles						
1982	17.23	22.54	3.88	3.68	4.09	0.41
1983	15.42	25.44	3.92	3.72	4.14	0.41
1984	14.45	23.12	3.34	3.21	3.48	0.27
1985	17.12	28.71	4.91	4.80	5.03	0.23
1986	13.47	21.53	2.90	2.70	3.11	0.41
1987	16.54	22.46	3.71	3.46	3.99	0.53
1988	14.91	27.02	4.03	3.90	4.16	0.25
1989	13.93	23.45	3.27	3.18	3.36	0.18
1990	13.48	18.82	2.54	2.45	2.63	0.19
1991	12.60	22.30	2.81	2.69	2.93	0.23
1992	13.05	24.68	3.22	3.12	3.33	0.21
1993	12.28	21.67	2.66	2.56	2.77	0.22
1994	12.23	20.85	2.55	2.44	2.66	0.22
1995	13.16	26.29	3.46	3.32	3.60	0.28
1996	13.38	26.05	3.48	3.35	3.63	0.28
1997	12.15	24.62	2.99	2.87	3.12	0.26
1998	13.75	18.55	2.55	2.45	2.66	0.21
1999	13.16	22.64	2.98	2.84	3.13	0.29
2000	10.96	19.94	2.19	2.00	2.39	0.39
2001	9.25	25.37	2.35	2.04	2.70	0.66
2002	10.99	12.77	1.40	1.03	1.91	0.88
2003	9.71	21.59	2.10	1.59	2.77	1.18
Commercial Vehicles - Vans						
1982	25.11	24.40	6.13	5.90	6.36	0.46
1983	26.15	28.21	7.38	7.15	7.61	0.47
1984	24.24	25.54	6.19	6.03	6.36	0.33
1985	22.65	23.70	5.37	5.21	5.53	0.32
1986	21.45	22.36	4.80	4.64	4.96	0.31
1987	21.47	17.77	3.82	3.61	4.04	0.43
1988	22.35	27.67	6.18	6.00	6.37	0.38
1989	20.82	24.62	5.12	4.88	5.38	0.49
1990	19.39	22.52	4.37	4.13	4.62	0.49
1991	17.24	25.23	4.35	4.05	4.68	0.63
1992	19.74	21.12	4.17	3.87	4.49	0.62
1993	16.84	24.45	4.12	3.80	4.46	0.67
1994	18.74	26.23	4.92	4.63	5.22	0.60
1995	17.42	21.20	3.69	3.45	3.96	0.51
1996	16.14	16.80	2.71	2.42	3.03	0.61
1997	16.76	21.84	3.66	3.33	4.02	0.69
1998	17.27	13.91	2.40	2.13	2.71	0.57
1999	15.45	21.33	3.30	2.97	3.66	0.70
2000	15.19	22.35	3.40	3.04	3.80	0.76
2001	14.50	21.57	3.13	2.59	3.78	1.20
2002	13.71	13.03	1.79	1.18	2.71	1.53
2003	11.78	16.38	1.93	1.04	3.58	2.54

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Commercial Vehicles - Utes						
1982	19.57	25.18	4.93	4.83	5.02	0.19
1983	18.10	27.05	4.90	4.79	5.01	0.22
1984	18.39	23.57	4.33	4.27	4.40	0.12
1985	20.62	26.11	5.38	5.33	5.44	0.11
1986	19.06	22.91	4.37	4.30	4.43	0.13
1987	18.48	19.94	3.68	3.60	3.77	0.17
1988	17.94	24.58	4.41	4.35	4.47	0.11
1989	17.60	22.55	3.97	3.93	4.01	0.08
1990	17.30	21.35	3.69	3.65	3.74	0.09
1991	16.03	23.97	3.84	3.79	3.89	0.10
1992	16.83	22.15	3.73	3.68	3.78	0.10
1993	16.29	26.03	4.24	4.19	4.29	0.10
1994	15.80	22.46	3.55	3.50	3.59	0.09
1995	15.10	21.35	3.22	3.18	3.27	0.10
1996	16.06	21.70	3.48	3.43	3.54	0.11
1997	16.04	21.17	3.40	3.34	3.45	0.11
1998	15.61	21.72	3.39	3.33	3.45	0.12
1999	16.73	21.88	3.66	3.59	3.73	0.14
2000	15.27	19.97	3.05	2.97	3.13	0.16
2001	13.57	21.48	2.91	2.81	3.02	0.21
2002	12.04	17.42	2.10	1.98	2.23	0.25
2003	11.26	24.42	2.75	2.60	2.91	0.31
2004	12.56	13.93	1.75	1.33	2.30	0.96
Large Cars						
1982	18.30	24.93	4.56	4.55	4.58	0.03
1983	19.03	25.33	4.82	4.80	4.84	0.04
1984	18.76	23.59	4.43	4.41	4.44	0.03
1985	18.39	23.38	4.30	4.29	4.31	0.02
1986	18.20	22.93	4.17	4.16	4.18	0.02
1987	17.86	23.18	4.14	4.13	4.15	0.02
1988	17.33	23.34	4.04	4.04	4.05	0.02
1989	17.00	23.76	4.04	4.03	4.05	0.01
1990	17.53	22.56	3.95	3.95	3.96	0.02
1991	17.07	22.00	3.75	3.74	3.77	0.02
1992	16.49	20.93	3.45	3.44	3.46	0.02
1993	15.56	21.38	3.33	3.32	3.34	0.02
1994	15.73	20.31	3.20	3.19	3.20	0.02
1995	15.56	20.23	3.15	3.14	3.16	0.02
1996	16.43	19.22	3.16	3.15	3.17	0.02
1997	15.50	20.13	3.12	3.11	3.13	0.03
1998	15.82	18.81	2.97	2.96	2.99	0.03
1999	15.29	19.88	3.04	3.02	3.06	0.03
2000	15.11	18.48	2.79	2.77	2.81	0.04
2001	15.33	19.18	2.94	2.91	2.97	0.06
2002	15.50	19.60	3.04	2.99	3.08	0.09
2003	14.37	14.56	2.09	2.03	2.16	0.14
2004	15.59	20.53	3.20	2.97	3.45	0.49

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Luxury Cars						
1982	18.52	23.21	4.30	4.24	4.35	0.11
1983	18.38	23.33	4.29	4.22	4.35	0.13
1984	16.31	24.77	4.04	3.98	4.10	0.11
1985	17.39	20.30	3.53	3.48	3.58	0.09
1986	15.92	21.68	3.45	3.38	3.52	0.14
1987	16.84	22.21	3.74	3.65	3.83	0.18
1988	15.61	23.92	3.73	3.66	3.80	0.14
1989	15.09	24.03	3.63	3.58	3.67	0.09
1990	14.05	19.20	2.70	2.65	2.74	0.09
1991	15.76	20.00	3.15	3.08	3.23	0.15
1992	14.16	20.62	2.92	2.85	2.99	0.14
1993	14.01	21.52	3.01	2.94	3.09	0.16
1994	15.20	20.27	3.08	3.02	3.15	0.13
1995	14.41	21.13	3.04	2.99	3.11	0.12
1996	13.76	17.87	2.46	2.38	2.53	0.15
1997	14.34	20.25	2.90	2.82	2.99	0.18
1998	13.35	17.82	2.38	2.28	2.48	0.20
1999	15.01	18.31	2.75	2.61	2.89	0.27
2000	12.40	13.91	1.73	1.58	1.88	0.30
2001	13.11	24.44	3.20	2.98	3.44	0.46
2002	15.36	17.41	2.67	2.36	3.03	0.67
2003	11.54	12.65	1.46	1.04	2.04	1.00
Medium Cars						
1982	21.62	23.55	5.09	5.08	5.11	0.03
1983	20.97	21.73	4.56	4.54	4.57	0.03
1984	20.84	22.65	4.72	4.71	4.74	0.03
1985	21.31	22.60	4.82	4.80	4.83	0.04
1986	20.27	24.77	5.02	4.99	5.05	0.06
1987	20.05	21.60	4.33	4.30	4.37	0.07
1988	19.11	23.76	4.54	4.52	4.56	0.05
1989	19.24	21.81	4.20	4.18	4.22	0.04
1990	18.03	22.94	4.14	4.11	4.16	0.04
1991	18.66	22.71	4.24	4.21	4.27	0.06
1992	16.89	20.43	3.45	3.42	3.48	0.07
1993	15.13	21.47	3.25	3.19	3.31	0.12
1994	15.97	23.61	3.77	3.71	3.83	0.12
1995	15.27	20.52	3.13	3.07	3.20	0.13
1996	16.51	25.05	4.14	4.06	4.22	0.16
1997	15.97	18.83	3.01	2.91	3.10	0.19
1998	15.24	19.65	2.99	2.85	3.15	0.30
1999	15.45	19.43	3.00	2.85	3.17	0.32
2000	15.16	21.60	3.27	3.10	3.46	0.37
2001	16.91	15.46	2.61	2.37	2.89	0.52
2002	13.17	20.37	2.68	2.31	3.12	0.81
2003	14.92	22.99	3.43	2.68	4.39	1.71

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
People Movers						
1982	27.01	33.48	9.04	8.70	9.40	0.70
1983	24.87	26.48	6.59	6.45	6.72	0.27
1984	24.60	26.98	6.64	6.52	6.76	0.24
1985	25.06	23.10	5.79	5.65	5.93	0.27
1986	24.94	24.52	6.12	5.87	6.37	0.49
1987	22.31	19.54	4.36	3.92	4.85	0.93
1988	19.52	19.04	3.71	3.49	3.95	0.46
1989	22.46	27.73	6.23	6.07	6.39	0.32
1990	19.02	24.01	4.57	4.33	4.82	0.49
1991	19.48	21.96	4.28	4.03	4.53	0.50
1992	17.71	15.15	2.68	2.46	2.93	0.46
1993	16.69	27.15	4.53	4.29	4.79	0.50
1994	16.42	22.97	3.77	3.50	4.07	0.57
1995	13.64	25.46	3.47	3.14	3.85	0.71
1996	14.50	16.13	2.34	2.00	2.73	0.73
1997	15.05	20.28	3.05	2.68	3.47	0.79
1998	13.87	11.66	1.62	1.22	2.14	0.91
1999	14.15	20.86	2.95	2.54	3.43	0.88
2000	13.94	21.11	2.94	2.38	3.64	1.27
2002	11.97	11.83	1.42	0.71	2.83	2.12
Light Cars						
1982	28.18	26.84	7.56	7.43	7.69	0.26
1983	29.17	21.72	6.34	6.25	6.43	0.18
1984	26.05	21.02	5.48	5.41	5.54	0.13
1985	27.63	27.89	7.71	7.66	7.76	0.10
1986	25.43	25.48	6.48	6.41	6.55	0.14
1987	26.19	27.22	7.13	7.06	7.20	0.14
1988	26.23	22.63	5.94	5.87	6.00	0.12
1989	24.16	24.24	5.86	5.82	5.90	0.08
1990	24.97	26.11	6.52	6.48	6.57	0.09
1991	23.35	23.84	5.57	5.53	5.60	0.07
1992	23.66	25.69	6.08	6.05	6.11	0.06
1993	23.50	24.60	5.78	5.75	5.81	0.06
1994	22.76	22.31	5.08	5.05	5.10	0.05
1995	21.69	23.32	5.06	5.04	5.08	0.04
1996	22.56	22.00	4.96	4.94	4.99	0.05
1997	21.90	23.29	5.10	5.08	5.13	0.05
1998	21.46	22.72	4.88	4.85	4.90	0.05
1999	21.67	24.11	5.22	5.18	5.27	0.09
2000	20.79	22.95	4.77	4.72	4.83	0.11
2001	18.75	24.17	4.53	4.44	4.62	0.18
2002	20.32	23.48	4.77	4.65	4.90	0.25
2003	20.20	23.44	4.74	4.54	4.94	0.41
2004	20.29	32.90	6.67	6.04	7.37	1.33

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
Small Cars						
1982	23.62	24.56	5.80	5.78	5.82	0.03
1983	24.16	23.07	5.57	5.55	5.59	0.04
1984	22.93	22.78	5.22	5.21	5.24	0.03
1985	24.18	22.95	5.55	5.53	5.57	0.04
1986	22.52	22.70	5.11	5.10	5.13	0.03
1987	21.97	23.26	5.11	5.09	5.14	0.05
1988	21.91	22.81	5.00	4.98	5.02	0.03
1989	20.55	23.58	4.84	4.83	4.86	0.04
1990	19.77	23.00	4.55	4.53	4.56	0.03
1991	20.09	23.36	4.69	4.68	4.71	0.03
1992	19.56	22.58	4.42	4.40	4.43	0.03
1993	19.08	21.59	4.12	4.10	4.14	0.04
1994	19.89	20.35	4.05	4.02	4.07	0.05
1995	17.93	21.27	3.81	3.79	3.84	0.05
1996	18.70	21.13	3.95	3.92	3.98	0.06
1997	18.98	22.60	4.29	4.27	4.31	0.05
1998	18.45	22.13	4.08	4.06	4.11	0.05
1999	18.48	20.51	3.79	3.76	3.82	0.06
2000	17.55	22.48	3.95	3.92	3.98	0.06
2001	17.05	20.43	3.48	3.44	3.52	0.08
2002	16.76	22.40	3.75	3.70	3.81	0.11
2003	17.60	17.85	3.14	3.06	3.23	0.17
2004	16.21	15.95	2.59	2.27	2.95	0.68
Sports Cars						
1982	21.13	24.62	5.20	5.06	5.35	0.30
1983	21.05	23.14	4.87	4.73	5.01	0.28
1984	21.55	24.02	5.17	5.06	5.29	0.23
1985	20.12	30.15	6.07	5.95	6.19	0.24
1986	18.84	20.16	3.80	3.65	3.96	0.31
1987	17.98	28.19	5.07	4.83	5.32	0.48
1988	18.31	21.61	3.96	3.81	4.11	0.30
1989	18.91	23.25	4.40	4.27	4.53	0.26
1990	19.49	25.77	5.02	4.92	5.13	0.20
1991	19.41	20.77	4.03	3.89	4.18	0.29
1992	18.92	24.25	4.59	4.47	4.72	0.25
1993	19.75	21.01	4.15	3.98	4.32	0.34
1994	17.26	23.72	4.09	3.91	4.29	0.38
1995	16.76	19.29	3.23	2.95	3.55	0.60
1996	19.84	23.99	4.76	4.51	5.03	0.52
1997	16.85	24.16	4.07	3.86	4.30	0.44
1998	19.04	22.62	4.31	3.95	4.69	0.74
1999	14.96	16.45	2.46	1.99	3.04	1.05
2000	11.80	17.21	2.03	1.58	2.60	1.02
2001	12.25	20.08	2.46	1.94	3.11	1.17
2002	20.25	20.09	4.07	3.41	4.86	1.45
2003	22.57	17.64	3.98	2.74	5.78	3.04

APPENDIX 9

CRASHWORTHINESS, INJURY RISK AND INJURY SEVERITY ESTIMATES BY YEAR OF VEHICLE MANUFACTURE FOR THE NEW ZEALAND VEHICLE FLEET

CRASHWORTHINESS INJURY RISK BY YEAR OF MANUFACTURE FOR ALL NEW ZEALAND VEHICLES

Year of Manufacture	Coefficient of Car Model	Standard Error of Coefficient	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**-0.2682**		**43.33**			
1964	0.0716	0.3151	45.10	30.70	60.37	29.67
1965	0.2089	0.3001	48.52	34.35	62.92	28.57
1966	0.0721	0.2637	45.11	32.89	57.95	25.06
1967	0.3629	0.2521	52.36	40.14	64.31	24.16
1968	0.2955	0.2184	50.68	40.11	61.19	21.08
1969	0.4059	0.2029	53.44	43.54	63.07	19.54
1970	0.1002	0.1448	45.81	38.89	52.89	14.00
1971	0.1566	0.1371	47.21	40.60	53.92	13.31
1972	0.272	0.1016	50.09	45.13	55.05	9.92
1973	0.2268	0.1023	48.96	43.98	53.97	9.99
1974	0.1627	0.0922	47.36	42.89	51.88	8.99
1975	0.2436	0.1014	49.38	44.44	54.34	9.90
1976	0.2145	0.0977	48.66	43.90	53.44	9.54
1977	0.2097	0.1015	48.54	43.60	53.50	9.91
1978	0.231	0.0844	49.07	44.95	53.20	8.25
1979	0.1363	0.0779	46.71	42.93	50.52	7.59
1980	0.1692	0.0676	47.53	44.24	50.84	6.60
1981	0.1967	0.0582	48.21	45.37	51.06	5.69
1982	0.1916	0.0552	48.08	45.39	50.79	5.40
1983	0.2307	0.0536	49.06	46.44	51.69	5.25
1984	0.0853	0.0468	45.44	43.18	47.72	4.55
1985	0.1413	0.0493	46.83	44.43	49.24	4.81
1986	0.0876	0.0485	45.50	43.15	47.86	4.71
1987	0.0109	0.0486	43.60	41.28	45.96	4.68
1988	-0.0216	0.0478	42.80	40.53	45.11	4.58
1989	-0.121	0.044	40.39	38.33	42.48	4.15
1990	-0.1347	0.0441	40.06	38.00	42.15	4.15
1991	-0.2058	0.0486	38.37	36.14	40.64	4.50
1992	-0.1557	0.0493	39.56	37.27	41.89	4.62
1993	-0.1526	0.0534	39.63	37.16	42.16	5.00
1994	-0.272	0.0542	36.81	34.38	39.32	4.94
1995	-0.2635	0.0619	37.01	34.23	39.88	5.65
1996	-0.1571	0.0634	39.52	36.60	42.53	5.93
1997	-0.2753	0.0756	36.74	33.36	40.24	6.88
1998	-0.2142	0.0897	38.17	34.11	42.39	8.28
1999	-0.4758	0.0964	32.21	28.23	36.47	8.24
2000	-0.4127	0.1025	33.60	29.28	38.22	8.94
2001	-0.4526	0.1191	32.72	27.80	38.05	10.25
2002	-0.464	0.1287	32.47	27.20	38.23	11.03
2003	-0.3759	0.1647	34.43	27.55	42.04	14.49
2004	-0.3292	0.2671	35.49	24.58	48.15	23.57

CRASHWORTHINESS INJURY SEVERITY BY YEAR OF VEHICLE MANUFACTURE FOR ALL VEHICLES

Year of Manufacture	Coefficient of Car Model	Standard Error of Coefficient	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**-1.4073**		**19.67**			
1964	0.2008	0.2085	23.03	16.59	31.05	14.46
1965	0.4658	0.1984	28.06	20.91	36.52	15.62
1966	0.3046	0.198	24.92	18.38	32.86	14.48
1967	0.5796	0.1685	30.41	23.90	37.81	13.91
1968	0.2607	0.1558	24.11	18.97	30.13	11.16
1969	0.3181	0.1274	25.18	20.77	30.16	9.39
1970	0.2324	0.1033	23.60	20.14	27.44	7.30
1971	0.0939	0.0988	21.19	18.14	24.61	6.47
1972	-0.0324	0.0818	19.16	16.80	21.77	4.97
1973	0.1443	0.0753	22.05	19.61	24.69	5.07
1974	0.1615	0.0672	22.34	20.14	24.71	4.57
1975	0.2922	0.0709	24.69	22.20	27.37	5.17
1976	0.1205	0.0692	21.64	19.43	24.03	4.60
1977	0.1475	0.0743	22.10	19.70	24.71	5.01
1978	0.2559	0.0619	24.02	21.88	26.31	4.43
1979	0.1734	0.0565	22.55	20.67	24.54	3.87
1980	0.1238	0.0521	21.69	20.01	23.48	3.47
1981	0.2326	0.0446	23.60	22.06	25.21	3.15
1982	0.177	0.042	22.61	21.20	24.09	2.88
1983	0.1161	0.0411	21.56	20.23	22.96	2.73
1984	0.0311	0.0375	20.16	19.00	21.37	2.37
1985	-0.0102	0.0396	19.50	18.32	20.75	2.44
1986	-0.0449	0.0408	18.97	17.77	20.23	2.46
1987	-0.0266	0.0407	19.25	18.04	20.52	2.48
1988	-0.0556	0.0405	18.80	17.62	20.04	2.42
1989	-0.0615	0.0377	18.71	17.61	19.86	2.25
1990	-0.0421	0.0381	19.01	17.89	20.19	2.30
1991	-0.1006	0.0424	18.12	16.92	19.39	2.47
1992	-0.1556	0.0439	17.32	16.12	18.59	2.47
1993	-0.1316	0.0485	17.67	16.33	19.09	2.77
1994	-0.1549	0.049	17.33	16.00	18.75	2.75
1995	-0.1561	0.0567	17.32	15.78	18.96	3.18
1996	-0.2482	0.0602	16.04	14.51	17.69	3.18
1997	-0.3955	0.0743	14.15	12.47	16.01	3.54
1998	-0.2262	0.0838	16.33	14.21	18.71	4.49
1999	-0.3447	0.0947	14.78	12.59	17.27	4.68
2000	-0.4086	0.1077	13.99	11.64	16.73	5.09
2001	-0.3606	0.1183	14.58	11.92	17.71	5.79
2002	-0.356	0.1331	14.64	11.67	18.21	6.54
2003	-0.323	0.1597	15.05	11.47	19.51	8.04
2004	-0.797	0.3329	9.94	5.43	17.48	12.05

CRASHWORTHINESS BY YEAR OF VEHICLE MANUFACTURE FOR ALL VEHICLES

Year of Manufacture	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Overall rank order	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**43.33**	**19.67**	**8.52**				
1964	45.10	23.03	10.39	25	6.54	16.50	9.95
1965	48.52	28.06	13.61	40	9.01	20.56	11.55
1966	45.11	24.92	11.24	34	7.49	16.88	9.40
1967	52.36	30.41	15.93	41	11.46	22.13	10.67
1968	50.68	24.11	12.22	38	8.93	16.72	7.79
1969	53.44	25.18	13.45	39	10.34	17.50	7.16
1970	45.81	23.60	10.81	32	8.69	13.44	4.75
1971	47.21	21.19	10.00	23	8.12	12.32	4.20
1972	50.09	19.16	9.60	22	8.15	11.30	3.15
1973	48.96	22.05	10.79	31	9.25	12.59	3.34
1974	47.36	22.34	10.58	29	9.20	12.17	2.97
1975	49.38	24.69	12.19	37	10.55	14.10	3.55
1976	48.66	21.64	10.53	26	9.11	12.17	3.06
1977	48.54	22.10	10.73	30	9.21	12.50	3.29
1978	49.07	24.02	11.79	36	10.40	13.36	2.95
1979	46.71	22.55	10.53	27	9.36	11.85	2.50
1980	47.53	21.69	10.31	24	9.27	11.46	2.19
1981	48.21	23.60	11.38	35	10.41	12.44	2.03
1982	48.08	22.61	10.87	33	9.99	11.84	1.85
1983	49.06	21.56	10.58	28	9.74	11.49	1.75
1984	45.44	20.16	9.16	21	8.48	9.90	1.41
1985	46.83	19.50	9.13	20	8.42	9.90	1.48
1986	45.50	18.97	8.63	19	7.94	9.38	1.43
1987	43.60	19.25	8.39	18	7.72	9.13	1.41
1988	42.80	18.80	8.05	17	7.40	8.75	1.35
1989	40.39	18.71	7.56	15	6.98	8.18	1.20
1990	40.06	19.01	7.62	16	7.03	8.25	1.21
1991	38.37	18.12	6.95	13	6.36	7.61	1.25
1992	39.56	17.32	6.85	12	6.25	7.51	1.26
1993	39.63	17.67	7.00	14	6.33	7.74	1.41
1994	36.81	17.33	6.38	10	5.75	7.08	1.33
1995	37.01	17.32	6.41	11	5.69	7.22	1.54
1996	39.52	16.04	6.34	9	5.60	7.18	1.58
1997	36.74	14.15	5.20	7	4.45	6.08	1.63
1998	38.17	16.33	6.23	8	5.23	7.43	2.20
1999	32.21	14.78	4.76	4	3.88	5.84	1.95
2000	33.60	13.99	4.70	2	3.75	5.89	2.14
2001	32.72	14.58	4.77	5	3.71	6.14	2.44
2002	32.47	14.64	4.75	3	3.59	6.29	2.70
2003	34.43	15.05	5.18	6	3.69	7.28	3.59
2004	35.49	9.94	3.53	1	1.79	6.95	5.16

APPENDIX 10

CRASHWORTHINESS, INJURY RISK AND INJURY SEVERITY ESTIMATES BY YEAR OF FIRST NEW ZEALAND VEHICLE REGISTRATION FOR USED IMPORT VEHICLES

CRASHWORTHINESS INJURY RISK BY YEAR OF FIRST NEW ZEALAND VEHICLE REGISTRATION FOR USED IMPORT VEHICLES

Year of first registration	Coefficient of Car Model	Standard Error of Coefficient	Pr(Risk) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE YEAR	**-0.3293**		**41.84**			
1986	0.1147	0.3549	1.122	44.66	28.70	61.80
1987	0.1033	0.1894	1.109	44.37	35.50	53.62
1988	0.1187	0.1609	1.126	44.76	37.15	52.62
1989	0.3633	0.0885	1.438	50.85	46.52	55.17
1990	0.2397	0.0682	1.271	47.76	44.44	51.10
1991	0.2038	0.0815	1.226	46.87	42.92	50.86
1992	0.199	0.0885	1.22	46.75	42.46	51.08
1993	-0.0204	0.0816	0.98	41.35	37.53	45.27
1994	0.1143	0.0716	1.121	44.65	41.21	48.14
1995	-0.0915	0.0706	0.913	39.63	36.37	42.99
1996	-0.1258	0.0657	0.882	38.82	35.80	41.91
1997	-0.1747	0.0707	0.84	37.66	34.47	40.97
1998	-0.0617	0.0752	0.94	40.35	36.86	43.94
1999	-0.0979	0.0714	0.907	39.48	36.19	42.87
2000	-0.187	0.083	0.829	37.37	33.65	41.25
2001	-0.025	0.0825	0.975	41.23	37.38	45.20
2002	-0.1227	0.0944	0.885	38.89	34.59	43.37
2003	-0.404	0.1127	0.668	32.45	27.80	37.46
2004	-0.1462	0.1829	0.864	38.33	30.28	47.08

CRASHWORTHINESS INJURY SEVERITY BY YEAR OF FIRST NEW ZEALAND VEHICLE REGISTRATION FOR USED IMPORT VEHICLES

Year of first registration	Coefficient of Car Model	Standard Error of Coefficient	Pr(Severity) %	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**-1.4532**		**18.95**			
1986	0.2117	0.321	22.42	13.35	35.15	21.81
1987	0.1515	0.1762	21.39	16.15	27.76	11.61
1988	0.2673	0.1208	23.40	19.42	27.91	8.48
1989	0.3071	0.0681	24.12	21.76	26.65	4.88
1990	0.094	0.0556	20.44	18.72	22.27	3.54
1991	0.105	0.0662	20.62	18.57	22.82	4.25
1992	0.0359	0.0739	19.51	17.33	21.88	4.55
1993	-0.0158	0.0716	18.71	16.67	20.94	4.27
1994	-0.00755	0.0622	18.84	17.04	20.77	3.73
1995	-0.011	0.0597	18.78	17.06	20.63	3.57
1996	-0.0578	0.0567	18.08	16.49	19.78	3.29
1997	-0.1027	0.0639	17.42	15.69	19.30	3.61
1998	-0.0864	0.0671	17.66	15.83	19.65	3.83
1999	-0.0804	0.0632	17.75	16.01	19.63	3.62
2000	-0.0849	0.0742	17.68	15.66	19.90	4.24
2001	-0.2095	0.0745	15.94	14.08	18.00	3.92
2002	-0.0838	0.0844	17.70	15.42	20.24	4.82
2003	-0.1423	0.1044	16.86	14.18	19.93	5.74
2004	-0.2902	0.1604	14.89	11.33	19.33	8.00

CRASHWORTHINESS BY YEAR OF FIRST NEW ZEALAND VEHICLE REGISTRATION FOR USED IMPORT VEHICLES

Year of first registration	Pr(Risk) %	Pr(Severity) %	Serious injury rate per 100 drivers involved	Overall rank order	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Width of Confidence Interval
AVERAGE	**41.84**	**18.95**	**7.93**				
1986	44.66	22.42	10.01	17	5.38	18.64	13.26
1987	44.37	21.39	9.49	14	6.75	13.35	6.60
1988	44.76	23.40	10.47	18	8.14	13.47	5.32
1989	50.85	24.12	12.27	19	10.74	14.00	3.26
1990	47.76	20.44	9.76	16	8.73	10.91	2.18
1991	46.87	20.62	9.66	15	8.46	11.04	2.59
1992	46.75	19.51	9.12	13	7.86	10.58	2.72
1993	41.35	18.71	7.74	11	6.67	8.97	2.29
1994	44.65	18.84	8.41	12	7.42	9.54	2.12
1995	39.63	18.78	7.44	10	6.56	8.45	1.89
1996	38.82	18.08	7.02	8	6.22	7.92	1.69
1997	37.66	17.42	6.56	3	5.73	7.51	1.77
1998	40.35	17.66	7.13	9	6.20	8.19	1.99
1999	39.48	17.75	7.01	7	6.14	8.00	1.86
2000	37.37	17.68	6.61	5	5.65	7.73	2.09
2001	41.23	15.94	6.57	4	5.63	7.68	2.05
2002	38.89	17.70	6.88	6	5.77	8.21	2.45
2003	32.45	16.86	5.47	1	4.36	6.86	2.50
2004	38.33	14.89	5.71	2	4.03	8.08	4.04