



Used Car Safety Ratings 2021 Update

Summary & Highlights

RATINGS OVERVIEW

The Used Car Safety Ratings (UCSR) measure four aspects of vehicle safety performance for passenger and light commercial vehicles in Australia and New Zealand; three measures of secondary safety (injury protection in the event of a crash), and one measure of primary safety (crash avoidance).

- **Secondary Safety**
 - **Crashworthiness:**
 - Measures how a vehicle protects its own driver in a crash.
 - The Crashworthiness rating specifically estimates the risk of death or serious injury (hospital admission) to the driver in a crash.
 - It is relevant to injury outcomes in about 90% of all crashes, the exception being those involving an unprotected road user (pedestrian, cyclist or motorcyclist).
 - The Crashworthiness rating is used to develop the UCSR “star ratings”.
 - **Aggressivity:**
 - Measures how well a vehicle protects other road users with which the vehicle collides including other vehicle occupants, pedestrians, cyclists and motorcyclists.
 - Specifically, the Aggressivity rating estimates the risk of death or serious injury (hospital admission) to another vehicle driver, pedestrian, cyclist or motorcyclists in a crash.
 - Is relevant to injury outcomes in crashes where another light vehicle or unprotected road user (pedestrian, cyclist or motorcyclist) is involved (about 55% of crashes).
 - **Total Secondary Safety:**
 - Measures the combined crashworthiness and aggressivity performance reflecting the relevant importance of each attribute in determining overall injury outcomes in a crash.
 - Specifically, the Total Secondary Safety Index estimates the average risk of death or serious injury (hospital admission) to all people involved in a crash including the driver of the rated vehicle and other road users, both

vulnerable road users (pedestrians, cyclists and motorcyclists) and occupants of other vehicles in a crash, with which the vehicle collides.

- As far as possible, each of the estimated secondary safety ratings are corrected for differences between vehicle models in non-vehicle related factors affecting injury outcomes. These include:
 - age and sex of the people involved;
 - year of crash;
 - speed limit at the crash site;
 - jurisdiction in which the crash occurred; and
 - configuration of crash.
- The resulting ratings measure only the differences in death and serious injury risk in a crash related to vehicle design and specification. They do not reflect differences in crash circumstances or the characteristics of people involved.
- **Primary Safety**
 - Measures the relative risk of a vehicle being involved in a crash.
 - Estimates the risk of being involved in a crash per registered vehicle year, relative to the average crash risk within the market group. Ratings are calculated within market groups to control for the unmeasured differences in use of vehicle and types of travel exposure that affect crash risk between market groups.
 - Analysis uses induced exposure methods to further control for driver and exposure-related differences between vehicles within each market group.
 - Primary safety ratings can only be compared within each market group but are controlled as far as possible for the influences of driver effects and travel exposure on crash risk.
- **Data and Coverage**
 - The total database from which the ratings are estimated covers over 8.8 million vehicles and over 2.2 million injured road users involved in crashes from 1987-2019 reported to police in Australia and New Zealand.
 - Registration data from New Zealand, Western Australia, Victoria, Queensland and New South Wales, in conjunction with the reported crash data, was used to estimate the primary safety ratings. Over 145 million vehicle registration years were analysed across the five jurisdictions.
- **Ratings Coverage and Eligibility**
 - Since it takes time for real-world data to accumulate, vehicles are generally not rated until at least five years after they were first sold. For less popular vehicles, this length of time can be much longer.
 - A vehicle will not be considered in the ratings analysis until it has been involved in at least 100 crashes and at least 20 driver injuries have been recorded. Ratings will not be released to the public unless they satisfy two additional criteria for minimum accuracy being a maximum confidence limit width on the rating estimate of 1.69% and a coefficient of variation (ratio of confidence limit width to rating point estimate) of 1.6. In practice, these criteria are only satisfied once a vehicle has been involved in at least 500 real-world crashes reported to police.

- A UCSR will not be published if a current ANCAP safety rating remains available and the vehicle is still available for purchase as new. Eleven vehicle models were excluded from publication due to having a current ANCAP rating.
- Analysis of the 2019 registered vehicle fleets in Victoria and New South Wales showed that a valid published UCSR was available for around 75% of light vehicles on the register and around 80% of light vehicles on the register over five years old.
- As far as possible, vehicles are classified into make and model clusters with homogeneous specifications with respect to factors determining safety performance such as structure, and critical safety features such as airbags.
 - In some instances, make and model groupings may contain vehicles with varying specifications; for example, if optional safety equipment is available that cannot be identified from information on the vehicle register or if a minor specification upgrade has occurred during the vehicle model's life. For some vehicle groups there may also be a mix of body types within the group, for example: sedans and station wagons, dual cab and cab-chassis utilities.
 - In some instances, vehicle model series are combined for rating if the differences between them are purely cosmetic and unlikely to alter safety performance. This includes models shared by two manufacturers (e.g. Toyota 86 and Subaru BRZ).

Presentation for Consumer Information

- Presentation format for the UCSR acknowledges that consumers are primarily interested in how a vehicle will protect them as a driver from serious injury in a crash. Consequently, the crashworthiness rating is the primary focus of the vehicle safety rating information presented and used to determine the star rating.
- Ratings are first filtered to determine those that meet a specific level of accuracy for public release. Criteria are given above in **“Ratings Coverage and Eligibility”**.
- The purpose of the presentation is to differentiate the safety performance of rated vehicles across 5 summary categories. To achieve this, vehicles manufactured from year 2000 onwards that appear in the brochure are classified in the following way:
 - The rating estimates for each vehicle are placed in order of magnitude from smallest (best) to largest(worst)
 - They are then divided in to 5 groups with equal number of vehicles in each (quintiles of performance) from best to worst crashworthiness performance.
 - The 20% of vehicles with the best (numerically lowest) crashworthiness estimates are assigned 5 stars, the next best 20% 4 stars and so on down to the worst 20% which are assigned 1 star.
 - The resulting cut-off points defining the crashworthiness quintiles for star rating allocation are:

<i>Star Rating</i>	<i>Rating Percentiles Defining 5 Equal Quintile Groups</i>	<i>Associated Crashworthiness Range</i>
5 Stars	<20 th Percentile	<2.55%
4 Stars	20 th – 40 th Percentile	2.55%-3.10%
3 Stars	40 th – 60 th Percentile	3.10%-3.75%
2 Stars	60 th – 80 th Percentile	3.73%-4.39%
1 Stars	>80 th Percentile	>4.39%

- Although not published in the brochure, vehicles manufactured prior to year 2000 are classified into star ratings based on the crashworthiness ranges for the star ratings calculated from the vehicle manufactured from year 2000 onwards. Adding vehicles manufactured prior to 2000 results in an unequal number of vehicles in each star rating category. All vehicles rated and manufactured prior to 2000 scored only 3 stars or less based on the star rating categories determined by the vehicles manufactured from year 2000 onwards.
- Quintiles and 5 category star ratings are also assigned to the aggressivity, total secondary safety and primary safety ratings in the same way to inform the 'Safer Pick' allocation.
- Some vehicles rated in the best crashworthiness category are awarded 'Safer Pick' status if they:
 - are also rated in the best category (5-Star) for total secondary safety;
 - do not have an aggressivity rating in the "poor" or "very poor" (1 or 2 Star) category;
 - do not have a primary safety rating in the "poor" or "very poor" (1 or 2 Star) category; and
 - are available with driver assist technology that has been proven based on Vehicle Safety Research Group (VSRG) research to reduce crash risk by rigorous evaluation and is widely available in the fleet and included:
 - Electronic Stability Control (ESC), and
 - Reversing assist technology (either reversing sensors, a reversing camera or both).
- Although the ratings cover vehicles manufactured from 1982-2018, only vehicles manufactured from 2000 are presented in the brochure due primarily to space constraints on the brochure. The remainder may be made available on-line by agencies promoting the ratings. Vehicles manufactured in the years 2000 onwards were chosen for the brochure because:
 - A 2000 cut-off for rating presentation covers the majority of vehicles currently in use in both Australia and New Zealand.
 - Of the 378 total post 1982 year of manufacture models rated, 98 of the 102 rated vehicle models manufactured prior to 2000 have a 1-star crashworthiness rating. Of the remaining 4 vehicles, 1 rated 3-stars and 3 rated 2-stars. This means drivers of these vehicles are generally much more likely to be killed or seriously injured than newer vehicles in a crash.

- All of the safest used vehicles (4 and 5-star) available for purchase were manufactured from 2000 onwards.

RATINGS CHANGES FOR 2021

- The addition of crash data from 2019 in all jurisdictions has expanded the set of vehicles that can be rated. It also increased the accuracy of the ratings for vehicles appearing in previous ratings. Since the ratings for all vehicles are updated with additional data, the ratings are all current and all directly comparable with each other.
- The requirement for rating accuracy for publication has remained the same as for the 2020 update with the maximum confidence limit width on the rating for a vehicle to be published being 1.69%. Although a vehicle must have at least 100 crash involvements for it to be included in the analysis, for the vehicle to pass the final accuracy requirements for public presentation it must have over 500 crash involvements. Despite the consistency in the exclusion criteria, a number of models that were rated in the 2020 update were not rated in the 2021 update due to slight variations in the confidence limit with leading to exclusion, a review in model groupings or exclusion due to having a current ANCAP rating missed in the 2020 update. The 9 models excluded from the ratings are listed in the following table with 5 excluded due to confidence limit width variation, 3 as a result of model grouping changes and 1 due to having a current ANCAP rating.

Vehicles Rated in 2020 not Rated in 2021

Audi	Q3/RS	12-18	SUV - Small	CI Width
Daihatsu	Terios	97-05	SUV - Small	CI Width
Toyota	Corolla Sedan	12-18	Small	Model grouping review
Ford	Focus	09-12	Small	Model grouping review
Mitsubishi	Starwagon/Delica Spacegear	95-03	People Mover	CI Width
Ford	Transit	95-00	Commercial - Van	CI Width
Isuzu	D-Max	12-18	Commercial - Ute	Model grouping review
Holden	Commodore Ute VG/VP	90-93	Commercial - Ute	CI Width
Mazda	6/Atenza	12-18	Medium	ANCAP Exclusion

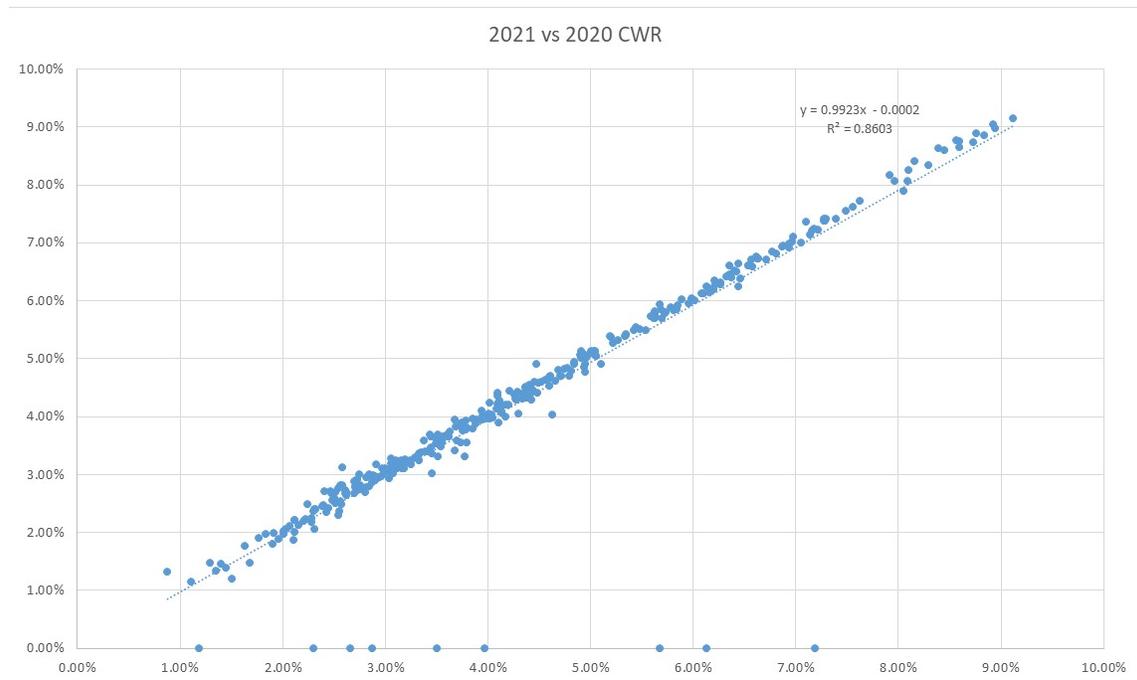
- 24 vehicles not previously rated now have sufficient data to appear in the 2021 ratings update, an effective 7% increase. The new vehicles rated are:

New Vehicles Rated in 2021

Holden	Colorado	12-19	Commercial - Ute
Volkswagen	Caddy	05-19	Commercial - Van
Jaguar	XJ/XJR	10-19	Large
Honda	City	09-13	Light
Honda	Accord	82-85	Medium
Mercedes Benz	C-Class W205/S205/C205/A205	14-19	Medium
Kia	Carnival	14-19	People Mover
Audi	A3/RS3/S3	13-19	Small

BMW	1 Series	11-19	Small
Honda	Civic/Ballade/Shuttle	84-87	Small
Kia	Cerato	09-13	Small
Mercedes Benz	A-Class W176	12-18	Small
Mercedes Benz	B-Class W246	12-18	Small
Nissan	Pulsar B17 Sedan	12-17	Small
Peugeot	308	08-13	Small
Subaru / Toyota	BRZ/86	12-19	Small
Isuzu	MU-X	13-19	SUV - Large
BMW	X3	10-17	SUV - Medium
Ford	Kuga	13-16	SUV - Medium
Jeep	Wrangler	07-18	SUV - Medium
Hyundai	Tucson	15-19	SUV - Small
Jeep	Compass	07-17	SUV - Small
Kia	Sportage	10-15	SUV - Small
Suzuki	SX4	07-14	SUV - Small

- Year to year consistency in the rating of those vehicles carried over is high as demonstrated in the following chart, which gives the numerical crashworthiness value estimated in the 2020 ratings update against that estimated in the 2021 ratings update (the dots on the x axis are those vehicles that were rated in 2020 but not in 2021 – see above).



- As UCSRs will not be published for models with current ANCAP ratings, 11 vehicle models of the 389 with sufficiently accurate ratings to be published are excluded from public presentation bringing the total number of models rated down to 378.

Vehicles With Current ANCAP Ratings Not Included in 2021 UCSR

Ford/Mazda	Ranger/BT-50	15-19	Commercial - Ute
Mitsubishi	Triton	15-19	Commercial - Ute
Toyota	Hilux	15-19	Commercial - Ute
Mazda	2/Demio	14-19	Light
Mazda	6/Atenza	12-19	Medium
Honda	Civic	16-19	Small
Subaru	Impreza/XV	16-19	Small
Toyota	Prius V	12-19	Small
Kia	Sportage	15-19	SUV - Medium
Nissan	X-Trail	14-19	SUV - Medium
Mazda	CX-3	15-19	SUV - Small

- Of the 362 vehicle models rated, 50 were allocated a 5-star rating with 25 of these awarded 'Safer Pick' status based on: scoring a 5-star rating for total secondary safety; not having a 1- or 2-star aggressivity rating or primary safety rating and being available with both ESC and reversing sensors or a camera.
- The numerical ratings benchmark against which vehicles are classified is lower (with a lower numerical rating indicating better safety) due to newer, safer vehicles entering the fleet.
 - Because the benchmark safety improves each year, the ratings for vehicles included in previous ratings updates may change due to the standard they are assessed against becoming more rigorous. Because ratings for all vehicles are recalculated every year, all ratings presented are current and comparable.
 - This means that a number of previously rated vehicles have been rated worse (in a lower star rating) this year due to their rating being further from the new standard. The process of applying a more stringent benchmark happens each year and reflects constantly improving safety in the vehicle fleet.
 - Consumers can expect the rating of their vehicle to get worse over time because the ratings reflect the safety of a vehicle in comparison to all others currently in the fleet. The average safety of the fleet improves year on year as newer vehicles are added so the ratings for older vehicles become worse over time in comparison. Consequently, the ratings can be used by people to identify when they can make significant gains in safety by updating to a newer, safer vehicle.
 - Of the 362 vehicle models rated in both the 2019 and 2020 UCSR updates, 66 vehicles (approximately 18%) changed by a single star rating category. 4 vehicles changed by 2-star rating categories, partly due to a change in the definition of hospital admission in the NSW police reported crash data which particularly impacted the data for these vehicles.
- Impact of the new star rating classification system (quintiles): Of the 354 (363-9) vehicles rated in 2021 that were also rated in 2020, 62 vehicles changed star rating. 30 of these

vehicles changed star rating primarily due to the inclusion of additional crash data and the addition of more vehicles to the ratings resulting in a change in their rating relative to the rest of the fleet. The remaining 32 changed rating due to the change in methodology for assigning the star rating category. All vehicles which changed star rating category only moved one star category except for the Nisan X-Trail 2007-14 which dropped by 2 star rating categories due to the combined impacts of the changes. Of the 62 vehicles with a changed rating from the 2020 ratings to the new 2021 ratings classification method, 42 reduced in star rating whilst 21 increase 1 star rating category.

Vehicles with Reduction in Star Ratings due to Change in Methodology

BMW	5 Series	03-10	Large
Nissan	Maxima	06-09	Large
Peugeot	206	99-07	Light
Hyundai	Sonata	98-01	Medium
Lexus	IS200/300	99-04	Medium
Honda	Odyssey	95-00	People Mover
Toyota	Avensis Verso	01-10	People Mover
Toyota	Tarago/Previa/Estima	06-18	People Mover
Honda	Civic	12-16	Small
Toyota	Prius 2	03-09	Small
Mitsubishi	Outlander	03-06	SUV - Medium
Suzuki	Grand Vitara/Escudo	05-08	SUV - Medium

Vehicles with Increase in Star Ratings due to Change in Methodology

Holden	Commodore VY/VZ Ute	02-07	Commercial - Ute
Ford	Falcon BA/BF	02-08	Large
Ford	Falcon FG / FG-X	08-16	Large
Holden	Commodore VE	06-13	Large
Toyota	Yaris/Vitz	05-11	Light
Toyota	Aurion	06-12	Medium
Toyota	Camry	06-11	Medium
Toyota	Camry	11-17	Medium
Ford	Focus	05-09	Small
Mazda	3/Axela	03-09	Small

Subaru	Impreza/XV	12-16	Small
Toyota	Corolla	02-07	Small
Toyota	Corolla	12-18	Small
Toyota	Landcruiser Prado	03-09	SUV - Large
Honda	CR-V	02-06	SUV - Medium
Mitsubishi	Outlander	12-19	SUV-Medium
Toyota	Kluger/Highlander	03-07	SUV - Medium
Toyota	Kluger/Highlander	07-13	SUV - Medium

2021 RATINGS HIGHLIGHTS

SUMMARY OF COVERAGE AND SAFETY PERFORMANCE

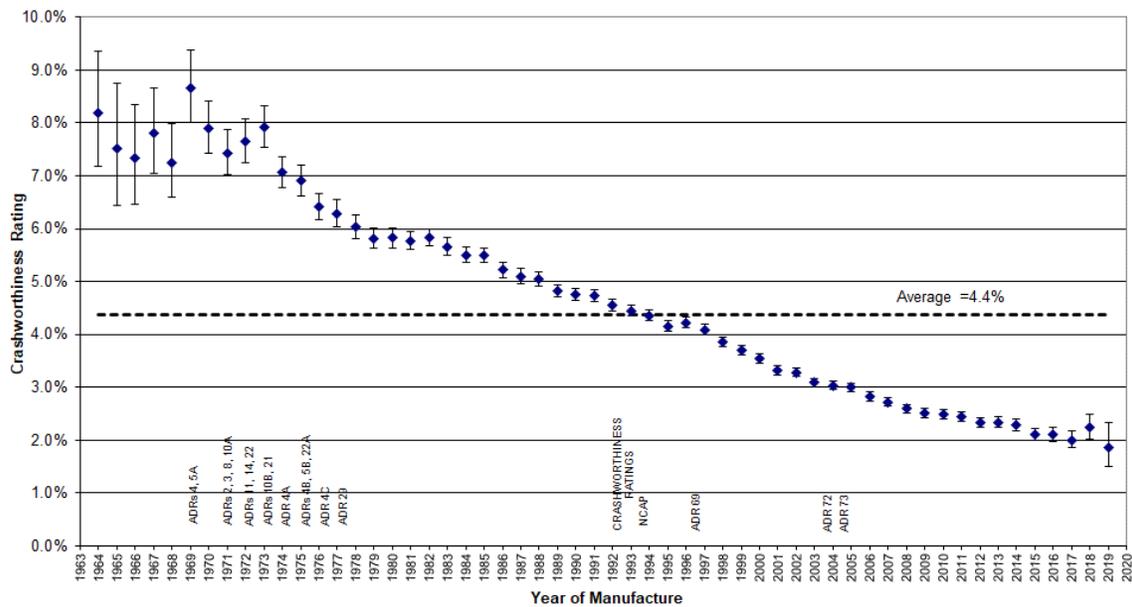
- 378 vehicle models manufactured from 1982 to 2019 are rated. 276 of those vehicle models are manufactured from 2000 to 2019 and are not vehicles currently on sale with a current (2015 date stamp or after) ANCAP rating. The 2000-2019 year of manufacture subset is used in some publications such as the brochure.
- Summary Table of Vehicle Performance by Class in Brochure:

Market Group	5-star	5-star and Safer Pick	4-star	3-star	2-star	1-star	# Rated
Commercial - Ute	3	0	3	7	6	4	23
Commercial - Van	3	0	3	2	0	2	10
Large	4	1	4	4	6	6	24
Light	0	0	2	1	8	18	29
Medium	5	4	9	9	10	4	37
People Mover	1	0	2	4	1	0	8
Small	7	6	9	17	13	20	66
SUV - Large	14	9	4	5	0	0	23
SUV - Medium	14	9	13	6	11	2	46
SUV - Small	1	0	5	1	1	2	10
All	52	29	54	56	56	58	276

GENERAL SAFETY TRENDS

- Vehicle safety has improved greatly over the period covered in the brochure:
 - The average risk of death or serious injury to the driver in a crash in a 2019 car is over 25% less than in a car manufactured in 2010.
 - The average risk of death or serious injury to the driver in a crash in a 2019 car is over 61% less than in a car manufactured in 1990.
 - The average risk of death or serious injury to the driver in a 2019 car is 68% less than in a car manufactured in 1990, as demonstrated in the following figure from the UCSR update technical report.
 - Newer designs developed with the assistance of high-tech computer modelling and the addition of many safety features, including airbags for frontal and side impact crashes, have improved safety on average. In addition, newer vehicles need to comply with a wider range of standards (e.g. ADR 69, 72 & 73).

Crashworthiness by Year of Vehicle Manufacture



- Although safety has improved in newer vehicles on average, there is still significant variation within vehicles both overall and within the same year of manufacture, so it is possible to select a safer vehicle of any age (and price) using the ratings. Although all vehicles rated in the UCSR meet specified design rules for minimum safety performance, it is clear that some just exceed the minimum whilst others exceed it by a significant margin.
 - The UCSRs help people identify and purchase those vehicles that exceed the minimum mandated safety performance by the greatest amount.
 - There is a significant difference in risk of death or serious injury for vehicle drivers between best and worst vehicle across all those rated. A driver of the worst vehicle rated is eight times more likely to be killed or seriously injured in the same crash than the same driver in the safest vehicle.
 - The safety improvement across generations of the same vehicle model can also be clearly seen in many instances. For example, the Toyota Camry, Ford Falcon, Mazda 626/6, Kia Carnival and Holden Commodore.

THE GOOD

- 52 vehicle models are in the excellent (5-star) category, with 29 earning ‘Safer Pick’ status for having excellent total secondary safety, average or better aggressivity and primary safety, in addition to having technology available which has been proven by VSRG research to assist in the avoidance of crashes, including ESC and reversing sensors or cameras.
 - No vehicle was excluded from ‘Safer Pick’ status for not having ESC, reversing sensors or a reversing camera available showing that these technologies are uniformly available on the safest newer vehicles.
- Large and medium SUVs along with commercial vans and large cars have a higher than average proportion of models in the excellent (5-star) categories. These are particularly the newer models of these vehicle types reflecting partly the growing popularity of SUVs, hence

the larger proportion of newer models on the road that are SUVs. Large and medium SUVs have replaced large and medium regular passenger cars in the Australian and New Zealand markets, so it is encouraging to see that the safety credentials of the SUVs meet that of the regular passenger vehicle. This is particularly the case for newer SUVs that now generally share the unitary (or monocoque) construction of the regular passenger car, largely overcoming the problem of high aggressivity in earlier large SUVs. The majority of small and medium cars and medium and large SUVs which scored 5 stars also scored a 'Safer Pick' rating.

- There are a further 54 vehicles in the good (4-star) category meaning that there is a wide range of vehicles with excellent or good safety performance available for purchase in the market at a range of prices.
- All market groups except the light car class have at least one excellent performer so it is possible to choose a vehicle that will provide occupant protection in the safest rating category regardless of size or purpose of use.
- The vast majority of 'Safer Pick' vehicles were manufactured from 2008 onwards showing the benefits of newer vehicles in terms of safety equipment available, design integrity and compliance with the newer safety regulation requirements in ADR 72 (*Dynamic Side Impact Occupant Protection*) and ADR 73 (*Offset Frontal Impact Protection*), both introduced around this time. It also corresponds with ESC being widely available from around this date.
- Many of the 'Safer Pick' vehicles and 5-star rated vehicles more broadly are available second hand for under \$15,000 and some for under \$10,000, which is particularly important for young drivers purchasing a first vehicle. It shows safe choices are available in all price ranges.
- Some vehicles that scored excellent in previous ratings, including some with 'Safer Pick' status, no longer achieve this result. This is because vehicles are rated relative to all others in the fleet. As the average safety of the fleet improves year on year with the introduction of new, safer vehicles, the rating for a particular vehicle will decline over time relative to the rest of the fleet.

THE BAD

- 56 models were rated in the poor (2-star) category, and a further 58 in the very poor (1-star) category. On average, a vehicle in the 1-star category is around 2.5 times as likely to cause death or serious injury to a driver in the same crash compared to a 5-star rated vehicle.
- Light and small car classes had by far the highest proportion of poor and very poor performing vehicles. This reflects both the role vehicle mass plays in determining the UCSR, with lighter vehicles performing worse on average, as well as the safety specification of these vehicles, which is often poorer with features such as airbags more likely to be optional. Many of the poorer performing light and small cars and small SUVs were also older model vehicles. However, some small vehicles and one small SUVs scored excellent (5-stars), and three small cars and one small SUV received 'Safer Pick' status showing it is possible to design a safe small car or small SUV. Safety is much harder to find in lighter vehicles showing the importance of using the UCSRs when purchasing a vehicle in this size class.
- The proportion of poor performing vehicles in the large car class was also higher than average reflecting that the average age of the large car class is now greater than average given this vehicle class has fallen from favour in the market.

- The relatively poor performance of commercial utilities in the ratings, with over half scoring only 2 or 3 stars, is also a concern given the relentless growth in popularity of this vehicle type in recent years. Three scored in the excellent category (5-stars) and none achieved 'Safer Pick' status primarily due to this vehicle class being highly aggressive. The choice of this vehicle class over a medium or large SUV, often based on business tax concessions, is having a negative impact on the safety of other road users. The population is also often unaware that the design standards for light commercial vehicles lag behind those of regular passenger cars making them less safe. For example, ESC for light commercial vehicles was mandated four to five years after regular passenger vehicles meaning this proven safety feature is not available in many light commercial vehicles in the second-hand market.
- No commercial vans or people movers were awarded 'Safer Pick' status also reflecting the high aggressivity of single box-style vehicles, particularly for unprotected road users.
- Many of the very poor performing vehicles are often driven by novice drivers. Novice female drivers have high exposure to very poor performing small cars whilst the worst performing large cars and increasingly commercial utilities are popular with novice male drivers. This is despite the fact that novice drivers are the most likely driver group to be involved in a crash and hence require their vehicle to provide the very best protection from death or serious injury in a crash. The UCSR are a vital resource for selecting a safe car for a novice driver.

2021 USED CAR SAFETY RATINGS FACT SHEET

HOW ARE THE 2021 USED CAR SAFETY RATINGS CALCULATED?

Records from more than 8.8 million vehicles in police-reported road crashes and more than 2.2 million injured road users in New Zealand and Australia between 1987 and 2019 were analysed by the Monash University Accident Research Centre (MUARC).

Ratings on protection to drivers in a crash (crashworthiness), harm to other road users in the crash (aggressivity), combined crashworthiness and aggressivity (total secondary safety) and crash risk (primary safety) were calculated using methods published in peer reviewed international journals. The ratings shown in the brochure are the crashworthiness ratings. Vehicles identified as a 'Safer Pick' in the brochure are those that score in the best (5-star) category for both crashworthiness and total secondary safety; do not have a worse than average aggressivity (1- or 2-stars), and do not have worse than average primary safety (1- or 2-stars). In addition, 'Safer Pick' vehicles must also be available with technology including reversing sensors or a reversing camera to reduce the risk of reversing crashes. The ratings are influenced by factors such as the vehicle mass, the structural design of the vehicle body and the safety features such as airbags and types of seatbelts in the vehicle.

Some published versions of the ratings include only those results for 2000 vehicles onwards although ratings for vehicles manufactured from 1982 are available. This reflects that most vehicles on the road are under 20 years old. All pre-2000 vehicles provide relatively poor occupant protection. None were rated in the two best (4 or 5-star) category for crashworthiness performance or awarded 'Safer Pick' status.

There are 276 vehicle models manufactured from 2000 onwards with ratings for protection to drivers. These cover most of the popular vehicles in the Australian and New Zealand vehicle fleets.

THE 'SAFER PICK' VEHICLES HAVE BEEN IDENTIFIED FROM THE TOTAL SAFETY RATING, AGGRESSIVITY RATING, PRIMARY SAFETY RATING AND FITMENT OF ESC AND REVERSING TECHNOLOGIES. WHY?

The total safety rating identifies how well individual vehicle models protect ALL road users from injury in the event of a crash, including cyclists, pedestrians, motorcyclists and drivers of other vehicles. This is a better guide to the TOTAL COMMUNITY IMPACT of vehicle safety. It is important that a vehicle does not pose excessively high risk to other road users in a crash as reflected in its aggressivity rating.

The crashworthiness of a light vehicle is relevant to injury outcome in around 90% of crashes in Australasia whilst vehicle aggressivity is relevant to injury outcome in around 55% of crashes. Consequently, the total crash safety rating is weighted more highly towards the crashworthiness performance than aggressivity performance of each vehicle. This also means that the estimated

total safety rating correlates more closely with the crashworthiness estimates of the vehicle rather than the aggressivity estimates.

To effectively reduce road trauma, we need to consider how any vehicle we purchase protects ALL road users, not just its own occupants. Vehicles identified as a 'Safer Pick' provide best possible injury protection to all road users including their own occupants.

The role of a vehicle in avoiding a crash is also important and is determined by aspects such as visibility, handling and whether driver assistance technologies such as ESC and Autonomous Emergency Braking (AEB) are fitted. Vehicles are only recommended as a 'Safer Pick' if they do not have below average crash risk (1- or 2-stars) as measured by the primary safety rating. Recent research has also identified that both ESC and reversing technologies including sensors and cameras are highly effective at reducing reversing crashes. Based on this research, a vehicle can only earn a 'Safer Pick' if it has ESC and one or both of reversing sensors and a reversing camera available.

WHY HAVE THE USED CAR SAFETY RATINGS BEEN PRODUCED?

These ratings are produced to help people in the market for a used car identify the safest models. People should use this guide to help them choose the safest possible car for the money they have available.

Safety designs and features that may significantly reduce risk of death or injury includes crumple zones, collapsible steering columns, reinforced door frames, front, side and curtain airbags and seat belts designed to work with airbags to minimise crash forces on occupants. Features that help reduce the risk of a crash occurring include ABS, ESC, AEB, BSM, LKA, LDW, reversing sensors/cameras the braking and handling of the vehicle and visibility from the vehicle. The overall safety of a vehicle will depend on how many of these features are present and how well they are designed and work in combination to protect people from injury in a crash. These ratings give an objective assessment of the safety performance of the models rated.

WHAT TYPES OF VEHICLES ARE INCLUDED IN THE RATINGS?

These ratings cover the majority of popular passenger vehicles and light commercial vehicles. The rated vehicles have been classified into ten categories, comprising four categories of passenger car, three categories of SUV, two categories of light commercial vehicle, and one category of people movers.

HOW ACCURATE ARE THE RATINGS IN PREDICTING HOW SAFE A VEHICLE WILL BE IN A CRASH?

These ratings are calculated from the outcomes of real-world crashes reported to police using statistical methods. The more often a particular vehicle model is involved in a crash, and the more vehicles there are registered, the more accurate will be the rating for that model.

This means that, in general, the ratings for more common and/or older vehicles may be more accurate than ratings for newer and/or less common models. Only vehicles with a specified minimum number of crash involvements and where the rating meets minimum accuracy criteria

are rated. The rating category given to a vehicle reflects the estimated average risk of death or serious injury in a crash.

Vehicles with limited real-world crash involvement and hence limited statistical confidence in the rating estimate tend to be later vehicle models that have only been on sale for a short time before the end of the data period on which the ratings are calculated. Ratings for these vehicles will possibly change in future updates as more crash data becomes available. Vehicles with a high degree of uncertainty in the ratings have been excluded from the ratings.

Any rating system of vehicle safety can only provide an indication of how much protection a vehicle is likely to offer a driver in the event of a crash, or how much harm it is likely to cause other road users. Whether or not death or serious injury results also depends on how the vehicle is driven, the person involved and the particular circumstances of the crash.

WHAT IS THE DIFFERENCE BETWEEN THESE RATINGS AND THE NEW CAR SAFETY RATINGS?

New car safety ratings (e.g. ANCAP) cannot be compared directly to the ratings in this brochure since there are fundamental differences between the two systems:

- ANCAP safety ratings are derived from laboratory testing and defined assessment criteria. ANCAP testing uses crash testing and active safety testing to internationally accepted standards.
- ANCAP crash ratings assesses how well the vehicle protects all occupants, driver, front seat and rear seat passengers in the event of a severe crash.
- ANCAP active safety testing assess the ability of the vehicle to avoid a crash, or in the event of a crash, to reduce the severity of the crash.
- ANCAP safety ratings are an absolute measure on the vehicle performance in the various tests, while the UCSR is a relative measure of the vehicle crashworthiness (driver protection) against all other vehicles that have sufficient crashes to be included in the analysis.

The differences in the assessment methods of new car safety ratings and UCSR can lead to differences in the ratings of many vehicles.

HOW DO THE AUSTRALIAN AND NEW ZEALAND VEHICLE FLEETS RATE FOR SAFETY COMPARED WITH FLEETS FROM OTHER COUNTRIES?

These ratings compare vehicle models with the rest of the in-service vehicle fleet, not against a fixed standard. That means that there will always be vehicle models that rate good or bad. It is not possible to assess objectively the overall safety standard of the New Zealand or Australian vehicle fleets from these ratings. They have not been compared with vehicle fleets from other countries for the same reason.

BUT AREN'T SOME VEHICLES LIKELY TO RATE POORLY BECAUSE OF THE TYPES OF PEOPLE THAT DRIVE THEM OR WHERE THEY ARE DRIVEN?

This was considered when the data was analysed. The ratings measure how well the vehicle protected the driver involved in the crash. They factor out, as much as possible, effects not related to the vehicle such as the age and gender of the driver involved in the crash or where

and when the crash occurred. This means the ratings are about how the vehicle itself contributes to injury outcome in a crash, and not who was driving the vehicle and where and how.

WHAT SHOULD PEOPLE DO IF THE VEHICLE THEY CURRENTLY DRIVE IS RATED POORLY?

Crashes in even the best-rated vehicles can still result in serious injury or death to the driver. The best protection against injury is to drive safely and encourage other road users to drive safely. When people are ready to buy another vehicle, they should consider choosing one of the highest-rated models.

WHY AREN'T VEHICLES THAT ARE RATED POORLY TAKEN OFF THE ROAD?

These ratings rate vehicles against each other, not against any fixed standard. This means that there will always be vehicles that are rated average, above average and below average. The rating system aims to have vehicle models distributed approximately equally across each of the five separate star ratings.

Although some vehicle models offer better protection to drivers in a crash than others, this does not mean that the less safe models are dangerous to the extent they should be taken off the roads. All vehicles must meet local design standards for safety before they can be made available for sale.

WHAT IS THE MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE?

The Monash University Accident Research Centre (MUARC) has been conducting research into vehicle safety for more than 30 years.

It began developing consumer advice on vehicle safety based on mass crash data in 1990. The same year, the New South Wales Roads and Traffic Authority (RTA) and National Roads and Motorists' Association (NRMA) independently set out on a joint project to develop a system for car safety rating based on police records of crashes. By 1991, they had produced a relative ranking of vehicles.

In mid-1991, the two groups began to work together and combine their data into one vehicle safety rating system. The UCSR brochure, which has been produced annually for most years from 1992, resulted from that work.

WHAT IS THE VEHICLE SAFETY RESEARCH GROUP (VSRG)?

The UCSR are the main output from the Vehicle Safety Research Group (VSRG) research program. The focus of the VSRG program has become much broader than just the ratings and there have been a number of highlights over the 25 years of publication in refining and extending the ratings. Key areas of vehicle safety explored by the program include assessment of vehicle safety technologies, modelling and projection of vehicle fleet composition and its effects on safety, estimating crash risk, consideration of the safety implications of vehicle choice on high-risk road user groups and examining the relationship between ANCAP and real-world crash outcomes.

Some specific activities of the VSRG are:

- Investigation of the effectiveness of vehicle safety technologies including anti-lock braking systems, frontal and side airbag systems, ESC, AEB and reversing safety technologies.
- Analysis of the influence of vehicle colour on crash risk.
- Estimating trends in light vehicle road trauma related to crashes involving heavy vehicles and predicting the likely impact of forecast rapid growth in heavy vehicle travel.
- Estimating crash risks by vehicle type including motorcycles and analysis of the effects of vehicle choice on overall crash risk.
- Extensive analysis of the crash risks and injury outcomes associated with 4WD vehicles compared to other regular passenger cars.
- Analysis of vehicle choices made by young drivers and their influence on secondary safety outcomes relative to the key crash types in which they are involved, including assessment of the potential benefits of safer vehicle choices for young drivers.
- Assessment of the effectiveness of novice driver vehicle restrictions and the potential for improving the restrictions to further reduce novice driver road trauma.

Members of the VSRG are:

- New Zealand Accident Compensation Corporation (ACC)
- Australian Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC)
- Department for Infrastructure and Transport South Australia (DPTI)
- NRMA Motoring & Services (NRMA)
- New Zealand Transport Agency (NZTA)
- Road Safety Commission (RSC) of Western Australia
- Royal Automobile Association of South Australia (RAA SA)
- Royal Automobile Club of Queensland (RACQ)
- Royal Automobile Club of Victoria (RACV)
- Royal Automobile Club of Western Australia (RACWA)
- State Insurance Regulatory Authority (SIRA) New South Wales
- Transport Accident Commission (TAC)
- Transport and Main Roads (TMR) Queensland
- Transport for New South Wales (TfNSW)
- Victorian Department of Transport