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# Access to safer vehicle technologies by young drivers: factors affecting motor vehicle choice and effects on crashes

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## TITLE

Access to safer vehicle technologies by young drivers: factors affecting motor vehicle choice and effects on crashes

## AUTHORS


RWG Anderson, S Raftery, J Grigo, TP Hutchinson


## PERFORMING ORGANISATION


Centre for Automotive Safety Research
The University of Adelaide
South Australia 5005
AUSTRALIA


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## ABSTRACT


*Background.* This report is an exploratory study of vehicle choices amongst young drivers, their access to safer vehicle technologies and the role that motor vehicle insurance has in shaping those choices. There is a brief review of the literature on vehicle choices made by young drivers, an analysis of the relationship between driver age and access to safer vehicle technology, a survey of young drivers and their parents (examining vehicle choices, knowledge about safety, and the influence of vehicle insurance on vehicle choice), and a summary of discussions with Australian motor vehicle insurance underwriters. *Findings.* In respect of their level of safety, cars that young drivers crash tend to lag the vehicles at risk of crashing by more mature drivers; this persists for a long time after a technology first becomes available. Previous literature and the present survey indicate that the safety level of a young driver's vehicle is not the first priority of the young driver or their parents. The motor vehicle insurance industry in Australia prices risk mainly in line with crash frequency and average claim costs. Vehicle safety systems are often not viewed as positively by the motor vehicle insurance industry as they are by other safety-related organisations, as these systems can lead to high repair costs after a crash. However, technologies that do lead to lower claim frequencies and costs are recognised, and some efforts are made to identify these as early as is possible. *Recommendations.* (a) In promoting safer vehicle access care should be taken not to also encourage motor vehicle use or greater primary access to vehicles. (b) Modifying insurance costs may not be an appropriate means of effecting changes in vehicle choice. (c) Better information, more tailored to the purchasing power and needs of young drivers, is likely to be of help. (d) Changes to family thinking about vehicle allocation and sharing access to vehicles should be encouraged, and information provided to increase understanding about the importance of specific vehicle safety features. (e) Insurance companies might be able to use their claims data to assist their customers to obtain the lowest risk vehicle for their circumstances. (f) Macro-scale interventions (e.g., rapid introduction of new technologies) may be the best long-term solution to maximise the safety of vehicles and the prevalence of safer vehicle technologies for young drivers.


## KEYWORDS


Young drivers, vehicle choice, motor vehicle insurance, new technology

# Summary

This report is an exploratory study of vehicle choices amongst young drivers, their access to safer vehicle technologies and the role that motor vehicle insurance has in shaping those choices. The study was commissioned by the National Road Safety Council of Australia. The report is in several parts:

- A brief review of the literature on vehicle choices made by young drivers or on behalf of young drivers by their parents;
- An analysis of the relationship between driver age and access to safer vehicle technology;
- A survey of young drivers and their parents, in which vehicle choices, knowledge about safety, and the influence of vehicle insurance on vehicle choice are examined; and
- A summary of discussions with Australian motor vehicle insurance underwriters, covering the operation of the Australian motor vehicle insurance industry, the principles of pricing risk used in the industry and aspects of the business that are relevant to young drivers.

In this report young drivers refer to those drivers who may have been licenced for only a few years and are under 25. The effects we discuss are likely to be most acute in the youngest drivers (those in their teens) and much of the literature refers to teenaged drivers.

The safety effects of the older than average vehicles driven by young drivers are detectible in crash data. This means that cars that young drivers crash tend to lag the vehicles at risk of crashing by more mature drivers in respect of the their level of safety. Because technologies are introduced gradually, the deficits of young drivers' vehicles persist for a long time. For example, South Australian data is used to project that the average effectiveness of ESC will be 30 per cent lower for young (16-18 year old) drivers than for drivers over 25, due to the lower relative installation rate in the vehicles of the younger drivers. Crash data is used to show that other new technologies are only affecting young driver crashes at a fraction of the rate that they are affecting the crashes of those over 25 years of age.

Typically, the safety level of a young driver's vehicle does not appear to be the first priority of the young driver or their parents. In the literature and in the present survey, safety features were rarely mentioned as governing the kind of vehicles chosen by or for the young driver. The average safety levels of young drivers' vehicles are inferior to the average vehicle, and amongst people we surveyed, young drivers' cars tended to be older than other vehicles in the young person's household. Economic factors, and the family's thinking about vehicle allocation and ownership tended to govern the standard of vehicle that the young driver had access to, and it was quite common to find young drivers who identified a single vehicle as theirs to use. It is relevant to note that studies in the literature find that primary access to a vehicle (as opposed to shared access) by a young driver increases the risk of crash involvement, partly because it increases vehicle use, and partly because risky behaviours also increase.

The survey data suggests that young drivers tend to drive older and inexpensive cars. The majority are worth less than $5000, and the average vehicle age was 12-13 years. This supports the proposition that vehicle cost is the primary factor in vehicle choice. Insurance costs were reported to affect vehicle allocation within the family by about one third of respondents although it was less clear how reduced insurance costs would affect allocation in practice.

The motor vehicle insurance industry in Australia prices risk mainly in line with crash frequency and average claim costs. This means that comprehensive insurance for young drivers is expensive, and it is difficult to see how this situation could be radically altered given that the youngest drivers claim at three or more times the average claim rate. For most young first car buyers, insurance considerations are secondary. However, the insurance costs associated with nominating a young driver on an insurance policy appears to affect vehicle allocation in some families.

Vehicle safety systems are often not viewed as positively by the motor vehicle insurance industry as they are by other safety-related organisations, as these systems can lead to high repair costs after a crash. However, technologies that do lead to lower claim frequencies and costs are recognised, and some efforts are made to identify these as early as is possible.

Recommendations include:

- Promoting safer vehicle access should not also encourage motor vehicle use, or greater primary access to vehicles as these would be likely to increase crash rates.
- Modifying insurance costs may not be an appropriate means of effecting changes in vehicle choice, although it might lead to increased levels of shared access in some cases, although there is no direct evidence to what extent this would actually happen.
- Better information more tailored to the needs of young drivers is likely to be of help. Advice on vehicles relevant to their purchasing power should be made available alongside sources of information used to find and research vehicles for intended purchase.
- Changes to family thinking about vehicle allocation and sharing access to vehicles should be encouraged, and information provided to increase understanding about the importance of specific vehicle safety features.
- Insurance companies might be able to use their own data on claims to tailor information for their customers to assist them to obtain the lowest risk vehicle for their circumstances.
- Macro-scale interventions may be the best long-term solution to maximise the safety of vehicles and the prevalence of safer vehicle technologies for young drivers. For example introduction of new technologies should be made as rapidly a possible and the effects of any delay should be made identifiable at the regulation stage.

# Contents

# 1 Introduction

This report describes a study commissioned by the National Road Safety Council of Australia. The motivation was the observation that while young drivers have particularly high crash rates, and it is thus desirable that they drive particularly safe cars, they tend to drive and crash older cars. The question then arises of how choice of safe cars can be encouraged. One aspect of this is whether a significant barrier to young drivers driving new or newish cars arises from the way the car insurance system operates. For example, it is often the case that the insurance premium payable on a family's newish car may increase substantially if a teenage novice driver is one of its drivers. Another aspect is how insurance companies are likely to respond to future improvements in both primary and secondary car safety, given the extent to which new technologies that have recently been developed might assist in the reduction of vehicle damage costs.

Moving younger drivers into safer (usually newer) cars has the potential to reduce both the number of crashes and the severity of crashes that do occur. Relatively recently, stability control systems have been widely installed in the new vehicle fleet, and access by younger drivers to this technology will assist in reducing the risk of single vehicle crashes. In the medium term, more vehicles will be fitted with technologies such as forward-looking RADAR and vision systems that will assist drivers to avoid crashes through autonomous braking interventions. Hence, newer vehicles will be even less likely to crash in a potentially wide range of crash conditions. More effective braking may mitigate crashes that do occur, including crashes typically leading to property losses only, and hence these (and similar) technologies may also result in lower costs for those businesses that underwrite risks of property damage in crashes. This aspect differentiates new safety technologies apart from more traditional passive safety measures that reduce injury risk once in a crash, but do little or nothing to reduce property losses. It is possible that the interests of businesses who underwrite losses due to vehicle damage in crashes, and those whose interest lies in the reduction of crash injury risks, will become aligned in respect of the next generation of technologies.

From a social perspective, the developments of safety technologies need to be matched by efforts to ensure that effective technologies are made available to those drivers most at risk of crashing. These efforts have included regulation and consumer information programs as well as the marketing activities of car manufacturers and accident injury insurers. Information on second hand cars is available too, for example through the Used Car Safety Rating program and through historical ratings of the New Car Assessment Program; but the reality is that the importance of new car safety to the average standard of second hand vehicles is central.

In some situations younger drivers may have the opportunity to drive safer vehicles given that many households collectively own more than one vehicle. In other situations when a young person is buying a vehicle, different aspects of the vehicle (style, colour, amenity, safety and running costs etc.) will be weighed up. In both of these situations motor vehicle insurance costs might play a role. Hypothetically, at least, steep comprehensive insurance premiums for young drivers may prevent parents from allowing their licensed children to drive the newest and safest vehicle in the household. Similarly, comprehensive insurance costs may be a factor in determining the maximum value of a vehicle that is purchased by a young driver, although it is also reasonable to expect that comprehensive insurance may be foregone in many cases in order that the money be put to use to buy a better vehicle or put to some alternative purpose. Of course, in many cases, insurance costs may have no bearing on choice.

This report describes an exploratory study on several of the considerations described above. The objectives were:

- To examine the extent to which safer vehicle technologies are likely to be utilised by young drivers, and their overall effect on young driver crashes, through analysis of recent crash data.
- To seek the views of young drivers and their parents on the importance of vehicle safety in the choices they make about the vehicles that young drivers use, and examine whether insurance costs affect those choices
- To consult with the insurance industry whose job it is to price risk and set premiums, to understand how younger drivers are considered in the industry, and how vehicle safety technologies are recognised in insurance pricing.

In this report young drivers refer to those drivers who may have been licenced for only a few years and are under 25. The effects we discuss are likely to be most acute in the youngest drivers (those in their teens) and much of the literature refers to teenaged drivers. In several jurisdictions in which this research took place, licensing ages are, or were, younger than in Australia (15 years in at least one case), but the themes of vehicle ownership and vehicle access covered by the relevant publications is nevertheless likely to be of some relevance to the present situation in Australia.

## 1.1 Young drivers and their cars

The sorts of vehicles suitable for use by young drivers often receives attention, but often in relation to restrictions based on performance, possibly in the context of graduated driver licensing programs (e.g. Ferguson, 2003). The objective of these restrictions is to limit the power of the vehicle in order to reduce the chance that the young driver will travel at excessive speeds. This is certainly relevant in the present context, but other vehicle characteristics are important too, and a limited amount of literature has been devoted to young drivers, their parents and vehicle choice. Some general themes in this literature are that vehicle ownership by young drivers is associated with increased rates of crashing and that the increase is attributable to increased levels of exposure and increased levels of risky driving. Several of these studies also examine the vehicle selection process and roles of parents and the young driver in the decisions over vehicle choice.

In the Australian context, a self-report survey of novice drivers in Queensland after six months of independent driving led to the following findings (Scott-Parker et al., 2011). (a) Most had their own car. (b) Those with their own car reported greater mileage and more risky driving. (c) Several traits and states (sensation-seeking, reward sensitivity, anxiety, depression) do not influence vehicle ownership. Instead, vehicle ownership allows these traits and states to influence behaviour.

According to Rivara et al. (1998) in the US, “little information is available on the factors that go into family decisions about which vehicles teenagers drive”. Rivara et al. administered questionnaires to parents of teenagers attending drivers education training in Seattle. 26 per cent of respondents said the teen would have sole use of a vehicle. Factors most commonly rated important or very important in purchase of an additional vehicle for the teen were as follows: insurance costs (94%), price (87%), repair record (85%), gas mileage (77%), antilock brakes (73%), airbags (64%), other safety features (84%). Rivara et al. regarded vehicle size and weight as the most important safety factors. They regretted that this was not rated more highly by families.

Williams et al. (2006) reported a study of 16 year old novice drivers in their first year of licensure in Connecticut. There is information about access to cars, and type, age, and size of car. At one year after licensure, the median age of cars owned was about 8.6 years. Car owners averaged 90 miles

weekly at licensure and 114 miles weekly one year later, whereas car non-owners average 51 miles weekly at licensure and 74 miles weekly one year later. According to Williams et al., “Cost is likely to be a major factor in the tendency for teens, particularly owners, to driver older and smaller vehicles. Unfortunately, there has been no formal study of how vehicle and ownership decisions are made, and how parents choose and rationalize the vehicles their sons and daughters drive is largely unexplored.” However, the authors emphasise the link between ownership, a tendency to drive older vehicles, to travel more often, and to be allowed to drive unmonitored by their parents. They noted that parents generally had control over what vehicles their children will drive and also over whether their children were allowed to own their own vehicle.

A study from New Zealand was reported by Brookland and Begg (2011). The sample was not a random sample of the newly licensed driving population, but nevertheless the socio-demographic characteristics show that it represented a wide cross section of New Zealanders. Vehicle features important to parents were small size and transmission type, but in a quarter of cases, no choice was expressed as the vehicle used was the only one available. Importantly, in about three-quarters of all cases, vehicles were owned by the parents prior to their child obtaining their licence, and in some of these cases, the parents considered the vehicle to belong to the child. These vehicles were less likely to be comprehensively insured than vehicles owned by the parents.

Similar results were obtained by Cammisa, Williams and Leaf (1999). In their longitudinal survey of new licensees, they found that the two most common reasons cited for the vehicle choice were that the vehicle was already owned by the family and that it was inexpensive. They concluded that parents needed to be made aware that allowing their children to own a vehicle meant that their children would drive more often and crash more often. Consistent with Scott-Parker, Cammisa et al. also concluded that ownership was more likely to be associated with psychosocial deviancy such as drinking and smoking, and that this would have negative impacts on risk taking.

Similar findings on a US survey are reported by Hellinga, McCartt and Haire (2007), but they add some useful detail. Rural respondents were more likely to report that a vehicle was purchased for the teenager, rather than handed down, and unsurprisingly, family income was predictive of a better vehicle being driven by the teenager. However, income was not predictive of whether the vehicle used was primarily for the use of the teenager.

A very recent study of teenagers’ crashes in New Zealand noted that in the majority of cases, the crashed vehicle was owned by someone aged 30-59, presumably often a parent (Keall and Newstead, 2013). Nevertheless, the vehicles crashed by teenagers were older and scored lower on a scale of crashworthiness used in Australasian Used Car Safety Ratings. Their main conclusion is that parents have a key role in improving teenagers’ access to better vehicles, and also controlling their levels of exposure (in addition to controls put in place by graduated licensing schemes). An important point made by the authors was that restricting access to a parent’s car may lead to teenagers owning their own vehicle. For reasons mentioned above, this may not be desirable.

## 1.2 Standard of vehicles currently recommended and available to young drivers

In order to give some sense of the standard of safety available that is likely to be typically available to a young driver today, it is instructive to be aware of current prices for some example vehicles. There is a lot of free advice available (on the web and elsewhere) for parents and young people about buying a first car, including on www.howsafeisyourcar.com.au. However, it seems unlikely that the advice is relevant to many families as there is (as yet) only limited availability of cars with modern safety features at low enough prices. In 2010, howsafeisyourcar.com.au was promoting several vehicles for

young drivers that may still (late 2012) be in excess of $20000 to purchase, and possibly difficult to insure in the name of a young driver.

Some background information is as follows (December 2012). The minimum wage in Australia is approximately $16 per hour (or approximately $13 for a 17 year old in casual retail employment). As to car prices, the following refers to South Australia. (a) If European cars are regarded as acceptable, it is reasonably easy to get a used car with ESC under $10000. (b) If European cars are excluded from consideration, perhaps because of maintenance costs, it is possible but not easy to get a used car with ESC under $10000. Examples would be a 2004 Nissan Maxima (large) or a 2010 Hyundai Getz (small). (c) For a low budget, the following (lacking ESC) are examples. At, say, $1500, a 1996 (145000 km) Ford Mondeo is advertised; for $3500, a 2003 (102000 km) Daewoo Lanos is advertised; for $5500, a 2000 (115000 km) Toyota Camry is advertised; for $7500, a 2005 (141000 km) Mitsubishi Magna is advertised. Many of the vehicles probably being considered by young drivers are likely to have relatively modest safety credentials. It is probably only now that many vehicles in the low to mid-thousands will have an ANCAP rating.

## 1.3 Vehicle safety technology

Vehicle safety technology falls into two main categories: primary safety and secondary safety. Primary safety features includes any technology that prevents crashes from occurring. Secondary safety measures are mainly for energy management, so that the risk to the occupants of the vehicle or the risk to other road users (vulnerable road users) is minimised.

The period from the mid nineties to the late 2000s saw great strides made in the design of secondary safety systems. Airbags became widely installed in vehicles, seat belt technologies improved as did vehicle structures. Advances in materials and manufacturing methods meant that the strength of the occupant space was increased, while occupants' crash energy was more effectively managed through the collapse of other parts of the vehicle structure coordinated with the mechanics of the restraint system. Injury risk in crashes reduced radically over the period (Hutchinson and Anderson, 2011; Newstead and Scully, 2009).

More recently, advances have been made in primary safety that probably owe much to the advent of cheap computing power and sensor technology. All of these technological advances deal with vehicle control and speed reduction, and are able to respond to the vehicle's environment and dynamics more ably in many situations than the driver. The most well known example in recent times is electronic stability control (ESC), which has been repeatedly shown to markedly reduce the risk of single vehicle crashes (Høye, 2011).

Young drivers are at elevated risk of being involved in single vehicle crashes, and this is probably related to young drivers' engagement with risky behaviours such as speeding and drink driving. Socio-economic factors are likely to be a factor too. Whether it is vehicle choice or choices regarding behaviour, it has been observed before that young drivers from low SES areas are at increased risk of crash-related hospitalisation, even when allowing for confounders including driving exposure and rurality (Chen et al., 2010). Although behavioural factors figure large in single vehicle crashes, ESC is likely to be of considerable benefit in many of these crashes, as vehicles are less likely to become unstable, which can occur with only small excursions of the wheels of vehicles from the roadway for example.

There is increasing interest in other primary safety systems. A range of technologies was reviewed in the Australian context by Anderson et al. (2011). Mass crash data was disaggregated by type and then grouped according to whether certain technologies were likely to be effective in reducing crash

risk. It was clear that technologies such as autonomous emergency braking are likely to be important to future reductions in crash risk. The review stated:

> "The largest potential for reducing the number of serious and fatal crashes in coming years is likely to come from forward collision detection and avoidance technologies. These technologies currently include emergency brake assist, 'city-safe' low speed obstacle detection with automatic braking, and adaptive cruise control with automatic braking (operating sometimes only above, for example, 60 km/h). In the next five years, it is expected that the technologies will continue to develop such that there will be complete convergence in the operable range of systems, and a complete integration of the sensing and intervention technologies. It is from such future systems that the largest road safety gains are likely to be made."

It is important to note that such systems can have multiple functions, and can fuse information from multiple sensors in the vehicle, meaning that the potential exists to reduce risk in a wide variety of situations.

From estimates made in Anderson et al. (2011) and also in a follow up study by Anderson et al. (2012), it is clear that autonomous emergency braking has the potential to eliminate a sizable proportion of serious and fatal crashes, subject to certain technological constraints being overcome. Such technologies are effective as they reduce reaction times and optimise braking allowing greater speed reductions in emergency situations than it is possible for a driver to achieve using their own senses and reactions. Such technologies are currently at very low penetration levels in the vehicle fleet. But historical precedent suggests that they will become widespread in new vehicles in the next decade.

# 2 Analysis of data on crashes of young drivers

The objective of this Section is to describe the effects on safety of vehicle choices made by young drivers who crash. The basis of the analyses that are used herein is that the difference in the incidence of crashes involving young novice drivers and mature drivers might be partly (but certainly not wholly) explained by the differences in the specifications of the vehicles that they drive. Vehicles driven and crashed by younger drivers are older than average, and they are less likely to have safety features such as electronic stability control and side curtain airbags. As these and similar technologies carry with them a reduced risk of crashing, or a reduced risk that a given crash will lead to severe injuries, the lack of features in the vehicles of young drivers will lead to higher crash frequencies and severities.

Hence, the aims of this Section are:

- To describe in a quasi-theoretical way, the effect of the effect of a new safety technology on average crash risk over time;
- To quantify, in general terms, the consequence of the difference in vehicle ages and specifications on crash risks faced by young drivers
- To provide some descriptive statistics on the rate of various technologies installed in the vehicles of young drivers who crash and to compare these rates with those of more mature drivers.

Similar treatments of crash data are reported by Keall and Newstead (2011) and Anderson and Doecke (2009) who examined differences in crashworthiness and vehicle age by driver age; the focus here is on the youngest driver groups, specific safety technologies and the implications for crash risk. The mode of analysis follows that of Anderson (2011).

The effect of a new safety technology on average crash risk depends on several factors: the effectiveness of the technology, the prevalence of the technology, and the composition of vehicles that are at risk of crashing. Where differences exist in the prevalence of technology between two populations of vehicles, differential average effects on crashes in the two populations are inevitable.

The introduction of new technologies into vehicles follows a fairly repeatable pattern. Initially, the technology may be restricted to only a few models and the rate of installation in new cars may be very low. If successful, the technology will then become available on more new vehicles through market demand, (in some cases) regulation, and/or through the requirements of, for example, the Australasian New Car Assessment Program. These effects lead to an “introduction curve” that describes the rate of installation in new vehicles with time. The rate of introduction of a technology then interacts with the turnover of the fleet to produce a gradual increase in the penetration of the technology. The average effect of the technology on all crashes depends on this and on the age profile of vehicles that crash (or would otherwise crash if it were not for the technology).

## 2.1 The effect of new safety technology over time – the example of electronic stability control (ESC)

In the case of ESC, all of the abovementioned factors (low initial installation rates, successful evaluations, ANCAP requirements and regulation) have played a role in its installation in new vehicles. The installation rate of ESC in light passenger vehicles was described by Gargett et al. (2011) and is reproduced in Figure 2.1.

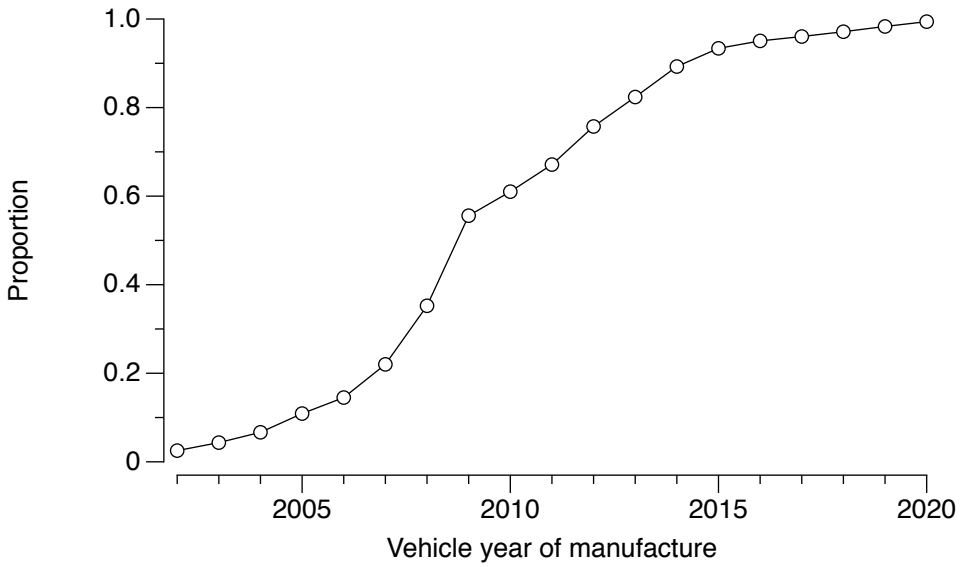


Figure 2.1
A composite introduction curve for ESC in new cars sold in Australia (2002-2020). Based on Gargett et al. (2011)

In this example, it is predicted that it will take nearly 20 years from 2002 for ESC to become universally installed on all new light passenger vehicles sold in Australia. The duration of the introduction period is typical of many vehicle safety technologies (Anderson, 2012).

Meanwhile, the prevalence of ESC in the general fleet will lag its introduction curve considerably due to the age of vehicles in the fleet. There are broadly two vehicle populations of interest in this respect: the general registered fleet (as this will govern availability of ESC in general), and the subpopulation of vehicles that are typical of the profile of vehicles involved in relevant crashes. As ESC is specifically effective in single vehicle crashes (Scully and Newstead, 2010) the subpopulation of vehicles involved in these crashes are of interest. Furthermore, those crashes involving younger drivers and alternatively more mature drivers are of interest.

Figure 2.2 shows three distributions. They are an approximation of the distribution of the ages of registered vehicles based on ABS data for South Australia, the distribution of ages of crashed vehicles driven by 16-18 years olds (based on South Australian serious and fatal crashes 2006-2012) and a similar distribution but for drivers over 24.

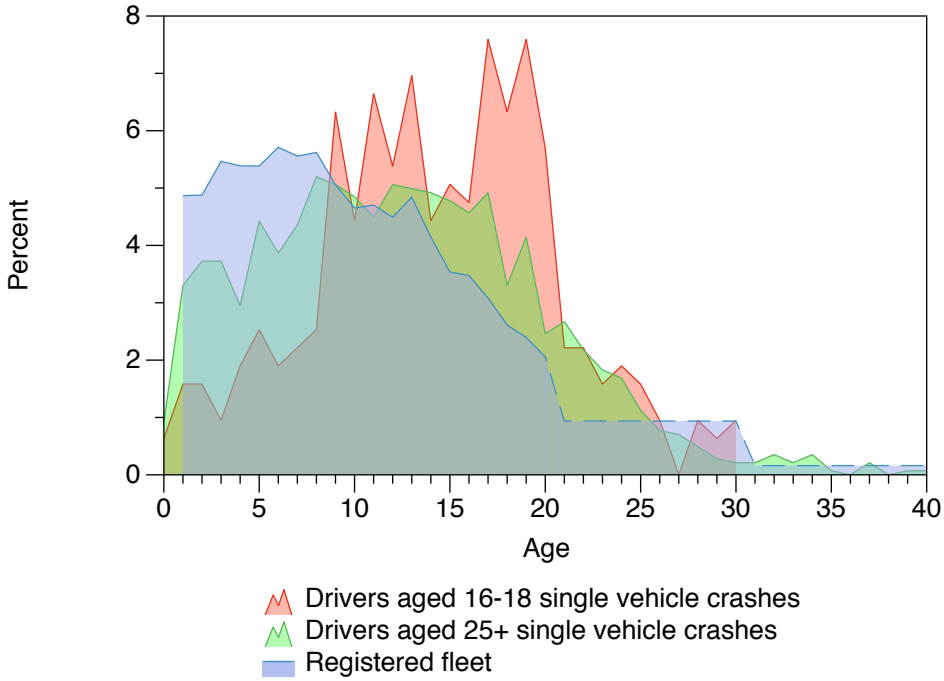


Figure 2.2
Age profiles of light passenger vehicles in the registered fleet and the age profiles of those segments of the registered fleet at risk of single vehicle crashes

The data in Figures 2.1 and 2.2 can be combined to estimate the change over time in the prevalence of ESC in vehicles within these populations of vehicles. Assuming that these age profiles are stable over time, and that they are currently only marginally affected by current ESC installations, it is possible to estimate for any given year in the future, the penetration of ESC in these populations of vehicles. In any given year, vehicles of a particular age will be associated with a known ESC installation rate (Figure 2.3). Hence the overall proportion of the population of vehicles with ESC may be estimated for each year.

The resulting penetration rates are shown in Figure 2.3, which also shows the introduction curve shown previously in Figure 2.1.

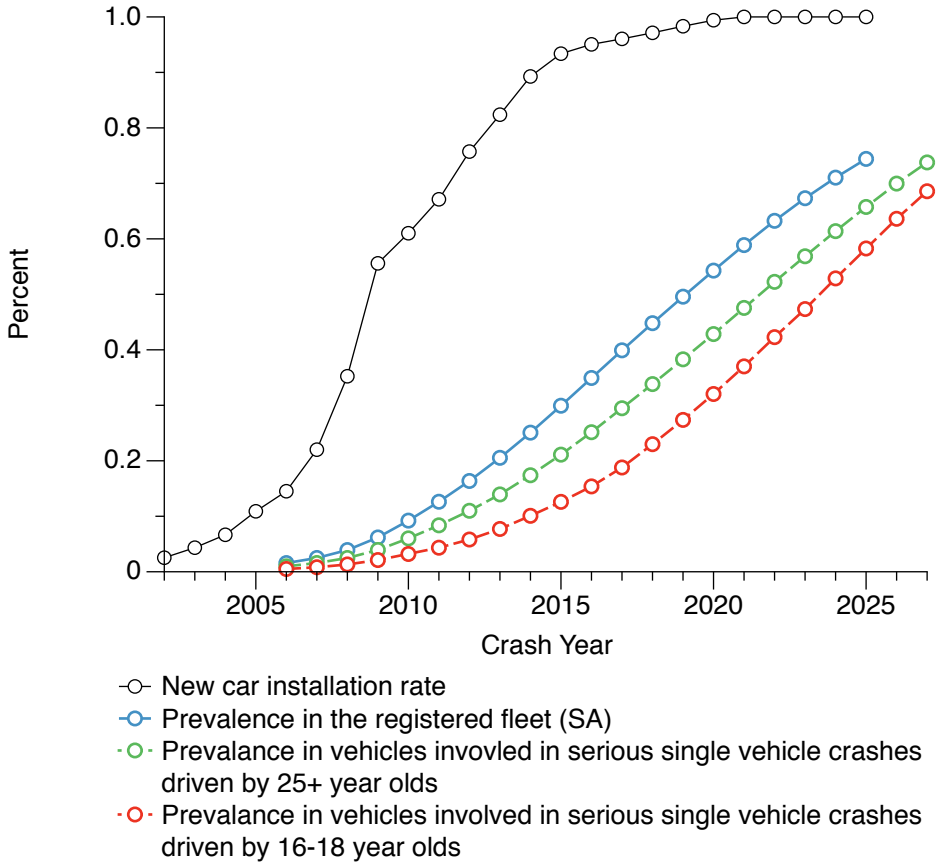


Figure 2.3
New car installation rate for ESC from Gargett et al. (2011) and penetration rates in the three populations of vehicles specified

The difference in the prevalence of ESC installations in crashes involving the younger age group and the older age group is clearly visible. The difference in the levels of penetration is projected to peak at about 11 per cent in 2019; as ESC prevalence in the registered fleet passes 50 per cent, the difference in the penetration in the younger driver and older driver crashed vehicle populations will begin to decrease. In 2019, ESC will have a prevalence of 38 per cent amongst vehicles who will crash (or otherwise would have crashed) whose drivers are 25 years or older. For the younger driver group, the prevalence will be 27 per cent.

### 2.1.1 Effects on crashes

ESC reduces the risk of serious single vehicle crashes in Australia by around 30 per cent (Scully and Newstead, 2010). This figure may be used to estimate how crashes will be reduced by ESC over time, by applying this effectiveness to that proportion of vehicles that will crash (or more correctly that otherwise would crash) that are projected to have ESC installed.

The results of this calculation are shown in Figure 2.4. Shown are the relative rates of single vehicle crashes for the two age groups of drivers to 2025. The rates are relative to what they might have been if it were not for ESC. (Hence the relative rates will asymptotically reach 0.7) Also shown is the ratio of

the two crash rates. This ratio is an estimate of the difference in single vehicle crash rates attributable to the difference in the prevalence of ESC amongst the two groups.

The average relative rate for 25+ year old drivers over the period displayed is 0.919 (i.e. an 8 per cent reduction over the period), and for 16-18 year old drivers it is 0.943 (a six per cent reduction); this means that is likely that, as a technology, ESC will be 30 per cent less effective for the younger group than the older group between 2006 and 2025. (Similar calculations to 2035, where the effects on crash rates are stabilising near 0.3, indicate that ESC will be 14 per cent less effective over the intervening period for the 16-18 year old group.) This is an indication of the reduced effect due to the delayed introduction of ESC for 16-18 year old drivers.

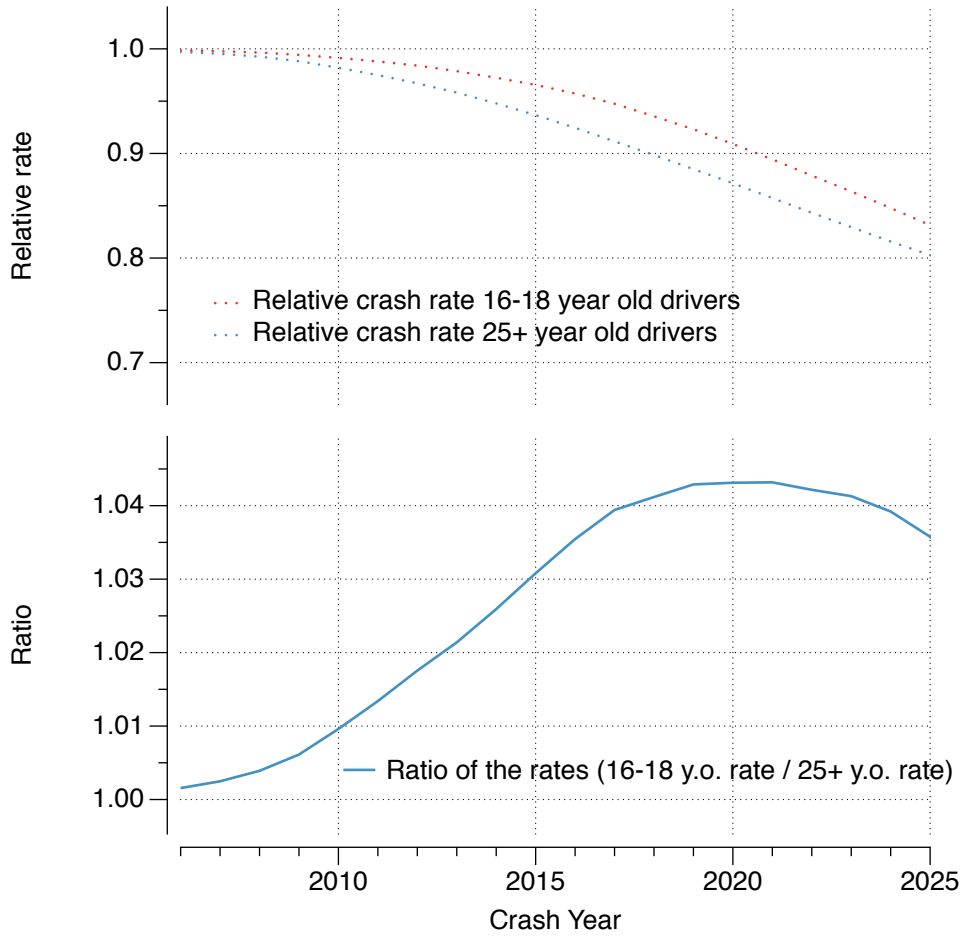


Figure 2.4
A projection of the change in the crash rates of 16-18 year old drivers and those aged 25 and above, relative to what the crash rate would other side have been, based solely on the effect of electronic stability control. The lower chart is the ratio of the rates.

## 2.2 Prevalence of new technology in crashes involving young drivers

The foregoing assumed that the rate of ESC installation may be approximated by the year of the vehicle within crash populations. However, crash data allow actual installation rates to be examined historically. The objective of the following Sections is to describe the actual prevalence of safety technology in recent crashes involving young drivers, and to estimate the reduced benefits of

technology for younger drivers that are a direct consequence of the differences in the specifications of the vehicles that were crashed.

### 2.2.1 Data and method

Records of crashes that occurred in South Australia between 2006 and 2012 were linked with registration and licensing data in order to add the vehicle identification number (VIN) to the crash record. The presence of the technology in a crashed vehicle was determined though linkage between crash data and specification data maintained by RL Polk Australia Ltd. VINs were sent to Polk for matching. Valid VINs were matched with details of the specifications of each vehicle.

VINs of vehicles manufactured before 1991 did not return any specifications, as a result of the limitations of the Polk data. It can be safely assumed that these vehicles did not have any of the safety features of interest due to their vintage. Approximately 10 per cent of vehicles with a build year after 1990 did not return any specification data; these were assumed to be random mismatches and therefore they were assumed to have the same rate of safety technology installation as other vehicles built after 1990. Prevalence calculations took account of both these factors.

Crashes were disaggregated according to the age of the driver, year of crash and according to whether there was a standard installation of particular safety features. For the purposes of this analysis, optional installations were ignored: though it was possible to tell if a technology was optionally available for a given vehicle in general, it was not possible to say that any specific vehicle had the optional feature installed. Furthermore, the rate of uptake of optional features is thought to be very low.

The safety features examined were ANCAP 5-star occupant rating, driver airbags, ESC, brake assist systems (BAS) and side curtain airbags. The prevalence of each safety feature was then calculated.

### 2.2.2 Results

In South Australia, over the period 2006-2012, there were 7623 crashes in which someone was either seriously injured (admitted to hospital) or killed. Note that reporting patterns for serious injuries in South Australia have changed recently, and hence the number of serious injury crashes recorded in 2012 are substantially lower than the trend would suggest. Furthermore, not all records for 2012 were available at the time of analysis, and hence results for this year are subject to more random error and potentially some bias when compared to the data for the other years (personal communication, SA Department for Planning Transport and Infrastructure).

The results of the matching and disaggregation are shown in Figure 2.5. The prevalence of all safety features was always less in the vehicles crashed by younger drivers.

Considering all crashes over the period, it was possible to calculate the relative prevalence of each feature in the two groups by taking the ratio of the overall prevalence in each group of vehicles.

For the most mature of the features considered - driver airbags - the overall installation rate in vehicles crashed by 16-18 year old drivers was 33 per cent. For drivers over 25 it was 54 per cent. Hence the relative prevalence of the younger group was 0.62. Expressed another way, the younger driver group potentially had only 62 per cent of the benefit of driver airbags that drivers over 25 had.

For the other features considered in Figure 2.5, the relative prevalence of each feature was:

- For BAS: 0.28
- For ESC: 0.16
- For 5 star safety: 0.30
- For side curtain airbags: 0.24

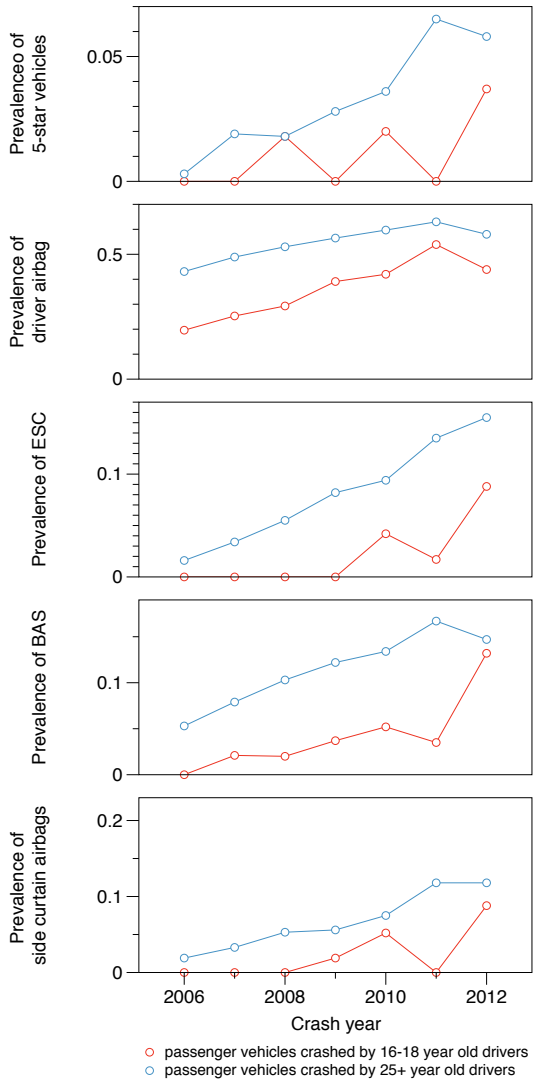


Figure 2.5
Prevalence of various safety features in cars crashed by 16-18 year olds and 25+ year olds, SA 2006-2012

## 2.3 Discussion

The objective of this section was to briefly describe, using the characteristics of the vehicles that are involved in crashes, the consequence of the lag in the utilisation of safety features by the youngest drivers.

Normally the benefits of vehicle technologies are described in per-vehicle and/or per exposure terms. For example, ESC is thought to reduce serious single vehicle crash risk by about 30% per vehicle, per km driven. In this analysis, information on exposure to risk and access to safety technology has also been included and hence the results describe the average effect of a technology, accounting for its utilisation. When a new technology is brought to the new car market, the introduction curve and the age of the fleet determine how quickly the fleet becomes saturated with that technology (or indeed, if the market becomes saturated with the technology). Hence, until such time that saturation has been achieved, there will be differential effects of the technology on particular groups of drivers who differ in respect of their access to, or take-up of, that technology.

In this report, the focus is on 16-18 year old drivers and the cars that they crash. The cars involved in crashes while being driven by drivers over 25 were used as a contrast. It was reasoned that many effective technologies that are part way through their introduction will not have the same effects on young drivers as older drivers, as a consequence of the differences in the age profile of vehicles involved in crashes. Actual fitment rates in crashes were also examined, and this more direct analysis of access to the safety features in crashes also shows that 16-18 year olds are at a deficit relative to drivers over 25.

It may be observed that the consequences are transient in the sense that eventually all vehicles in the fleet will have any given feature that becomes universally available in all cars. By 2035, it is likely that, almost every vehicle on the road will have ESC installed. But the duration of these transient effects span decades, and the positive benefits of the technology on young drivers during the transient period are attenuated.

Future work in this area might include the examination of the relative benefits of accelerating the introduction of proven and effective technology on the crash risk of different sub-populations of drivers. If economic factors related to the free market for second hand vehicles mean that it is difficult to manipulate the ages and specifications of vehicles driven by younger drivers, it may be worth examining the benefits and costs of the accelerated introduction of technology on average levels of safety.

# 3 What young drivers and their parents have to say about vehicle choice and the role of insurance costs

An important aspect of this exploratory study was the opportunity to interview a cross-section of young people and their parents. Three sets of data were collected. Two were at large metropolitan suburban shopping centres (one in Adelaide and one in Melbourne) and another set of data was collected at an inner regional centre in South Australia.

The objective of the surveys was to build a picture of how young novice drivers and their parents make decisions about vehicle choices: choices around vehicle ownership and choices around vehicle selection for particular trips (and in general), and how vehicle insurance costs bear on those decisions.

## 3.1 Method

A cross-sectional survey methodology employing a semi-structured interview was used to gain the perspectives of young drivers (aged 16-25 years) and the parents of a young driver.

### 3.1.1 Participants

A total of 38 young drivers (53% female) aged 16-25 years (mean age = 19.71 years, SD = 2.52) were interviewed. With regard to licence type, 14% were Learner's, 37% were P1, 20% P2, and 29% had a full licence. The number of cars available to young drivers ranged from one to seven vehicles; two or three vehicles were the most common responses (34% each); young drivers most often reported driving only one vehicle most regularly (74%). Fifty five per cent of young drivers reported owning the vehicle that they drove most regularly. Parents or others (e.g., grandparents, friends, relatives, etc.) were the owners in 32% and 13% of cases respectively.

Thirty seven parents/guardians (62% female) were also interviewed for the study. Ages ranged from 38 to 68 years, (mean age = 49.06, SD = 7.04). The number of young drivers per family ranged from one to three, with 65% reporting information with regard to one young driver only. The number of vehicles available to young drivers ranged from one to five, the most commonly reported number of vehicles were three (32%) and two (30%). Young drivers were generally reported to drive one vehicle most often (62%), and the majority of those vehicles were owned by parents (59%); 35% of young drivers owned their own vehicles.

### 3.1.2 Instruments

In order to determine the extent to which insurance costs influence decisions regarding the vehicle young drivers were allowed to drive two questionnaires were prepared, one for use with young drivers and the other for use with parents or guardians of young drivers. Copies of the questionnaires are provided in the appendix. Following a pilot phase both questionnaires were improved to make the interview easier to conduct and increase the relevance of the information collected.

For young drivers, the questionnaire covered basic demographic information including age, sex, licence type, living arrangements (e.g., alone, with parents, other), and an estimation of number of kilometres driven per year. A second section obtained information regarding the vehicles available to young drivers (e.g., make, model, year), including ownership of the vehicle (young driver, parent or other), and type of insurance for the vehicle. Participants indicated which vehicle was most frequently driven by the young driver. A final section addressed the reasons why the young driver drove one

vehicle more than the others and the reasons why they did not drive the other vehicles as often. This section contained questions specifically asking whether insurance costs were an issue. A final section contained four multiple-choice questions to assess participant's knowledge regarding vehicle safety features.

The parent/guardian questionnaire followed a similar format to the young driver questionnaire and differed only in terms of adapting questions to obtain answers from the parent's perspective. Additional demographic questions regarding the age, sex, licence type, living arrangements (alone, with parents, other), and estimated kilometres travelled per year for each of the participant's young drivers were obtained. All other sections of the parent questionnaire were similar to the young driver questionnaire in terms of the information collected.

### 3.1.3 Procedure

Interviews were conducted at two urban shopping centres, Westfield Marion (N=29) in South Australia and Westfield Southland (N=23) in Victoria. A third set of interviews were conducted in the rural centre of Gawler, South Australia (N=23). These locations were selected in order to as simply as possible account for potential differences at a national level and between country and metro drivers. Interviewers attempted to reach a quota of 10 young driver interviews and 10 parent interviews with, as close as possible, an even distribution of sex. Interviews in South Australia were conducted on a weekday between the hours of 9 am to 5 pm while interviews in Victoria were conducted on a weekend between the hours of 9 am to 5 pm. Researchers were permitted to undertake interviews by each of the shopping centres visited, and procedures were approved by the relevant institutional ethics committee of the University of Adelaide.

Interviewers approached passers-by and invited them to participate in a short interview designed to find out the reasons why young drivers drive the cars that they drive. In order to meet the desired quotas some selective sampling was undertaken as needed. Details of the research and participant requirements were described in detail to potential participants and informed consent was obtained prior to commencing an interview. Parental or guardian consent was also obtained for young drivers under the age of 18. Interviews lasted between five to ten minutes depending on the amount of information provided by the participant and all responses were hand recorded by interviewers on an individual form (i.e., one form per interview). Upon completing the multiple choice questions regarding knowledge of vehicle safety interviewers briefly explained the correct answers where participants had either selected an incorrect answer or indicated that they had made a guess. Participants were provided with CASR branded merchandise (e.g., pens, drink bottles, stress balls in the shape of a traffic cone, or a USB drive) for their participation in the study.

The first round of data collection also served as a pilot for both questionnaires. A number of improvements were identified with the questionnaires amended to reflect these. As the changes were minor in nature the data obtained during this period were also included in this study.

It is important to note that the samples are not matched (i.e., young driver with parents), although a number of young driver/parent combinations were interviewed during the course of the study. The responses of these groups were not compared.

An important limitation to note is that the sample and the responses are not guaranteed to be representative of all young drivers or their parents, and the numbers are such that random variation may affect the proportions presented in the results. For this reason, the results should be seen as preliminary and indicative, rather than conclusive.

## 3.2 Results and discussion

### 3.2.1 Young driver vehicles

The year of manufacture of the vehicles driven by young drivers ranged from 1986 to 2012 with 41% of vehicles made before the year 2000. Forty eight per cent of young drivers' vehicles were manufactured within 10 years of the study, and 26% were made between 2008 - 2012. Where it was possible to compare the age of the young driver's vehicle to that of other vehicles available to them (N = 40) 67% were found to be older than the other cars. In a number of cases (N = 12) the young driver's car was built more recently than other available vehicles, 10 (83%) of these were produced during or after 2010.

The cars driven by young drivers were purchased by, or for, the young driver in 50 (67%) of cases and 23 (31%) were a pre-existing family vehicle (this information was missing in one case and in the other the vehicle in question belonged to a housemate).

Red book valuations were checked for all vehicles that the young driver participants said that they drove. Twenty eight per cent of vehicles driven by the young drivers were worth less than $2000, 64 per cent were worth less than $5000, and 86 per cent were worth less than $10000. When the young driver was the owner, these percentages were 23, 68 and 91 per cent.

Safety features was rarely a consideration in the process of buying a car for a young driver. The most common reasons for buying a car were price, type of car (make, model, size, transmission), running costs (e.g., fuel consumption), and condition. Some respondents (N = 9), both young drivers and parents, reported that safety features such as airbags or ANCAP safety rating were considered in the decision to purchase a vehicle.

In the majority of cases the young driver had access to more than one vehicle, with the number available ranging up to seven, although the most common response was two (32%) or three (35%). Despite having often having more than one vehicle available young drivers were most often reported to predominantly drive one vehicle (68%). This vehicle was usually their own vehicle or designated for their use by parents, which, in conjunction with limited availability of vehicles used by other family members, was the primary reason reported for driving a particular vehicle over others. Furthermore, it was often reported that young drivers preferred to use their own vehicle even when others were available to them.

It was also found that young drivers would drive another vehicle when they did not have enough petrol or their own car was not running or undergoing repair, or if a particular trip required the use of a different vehicle that was more suited to the purpose (e.g., using a 4WD for camping).

### 3.2.2 Insurance questions

When asked whether insurance costs were a reason that they did not drive other vehicles available to them as often, 11 young drivers indicated that they were, 25 that they were not, and two that they may have been a reason.

A second question asked: if insurance costs were cheaper on those other cars did they think they would be allowed to drive those other vehicles. Ten young drivers reported that they would be able to, 25 indicated that they would not, and three stated that it was possible.

When asked similar questions, 11 parents indicated that the cost of insurance was a reason they did not allow their young drivers to drive other vehicles, 25 indicated that this was not the case, and two

indicated that this was one possible reason. With regard to cheaper insurance costs 10 parents reported that they would allow their young driver to drive the other vehicles if the premiums or excess were cheaper on those cars, 25 reported that this was not the case, and three indicated that this was a possibility.

These findings are generally consistent with the observation that many of the young drivers in this study (including the young drivers of the parent participants) had access to at least one vehicle that they were allowed to drive on a regular basis, and about 50 per cent said that the vehicle they drove regularly belonged to them. As to the reasons why young drivers were restricted from driving other vehicles the most common responses, particularly from parents, related to the young driver's ability to drive a manual over an automatic vehicle, capacity or power of the vehicle, or running costs. Another common reason why young drivers drove a particular vehicle more often was usually because it belonged to the young driver and they preferred to drive that vehicle, or that the vehicle was allocated for the young drivers use by parents. This also fed into the reasons why other vehicle were driven less frequently, as these tended to be used by parents or other family members leaving only limited opportunity for their use by the young driver. Insurance costs were rarely mentioned spontaneously as a reason for segregating vehicles for use by particular family members.

When asked, about one third of respondents did mention that the cost of insurance was a reason that young drivers did not drive other vehicles as often, and predominantly it was excesses that would be payable should there be a crash that were considered prohibitive. Many parents noted that "family vehicles" were often insured only for drivers over the age of 30 years, and that should premiums or excesses be reduced sufficiently, they would consider nominating younger drivers on their policies. This provides some evidence that discounted insurance costs may improve the safety of vehicles driven by some young drivers, and/or that parents are unwilling to nominate young drivers on their car insurance policies.

An interesting finding is that a number of participants (young drivers and parents) indicated that a reduction in insurance costs was more likely to influence the type of insurance they had for their (the young driver's) vehicle (e.g., ability to have comprehensive over third party insurance) rather than necessarily affecting the vehicle the young driver would be allowed to drive. For young drivers, the purchase price of a vehicle was overwhelmingly the main influence over the type of vehicle they buy.

Respondents had varying levels of knowledge regarding vehicle safety. Questions were asked that revealed whether they had a basic understanding of ANCAP star ratings, driver airbags and electronic stability control (ESC).

Over 85 per cent of young drivers knew that the star rating indicated level of safety rather than something else (luxury, efficiency) and a similar number know the basic function of an airbag. Fifty per cent knew what the function of ESC was – these respondents also generally reported correct answers to both other questions.

Very similar results were found amongst the parents of young drivers, but slightly more (about 60 per cent) understood the function of ESC. It is noteworthy that ESC did not have the same recognisability as ANCAP and driver airbags.

# 4 Motor vehicle insurance, vehicle technology and young drivers

A focus of this study is how motor vehicle insurance affects vehicle choices made by young drivers. As young drivers have higher crash rates, they (or the owners of the cars that they drive) are asked to pay more for first party insurance than they would if they were older, with a good driving record. It is reasonable then to assume that this cost affects behaviour in some way; in the previous section, about one third of young drivers and the same proportion of parents of young drivers said that insurance costs, particularly excesses, influenced which vehicles in the household they tended to drive. It is possible that in these cases, reduced costs might lead to altered behaviour.

The views of the automotive insurance industry were sought. Representatives of the motor vehicle insurance industry were interviewed in order to describe how motor vehicle insurance risk is priced and how factors relating to young drivers are considered in pricing. Moreover, we sought information on how new vehicle technology was considered when pricing insurance.

## 4.1 Background

### 4.1.1 The insurance industry

Motor vehicle insurance in Australia is mainly run as an arm of general insurance businesses. The Productivity Commission (2005) identified four major corporate groups that dominated motor vehicle insurance in Australia. With the takeover of the AAMI insurance brand by Suncorp in 2007 (as a part of Suncorp's takeover of Promina), the number of major market participants reduced to three. There are a number of smaller independent insurance businesses that may have substantial market share in particular jurisdictions (for example RAA insurance in South Australia). However the major insurance groups appear to be:

- Insurance Australia Group (IAG) whose major brands are NRMA, CGU, SGIO, SGIC, and RACV (joint venture);
- Suncorp-Metway whose major brands are Suncorp, GIO, AAMI, InsureMyRide, Just Car Insurance, Shannons, and Bingle. Suncorp divested themselves of joint ventures in RACQ insurance and RAA insurance in 2010.
- Allianz (7 per cent) whose single brand is Allianz.

### 4.1.2 Types of car insurance

There are several types of car insurance. These include compulsory third-party injury insurance (CTP), third-party damage insurance, and first-party damage insurance. Exactly what these cover differs from one jurisdiction to another, and the following is a simplification.

- CTP. At-fault schemes cover injured persons if they can show the accident was the fault of a driver (other than themselves). No-fault schemes cover everyone.
- Third-party damage. This covers a driver for damage that he or she causes to other vehicles (and property).

- First-party damage. This is bundled with third-party damage into what is termed comprehensive insurance. It covers drivers for damage to their own vehicles.

It is the third of these types of insurance that falls under the scope of the present report.

It is important to note that the business models differ across types of insurance. CTP and damage insurers may have quite different views, both of their business worlds and their car safety worlds. With CTP insurance, there are relatively few claims, but a proportion are very large (millions of dollars) and are only finalised after several years. Small underwriting losses are tolerable as there is investment income on the technical reserves. With damage insurance, on the other hand, there are a great many claims, but these are small in magnitude and finalised within months. The loss ratio (rather than investment income) is very important and so models of the technical pricing of risk and strategies to write new business become extremely important. There may also obvious differences in the way insurance is sold.

Some background on the business aspects of motor vehicle insurance in Australia may be found in the report by the Productivity Commission (2005) on the interactions between the insurance and crash repair industries. The report also noted that a range of factors may be reducing the incidence and severity of motor vehicle accidents. These are said to include improvements in vehicle technology, which have assisted drivers to avoid accidents (for example, anti-lock braking and traction control systems), traffic calming initiatives (for example, reductions to speed limits in certain suburban areas) and better roads, and more stringent policing of unlawful drink driving and greater numbers of speed cameras. The point is made that other factors also exert an influence on claims numbers and repair work, including the number of vehicle thefts and the prevalence of major hail storms.

### 4.1.3 Factors affecting premiums

There is some controversy over the use of some factors such as age, sex, and marital status to set motor insurance premiums, although it appears to be accepted practice in Australia. Wiegers (1989) examines economic, legal, and ethical aspects, in the Canadian context, and provides interesting discussion of the related topics of (a) variability between people within a category (e.g., not everyone who fits the stereotype of a dangerous driver is in fact a dangerous driver), and (b) the practicability or otherwise of rating the individual rather than the category of that individual.

A report from the OECD (1990) describes the operation of car insurance systems in countries of the OECD at that time. Of particular interest is Annex A, which summarises countries' responses to particular questions. Some relevant extracts are given below.

- There is quite a lot of variation from one country to another in their systems.
- Page 105 and page 110. Major risk factors and their impact on premiums are described: driver characteristics, vehicle characteristics, mileage, use, zone, deductible (claim excess), alcohol. It is said that "The principle of 'realistic pricing' appears to be widely applied; the limits to its application would seem to be economic, conceptual (insufficient knowledge of risks and especially a priori risks), and legal (statutory ban on discrimination on grounds of sex, ethnic origin, etc.)." However, this should not necessarily be read as asserting that premiums are fair in some sense. Rather, it is likely that realistic pricing (as in pricing that reflects risk) is a baseline which may then be modified.
- Page 108. Pricing policy was not seen as being designed to influence the choice of vehicle.

- Page 113. “In the great majority of cases, the insurance industry disclaims any interest in the choice of vehicle and does not seek to direct drivers’ choice, apart from the possible effect of differences in premium rates according to vehicle.”

- Page 115. “Is there a pricing structure specific to young newly licensed drivers? What is its structure: systematic extra premium in addition to the reference premium (extent of this extra premium; is it regulated and controlled?); specific restrictive clauses of insured vehicle use; special higher deductibles? There appears to be a wide diversity of situations. While the majority report a systematic premium supplement for young drivers, a sizeable minority do not apply a premium supplement, at least for personal injury. When a supplement is applied, the differential varies widely. Clauses limiting use of the insured vehicle (or its use under certain conditions) do not appear to be employed.”

- Pages 116-117. “While young people are not generally considered to be a ‘poor risk to be avoided’, this idea is effectively present and influences thinking. In countries where young newly licensed drivers have to pay a substantial additional premium (e.g., France), they may become a major target of companies’ sales policies.”

It is sometimes argued that usage-based, or pay-as-you-drive, insurance is desirable and feasible (e.g., Wriggins, 2010, especially pp. 86-88). Cars insured under pay-as-you-drive insurance have a telematic device installed that uses GPS. The price charged is based on aggregate distance travelled. It is something that may become more common in the future, but the information technology demands on such a service are likely to be large.

## 4.2 Interviews

Most of the major insurance groups and several smaller brands were approached to assist with this study. In general, the targets of these approaches were underwriting managers or the heads of motor vehicle insurance underwriting.

Responses were not received from all companies approached, but positive responses were received from companies whose collective coverage of Australian motor vehicle insurance exceeds 80%. Not all respondents wished to be named, but those insurers interviewed for this part of the report and who are willing to be identified were Suncorp, IAG and RAA Insurance. All interviews were about vehicle insurance, and focussed on comprehensive insurance, which is the type of insurance chosen by about 80 per cent of their customers.

Letters were sent to participants that outlined the purpose of the study and several topics that we wished to talk to them about. This was followed up with interviews conducted either in person or by telephone. In most instances, the interview was conducted with personnel with managerial responsibilities for underwriting often jointly with other personnel who specialised in technical aspects of underwriting motor vehicle risks.

Interviews were structured around three broad areas: the pricing of risk particularly in relation to younger and novice drivers; new vehicle technology and how information on safety was used in the underwriting process; and how customers bought insurance, with a view to identifying means of promoting decisions likely to promote safer vehicle choices.

### 4.2.1 The pricing of risk and the setting of premiums

The principle behind insurance, including motor vehicle insurance, is to pool the risks faced by a group of people (the customers of the insurance company) and for that group of people to jointly bear the

cost of covering that risk. Respondents indicated that a major task of insurance underwriting is to identify and price particular risk factors associated with claims on the insurance fund. Correctly pricing risk allows the insurance company to differentiate pricing amongst its customers while ensuring the financial viability of its insurance business. Correctly identifying risk also allows insurance companies to structure their businesses to target certain segments of the insurance market for their own financial benefit. Use is made of independent actuaries to provide compliance with regulatory requirements of the Australian Prudential Regulation Authority (as Appointed Actuaries), and to provide systems for analysing and making use of large datasets to assist the pricing of risk.

In general, risk profiles are created at the insurance quotation stage and these are used to determine the price of the insurance premium. Information that is used will generally include:

- Age and sex of the owner and other drivers
- Postcode of residence
- Garaging information
- Vehicle information (make, model year and vehicle features)

Other information may also be gathered such as the distance that the car will be driven each year. In the case of some brands that might target younger car owners in particular, many other questions will be asked of them. In all cases, the objective is the same: to predict and price the risk that the business is being asked to take on. Specifically, this risk is priced by categorising vehicle and driver information in a way that allows the business to assess likely claim frequency and average claim costs. Ultimately it is claim frequency and cost that determines premium pricing and the setting of excesses.

The competitive nature of the insurance business means that it is in the insurers' best interests to gain competitive advantage from their pricing strategies. This may encompass strategies that look beyond immediate risks and consider the identification of future risks (which might be lower) and that consider the advantage of "market capture". These additional factors affect the pricing determined using actuarial methods that are used to calculate "model" premiums (or "technical" or "efficient" premiums). Actual premiums may vary from these based on business strategies.

Business strategies may also take account of broader considerations, notably how the business wishes to be perceived in the community, including in relation to road safety (they may offer safety related training, or sponsor safety related activities); in the case of insurance based around motoring clubs, the objectives of the club in respect of their membership are important too.

In regard to the actuarial methodologies employed, of great importance is historical claims information. As much information as possible is used to establish, using statistical methods, factors affecting claim frequency and average claims costs, and in some cases, the statistical interaction of these factors. Sometimes, ancillary information is used as indirect measures of risk, or for the identification of "good risks" in order to be able to gain some competitive advantage. (An example might be a discount for young drivers that attend a driver safety course – participation in the course may indicate a willingness to drive safely and is therefore a way of identifying good risks.)

In every business we spoke to, the objective appeared to be to identify some core source of profitability and to pursue that segment of the market. This appeared to be the main reason for any distortion of premiums, which were otherwise in line with risk pricing. As customers tend to stick with one insurer for some time, an objective is to capture customers as they become profitable. Examples of this can be seen in the marketing strategies of several insurance providers (not necessarily

including or limited to the businesses represented in this survey) and explains why the insurance business of people over 30 years of age is sought-after.

In relation to young drivers, the view was that they are indeed a particular challenge within the insurance industry. Young drivers may face steep insurance costs when they are owner-drivers particularly if the vehicle is of high value or is unusual in some respect. Newly licensed young drivers may claim at a rate three times that of the average driver (or more), and claim costs are higher on average too. This can leads to expensive premium settings. A young driver who makes an injudicious vehicle selection bought under finance may find that the vehicle is uninsurable, leading to the sale of the vehicle. It is common to find that young drivers' vehicles are registered and insured in the name of a parent for similar reasons.

When young drivers are added to their parents' insurance certificate as a nominated driver, premiums and/or excesses increase. High insurance costs related to young drivers can cause some problems with disclosure, manifesting as unusual claims patterns. Increased rates and costs of claims are seen amongst middle aged people, particularly women, and the explanation appears to be crashes that occur when the policy holder's child is driving, the responsibility being attributed to one of the young person's parents, more often their mother.

In some cases, insurance prices are offset to some extent: higher excesses may be imposed in exchange for lower premiums (and this might be selectable by the customer), or premiums for new drivers may be slightly less than the model premium would suggest, but slightly higher after a few years. For some insurers (possibly more likely to be smaller insurers) the risks related to young drivers are too high and they are more likely to price themselves out of that particular segment of the market. In general, most insurers aim to offer a price that is reflective of the actual risk. Aligning a young person to a brand for the long term, or maintaining existing custom from the young driver's family are also considerations.

Some brands ostensibly target younger drivers. However they will apply methodologies to identify high risk drivers and will adjust premiums accordingly.

## 4.3 Vehicle safety technology

In regard to vehicle technology, historical claims experience and also the expertise of claims assessors are used in setting that component of a premium that relates to the vehicle. When a new model is released, insurance companies will assess the damageability of the vehicle and likely costs of repair in common crash types. Hence vehicle safety systems are not always viewed positively by insurers. In many cases vehicle safety systems are designed to reduce the risk of injury in a crash but they do little to reduce risks of vehicle damage per se, and will, in some cases, increase repair costs. Most secondary safety systems fall into this category, where the deployment of multiple airbags sometimes leads to the total economic loss of the vehicle. There is, therefore, an ambivalence – and certainly some scepticism – regarding new vehicle safety technology.

Nevertheless, some insurers proactively attempt to identify those technologies that are likely to reduce claim frequency and mitigate losses, for the same reasons that insurers will attempt to identify safer than average drivers: to do so will allow them to identify lower risks and to offer better prices and capture market share. Sources of such information may include technology trials, or early claims experience in overseas markets where volumes are higher and technologies are often introduced earlier. The claims experience of makes and models are reviewed regularly to adapt the pricing of their associated risk. It was not clear how uniform such approaches are across the industry however. Current vehicle valuations are important too, as it may often be the cost of the most expensive claims

(i.e. claims for a total loss) that differentiates average claim costs between one vehicle model and another.

Interactions with the motor vehicle manufacturers appears to be limited or ad hoc at best, and there does not appear to be a single platform for the exchange of information between the insurance and motor vehicle industry. Some respondents mentioned that it was typically the case that they had to seek information from the manufacturers.

## 4.4 Discussion

The insurance market is dominated by only a few companies although there are many brands and several smaller new players in the market. It was not possible to assess from these interviews how truly competitive the marketplace is, but certainly respondents described the process of the setting of premiums as a competitive process, and one in which the underwriting process is of central importance. Respondents seemed ready to acknowledge that younger drivers were a difficult part of their business due to their higher than average crash rates and claims costs. They recognised that pricing premiums in a way that reflected that risk created problems for young drivers and often the young drivers' parents too, leading to problems with disclosure and claims patterns. However, the identification of good risks amongst younger drivers, and attracting their business was seen as desirable by several brands. Respondents saw insurance pricing as not influencing vehicle purchase decisions except in certain specific situations, such as when expensive or high risk vehicles are obtained using a bank loan or similar. In these cases young drivers often find that comprehensive insurance is a requirement of the bank and that insurance costs are very high (or even that insurance cover might be denied). It is possible that this might lead to the sale of the vehicle in some cases. But in most cases, their experience was that insurance was very often an afterthought, and played only a minor role in vehicle choices made when a young person is buying a car. Only when parents were involved did insurance costs sometimes figure in the purchase decision.

The pricing strategies of insurance businesses was to identify likely claim frequency and average claim costs and to charge accordingly. Given this, young driver insurance costs will always have an intractable element to them.

# 5 Discussion: Opportunities for improvement

In this report, the focus has been on young drivers and the vehicle choices that they make and how these may be affected by the costs of motor vehicle insurance. The motivation was the deficit in safety technology in the vehicles that young drivers use. However, these quite specific concerns ought to be considered in the context of how transport costs affect transport choices in general.

It is axiomatic that the costs of transport shape people's decisions about transport modes and vehicle choices, as well as the type and amount of travel. Crash risk varies across transport modes and also within modes (for example according to make and model of vehicle), and crash rates are also proportional to the amount of driving. Hence it is to be expected that transport costs ultimately affect crash rates.

When it comes to young drivers, it is very important to be mindful of the finding that encouraging motor vehicle use increases crash risk. This fact is recognised in the context of driver training and education, in which it has been found that interventions that have lead to early licensure also lead to increased crash rates, simply due to the increased exposure that results (e.g. Woolley, 2000; Mayhew and SImpson, 2002).

Similar considerations apply in the present context too: increased access to safer vehicles might be facilitated in several ways, but if the mechanism also leads to more driving, then it is quite reasonable to expect that the safety advantages of those vehicles, which might be measured as a reduced crash risk per trip, will be countered, to some extent, by the increased number of trips that ensue. An example of a mechanism that would allow young drivers increased access to safer vehicles is to make it attractive for a parent to share access to their vehicle. In this case, the probability that the young driver will obtain their own vehicle may decrease, or it may be delayed. Primary access to a vehicle is known to have negative impacts on the safety of young drivers, possibly doubling their crash risk (Cammisa et al., 1999; Williams et al, 2006; García-España et al., 2009).

Hence there is a potential conflict to be resolved: the independence that comes with vehicle ownership is likely to be seen as attractive to many young people, and many parents may support a child's wishes in this respect. From a road safety perspective it is something that should be discouraged. Promoting shared access to a parent's vehicle may have two important effects: the parent's vehicle may be newer and more likely to have safety features than the car that the child might otherwise purchase and importantly, shared access is likely to reduce crash rates, independent of other effects (García-España et al., 2009).

Many of the suggestions that might be made to encourage better patterns of car use amongst young drivers are broad in scope. Improving advice about safe cars is relevant to all drivers, not only to young drivers, for example.

There are several suggestions below that, while relevant to young drivers, car ownership, and car insurance, are not limited to them.

- If turnover of the fleet is difficult to manipulate, then certainly an objective should be to steepen the introduction curve of new safety technologies, to increase the average effectiveness of the technology in the medium to long term.

- Information should be provided on the benefits of emerging technology especially for young drivers to increase their utilisation of new technologies.

- Whatever is done, it should not increase motor vehicle access by young drivers overall.

- Encouragement might be given to families to examine their own thinking about vehicle access (further comments are made on this below)

## Family thinking

There are several ways in which a family with a teenage driver might be encouraged to best utilise the safest vehicles in the household.

- Expert opinion is that newer cars tend to be much safer than older cars; perhaps more could be done to publicise this.

- Sometimes, one of the family's considerations may be the possibility that the teenager will damage the family's primary car, and the cost of repairs become an issue because of higher excesses that are payable. Perhaps the family could be persuaded to consider whether the primary consideration ought to be the teenager's safety. If the teenager can only drive the family's primary car as a privilege, rather than a right, perhaps that should change.

- Encourage shared access to better vehicles. Whether they do perceive a problem or not, families may wish to consider whether the safest car should be treated as belonging to the family collectively, and be usually used in the worst circumstances (e.g., when the journey is a long one, or when the driver is an inexperienced one). It is reasonable to encourage families to discuss such issues.

- The provision of a vehicle for the teenager's use might be viewed differently: an additional vehicle might be viewed as adding to the pool of "vehicles in common" for use within the family, rather than leading to the primary allocation of the least valuable, least safe vehicle to the youngest driver.

- It is possible that motor vehicle insurance companies might recognise the kind of arrangement mentioned above, if it truly reduces claims frequency across all vehicles. How practicable an arrangement this is for families would remain to be seen, as it is likely that in many cases they may not obtain comprehensive insurance for the least valuable vehicle(s), while comprehensive insurance costs for the more valuable vehicles would be likely to increase under such an arrangement.

- It is reasonable that insurers should be able to charge premiums and design excesses that reflect the risk profile of the insured, and hence the primary decision may always be for families to decide whether to bear the additional insurance costs of shared access to vehicles, in cases where this is practicable and acceptable.

- In the cases where a teenager wants or needs his or her own vehicle, the family might consider whether it can give extra money to the teenager, to permit purchase of a safer car[1].

- And perhaps the best option is for the teenager to delay driving for a few years.

Many people use the internet to buy insurance, or to find out about insurance products before contacting a call centre. Indeed, many regard the internet as their prime source of information, and use the consumer information websites of governments, motoring clubs, and mass media. Thus the

[1] Istre (2001) reports that his teenage children chose car models with low driver death rates when he contributed to the cost in inverse proportion to the death rate (which is available in publications).

internet offers an opportunity for information to be provided on the benefits of sharing access of family vehicles with younger drivers.

### Ease of identifying a safe car

It is desirable that choosing a safe car be as easy as possible - whether the buyer is young or old. The level of knowledge about vehicle safety is imperfect amongst families. This was evident in our survey: only 50 per cent of young drivers and about 60 per cent of the parents of young drivers knew the function of ESC. (Similar findings in relation to knowledge about vehicle safety are reported in the literature.) This is unsatisfactory as ESC is likely to be very effective for common types of serious young driver crashes. The internet is an obvious means of targeting information for young drivers. However, it may be the case that the information that safety authorities wish to provide is too separated from those websites most likely to be consulted when buying a new car: the online advertising websites. Online advertising websites are good for their purpose, but in regards to car safety they are useable rather than ideal. Some comments may be made as follows.

- It is possible to specify safety features when searching the websites. For example, on several websites are direct means of searching for cars with 5-star ANCAP ratings. Some websites include specification data, and so it is possible to identify many vehicles with ESC if stability is entered as a keyword.

- More safety search criteria, with linked information on the benefits of each technology, would provide useful information in a very direct way to people searching for a vehicle. If that is not possible, then governments and consumer organisations should consider giving detailed advice on how to exploit the features, and adapt to the limitations of, specific car sales websites.

- Several state based road authorities provide web-based information on safer vehicle choices for first-time buyers. But these may be of limited use because they tend to favour models of vehicles that are currently very expensive, while young drivers tend to drive vehicles that are much lower in value. Furthermore, such lists are not available at the point-of-access for vehicle searches online.

### Motor vehicle insurance

Motor vehicle insurance companies could probably do more to promote safe vehicles for young drivers. For some parents, the steep cost of insuring young drivers appears to affect vehicle choice; this was true for approximately one third of young drivers that were the subject of our interviews. However, it is not possible to say to what extent vehicle choices would actually be affected by lower insurance costs, as it is reasonable to assume that lower costs would have also to be matched with a change in family thinking about their vehicle utilisation.

Lowering the price of insurance for young drivers who wish to share access to a vehicle with their parents appears only to be achievable through cross-subsidies within insurance schemes. It is not possible for us to comment on how appropriate that might be for any given insurance company, but it might be arguable on the basis that young drivers one day become older drivers, and if a cross subsidy was in place, drivers receiving the subsidy at one time in their lives also pay the subsidy at a later stage in their lives. This is in some sense a recommendation for a greater role for community rating in motor vehicle insurance, and hence possibly regulation, and it is questionable how realistic or appropriate this would be.

A possibly more realistic recommendation is that insurance companies might consider making use of the information they have on claims to assist families to identify the lowest risk vehicles for their situation. Insurers often use sophisticated risk pricing methods, and these might also be able to alert to higher risks in more ways than simply the signals they send through pricing. Similar information is produced through the Australasian Used Car Safety Ratings, and it might be of interest to car buyers to identify those vehicles that carry low injury risks as well as low insurance risks. As many of the companies involved in motor vehicle insurance are also involved in CTP insurance, jointly presenting this information to clients would be in the interests of both aspects of their insurance business, as well as being good for their customers. Obviously, some care would be needed in the design of such a source of information though, as the vehicles representing the lowest risk in respect of damage losses may not be those with the best safety features or the lowest injury risk profile.

For any driver, their economic situation will tend to prescribe the kind of car that they buy and/or use. Prices of insurance play a part in the operating costs of motor vehicle, but in reality it is only one component of many. It is probably not realistic to assume that a reduction in premiums for younger drivers will have large effects on motor vehicle selection. The tools that are probably most effective are information that will allow families to make rational and informed decisions, and the support and promotion of programs that affect new vehicle safety such as ANCAP and vehicle regulations. The early and steep introduction of safety features is a useful way of increasing the availability and utility of technologies for young drivers.

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# Appendix A – Interview forms

# Young driver survey

**Demographic and vehicle details**

1. Age _____
2. Sex M ☐ F ☐
3. Licence type L ☐ P1 ☐ P2 ☐ Full ☐
4. Residential post code _____
5. House-hold make-up:
   - Lives alone ☐
   - Live with parent/guardian(s) ☐
   - Other (please specify): ☐ _____
6. Estimated km/s driven per year? _____
7. How many crashes have you been involved in in the previous year? _____
   a. To the best of your knowledge what was the worst injury in each crash:

| | Crash 1 | Crash 2 | Crash 3 |
|---|---|---|---|
| Don't know | ☐ | ☐ | ☐ |
| No injury | ☐ | ☐ | ☐ |
| Someone was treated by a Dr | ☐ | ☐ | ☐ |
| Someone was taken to hospital in an ambulance for treatment | ☐ | ☐ | ☐ |
| Someone was taken to hospital by an ambulance and stayed for at least one night | ☐ | ☐ | ☐ |
| Other | _____ | _____ | _____ |

8. How many vehicles are regularly housed at your residential address? _____
9. How many vehicles do you regularly drive that are housed at your residential address? ____
10. How many other vehicles do you drive regularly? _____
    a. Who owns these vehicles:
       - Friends ☐
       - Family ☐
       - Other ☐ _____

**Details of any vehicles at home or that the young driver drives regularly**

a. List the vehicle the young driver drives most often in the first column
b. Regularly driven vehicles might include: extended family, friends/housemates, work cars.

| | Main vehicle | Other vehicle 1 | Other vehicle 2 | Other vehicle 3 |
|---|---|---|---|---|
| Make | | | | |
| Model | | | | |
| Year | | | | |
| Body type | | | | |
| Owner | ☐ Self<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Self<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Self<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Self<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ |
| Do you consider yourself the owner of this vehicle ( e.g. do you need permission to use it?) | | | | |
| | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Type of insurance | | | | |
| Are you listed on the policy? | | | | |

**With regard to the MAIN VEHICLE (i.e., the one driven most often by the young driver):**

11. Was the vehicle purchased for/by you or was it a pre-existing vehicle in your household/family?

    Purchased ☐ Pre existing ☐

    a. If purchased, what were the main reasons for choosing that vehicle?

    _____

    _____

    b. Who paid for the vehicle: Self ☐ Parents ☐ Other ☐ _____

    c. Who pays for the registration: Self ☐ Parents ☐ Other ☐ _____

    d. Who pays the insurance: Self ☐ Parents ☐ Other ☐ _____

    e. Who pays for maintenance: Self ☐ Parents ☐ Other ☐ _____

    f. Who pays for running costs: Self ☐ Parents ☐ Other ☐ _____

    g. How did ongoing costs such as registration and insurance influence the choice of vehicle?

    _____

    _____

    h. What safety factors did you consider when you purchased the vehicle?

    _____

    _____

12. Who has the main say over which vehicle you drive?

Yourself ☐

Parent ☐

Other (please specify) ☐ _____

13. Why do you drive this car more than the others?

_____

_____

_____

_____

_____

14. Do you drive any of the other vehicles?

Yes ☐ No ☐

How often do you drive these cars?

_____

_____

_____

_____

What are the main reasons you don't you drive these cars as often?

_____

_____

_____

_____

15. Are insurance premiums or excess a reason that you don't drive the other cars as often?

Yes ☐ (answer a) No ☐

a. If insurance premiums or excess were cheaper on the other cars do you think you would be allowed to drive them?

Yes ☐ No ☐

16. Do you drive a different car when going on long trips (e.g., driving in the country)?

Yes ☐ (complete below) No ☐ (answer a.)

a. Why?_____

_____

b. Who decides which vehicle you use for these trips? _____

17. If young drivers received reduced insurance premiums or excess for driving a safer vehicle how would this influence:

a. Which of the vehicles you drive?

_____

_____

b. The type of vehicle you would buy?

_____

_____

## Multiple choice questions: Safety knowledge

18. What does a 5 star vehicle safety rating mean?
    - ☐ A) The car is rated a luxury vehicle
    - ☐ B) The car is more energy efficient than a 4 star ANCAP rated car
    - ☐ C) The car is safer than a 4 star ANCAP rated car
    - ☐ D) None of the above
    - ☐ E) I don't know

19. Select the most correct statement about frontal driver and passenger airbags from the following:
    - ☐ A) The airbags can reduce injury to vehicle occupants during a crash but experts generally considered them a danger as they can inflate prematurely leading to injury
    - ☐ B) The airbags reduce injury to vehicle occupants by reducing the impact when the driver or passenger is thrust forwards during a crash
    - ☐ C) The airbags reduce injury to vehicle occupants by allowing the driver or passenger to rest their head on a soft surface while waiting for an ambulance following a crash
    - ☐ D) None of the above
    - ☐ E) I don't know

20. Select the most correct statement about Electronic Stability Control (ESC)?
    - ☐ A) ESC prevents a vehicle's wheels from locking when the brake is applied in an emergency
    - ☐ B) ESC stands for Elevated Structural Condition. When a vehicle has ESC it has greater structural integrity reducing injury to car occupants during a crash
    - ☐ C) ESC prevents a vehicle from sliding uncontrollably when a driver suddenly steers sharply in one direction
    - ☐ D) None of the above
    - ☐ E) I don't know

# PARENT/GUARDIAN SURVEY

**Parent demographics**

1. Age _____
2. Sex M ☐ F ☐
3. Residential post code _____
4. How many crashes have you been involved in in the previous year? _____
   a. To the best of your knowledge what was the worst injury in each crash:

| | Crash 1 | Crash 2 | Crash 3 |
|---|---|---|---|
| Don't know | ☐ | ☐ | ☐ |
| No injury | ☐ | ☐ | ☐ |
| Someone was treated by a Dr | ☐ | ☐ | ☐ |
| Someone was taken to hospital in an ambulance for treatment | ☐ | ☐ | ☐ |
| Someone was taken to hospital by an ambulance and stayed for at least one night | ☐ | ☐ | ☐ |
| Other | _____ | _____ | _____ |

**Young driver demographics**

| | Young driver 1 | Young driver 2 |
|---|---|---|
| Age | | |
| Sex | ☐ Male<br>☐ Female | ☐ Male<br>☐ Female |
| Licence | ☐ L<br>☐ P1<br>☐ P2<br>☐ Full | ☐ L<br>☐ P1<br>☐ P2<br>☐ Full |
| Post code | | |
| Where do they live | ☐ Alone<br>☐ With parent/guardian(s)<br>☐ Other:_____ | ☐ Alone<br>☐ With parent/guardian(s)<br>☐ Other:_____ |

| | | |
|---|---|---|
| Avg Kms per year | | |

5. How many crashes has each Young Driver 1 been involved in in the previous year?

   Young driver 1: _____ Young driver 2: _____

   a. To the best of your knowledge what was the worst injury in each crash:

| | Crash 1 | Crash 2 | Crash 3 |
|---|---|---|---|
| Don't know | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 |
| No injury | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 |
| Someone was treated by a Dr | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 |
| Someone was taken to hospital in an ambulance for treatment | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 |
| Someone was taken to hospital by an ambulance and stayed for at least one night | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 | ☐YD 1 ☐YD 2 |
| Other | _____ | _____ | _____ |

6. How many vehicles are regularly housed at your residential address? _____
7. How many of these does the young driver(s) drive regularly? _____
8. How many other vehicles does the young driver(s) driver regularly? _____

   a. If one or more, who owns these vehicles (e.g., friends, family etc.)

      Friends ☐

      Family ☐

      Other (please specify): ☐ _____

**Details of vehicles driven by young driver or available at young drivers place of residence**

9. Which of these vehicles does the young driver drive most often?

| | Vehicle 1 | Vehicle 2 | Vehicle 3 | Vehicle 4 |
|---|---|---|---|---|
| Make | | | | |
| Model | | | | |
| Year | | | | |
| Body type | | | | |
| Owner | ☐ Young driver<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Young driver<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Young driver<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ | ☐ Young driver<br>☐ Parent/Guardian<br>☐ Other<br>_____<br>_____ |
| Do you consider the young driver to be the owner of this vehicle ( e.g. do they need permission to use it?) | | | | |
| | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Type of insurance | | | | |
| Are the young drivers listed on the policy? | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No | ☐ Yes ☐ No |
| Which is the safest car? | ☐ | ☐ | ☐ | ☐ |

Young driver 1 – Vehicle _____

Young driver 2 – Vehicle_____

10. Was the vehicle purchased for the young driver or was it a pre-existing family vehicle?

**Young driver 1**: Purchased ☐ Pre existing ☐

**Young driver 2**: Purchased ☐ Pre existing ☐

a. If purchased, what were the main reasons for choosing that vehicle?

**Young driver 1**: _____

_____

_____

**Young driver 2**: _____

_____

_____

| | Young Driver 1 | Young driver 2 |
|---|---|---|
| Who paid for the vehicle | YD ☐ Parents ☐ Other ☐ _____ | YD ☐ Parents ☐ Other ☐ _____ |
| Who pays for registration | YD ☐ Parents ☐ Other ☐ _____ | YD ☐ Parents ☐ Other ☐ _____ |
| Who pays for insurance | YD ☐ Parents ☐ Other ☐ _____ | YD ☐ Parents ☐ Other ☐ _____ |
| Who pays for maintenance | YD ☐ Parents ☐ Other ☐ _____ | YD ☐ Parents ☐ Other ☐ _____ |
| Who pays running costs | YD ☐ Parents ☐ Other ☐ _____ | YD ☐ Parents ☐ Other ☐ _____ |

b. How did ongoing costs such as registration and insurance influence the choice of vehicle?

_____

_____

_____

11. Who has the main say over which vehicle the Young Driver drives?

Yourself ☐

Young driver ☐

Other (please specify) ☐ _____

12. What factors influence decisions about the vehicle they can drive?

_____

_____

_____

_____

13. Do you prefer the young driver(s) to use a different car for longer trips (e.g., driving in the country)?

Yes ☐ (complete a & b) No ☐ (complete a)

a. Why? _____

_____

_____

b. Who decides which vehicle they use for these trips? _____

14. Of the vehicles mentioned above, are there any that the Young Driver never drives?

Yes ☐ No ☐

Why?

_____

_____

_____

_____

15. Does insurance premiums or excess influence which vehicle you allow your child/children to drive?

Yes ☐ No ☐

a. Why?

_____

_____

_____

_____

16. If insurance premiums or excess were discounted for safer cars, would this influence:

a. Which vehicle the young driver drives?

_____

_____

_____

_____

b. The type of vehicle bought for the young driver?

_____

_____

_____

_____

## Multiple choice questions: Safety knowledge

17. If a car has a 5 star safety rating what does this mean?
    - ☐ A) The car is rated a luxury vehicle
    - ☐ B) The car is more energy efficient than a 4 star ANCAP rated car
    - ☐ C) The car is safer than a 4 star ANCAP rated car
    - ☐ D) None of the above
    - ☐ E) I don't know

18. Select the most correct statement about frontal driver and passenger airbags from the following:
    - ☐ A) The airbags can reduce injury to vehicle occupants during a crash but experts generally considered them a danger as they can inflate prematurely leading to injury
    - ☐ B) The airbags reduce injury to vehicle occupants by reducing the impact when the driver or passenger is thrust forwards during a crash
    - ☐ C) The airbags reduce injury to vehicle occupants by allowing the driver or passenger to rest their head on a soft surface while waiting for an ambulance following a crash
    - ☐ D) None of the above
    - ☐ E) I don't know

19. Select the most correct statement about Electronic Stability Control (ESC)?
    - ☐ A) ESC prevents a vehicle's wheels from locking when the brake is applied in an emergency
    - ☐ B) ESC stands for Elevated Structural Condition. When a vehicle has ESC it has greater structural integrity reducing injury to car occupants during a crash
    - ☐ C) ESC prevents a vehicle from sliding uncontrollably when a driver suddenly steers sharply in one direction
    - ☐ D) None of the above
    - ☐ E) I don't know