

## **Demographic factors associated with pre-licensed driving in a NSW young driver cohort: the DRIVE Study**

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### **Abstract**

Research on pre-licensed driving (driving before gaining a learner licence) by Australian youth is scarce but suggests it is a high risk activity. This study aimed to explore demographic and behavioural factors associated with self-reported pre-licensed driving among a large sample of NSW newly-licensed young drivers. All drivers resident in NSW aged 17-24 years holding a provisional (P1) licence between June 2003 and December 2004 were invited to complete a detailed on-line questionnaire, including items on demographics and driving before gaining a learner licence; therefore a mix of current and retrospective self-reports. Binomial models were developed to calculate relative risk and 95% confidence intervals of pre-licensed driving. 20,822 young drivers completed the questionnaire. Pre-licensed driving was higher among males and rural and regional residents and lower among respondents from moderate socioeconomic status areas, those never married and those born in Asian countries. Other risk behaviours were strongly associated with pre-licensed driving, including drink driving, drug driving and a high engagement in risky driving behaviours, high alcohol use, marijuana and other drug use, as well as high sensation seeking. These factors identify important targets for interventions to reduce pre-licensed driving.

### **Keywords**

Young drivers, pre-licensed/unlicensed/illegal driving, males, rural, socioeconomic status

### **Introduction**

Few Australian studies have examined illegal driving by young people before gaining a licence, with limited information available to identify "at-risk" groups to target in prevention initiatives. In New South Wales, examination of police-recorded crashes over a five year period (1996-2000) found over 500 crashes involved underage drivers [1]. In 84% of cases the driver was killed or injured in the crash. In addition, a cohort study of 1796 newly licensed drivers in Western Australia demonstrated that youth who frequently drove before gaining a learner licence were at increased risk of crash as a first year provisional driver [2]. Therefore pre-licensed driving has been shown to be an extremely high risk activity.

Previous research has speculated whether driving risks might cluster with other risk taking during adolescence, although to date there is limited exploration of this theory, particularly during the pre-licence period [3-6]. The DRIVE Study [7], a cohort study of over 20,000 newly licensed young drivers in NSW, offered the opportunity to explore factors associated with illegal pre-licensed driving including a range of other risk behaviours in a large and varied sample of Australian youth. The objective of this paper was therefore to explore demographic and behavioural factors associated with pre-licensed driving in relation to self-reported driving before gaining a learner licence.

### **Method**

The DRIVE Study is a web-based cohort study of young drivers in NSW for which detailed methods have been previously reported [7]. Briefly, all drivers resident in NSW aged 17-24 holding a first-stage provisional motor vehicle licence (P1) between June 2003 and December 2004 were invited to participate in the study by first completing an extensive on-line questionnaire. The DRIVE questionnaire included items on demographics (e.g., gender, Indigenous status, marital status, country of birth), as well as a range of risk behaviours based on previously validated surveys. This included driving experience as a pre-learner and

current alcohol use and drug use in the past 12 months (AUDIT) [8] as well as driving after alcohol or marijuana use in the past 4 weeks, ratings of risky driving behaviours and perceptions of risky driving [9-10] and sensation seeking [11]. The risky driving measure rated the frequency of undertaking 14 risky driving behaviours (e.g., speeding, close following, multiple passengers, mobile phone use, aggressive gestures and manoeuvring) and the risk perception measure rated how safe 10 of these items were perceived to be, with responses categorised into tertiles (high, moderate, low) [see 12]. Residential postcode was used to determine remoteness of residence and socioeconomic status according to Australian Bureau of Statistics coding [13, 14]. An item on car modification was also included: "Has the car you mostly drive been modified? (e.g., suspension raised or lowered, wide tyres, non-standard additions or body kits such as side skirts, bumper additions, muffler)" (Yes/No/Don't know). The University of Sydney Human Research Ethics Committee and the NSW Health Ethics Committee approved the study.

This paper reports on analyses of cross-sectional data collected at the baseline interview. The main outcome variable, pre-licensed driving, was dichotomised based on responses to the following questionnaire item, "How many times did you drive a car (or van/utility/4WD etc) on the road without the necessary licence before you received your learner licence (L-plates)?" (0 = No, 1+ = Yes). SAS Version 9.1 (SAS Institute Inc) was used to calculate descriptive statistics for a wide range of potential factors associated with pre-licensed driving (as listed in Table 1) and binomial models to determine relative risks (RR) and 95% confidence intervals (CIs) for pre-licensed driving.

## Results

In total, 20,822 young drivers completed the DRIVE survey with 95% completed online. The majority (74.6%) of the study population was aged 17-18 years; 54.6% were female. Table 1 summarises the demographics and characteristics of the sample by those who did and did not report driving before gaining their learner licence and Table 2 summarises the relative risks and confidence intervals for variables that were significant factors associated with unlicensed driving.

Pre-licensed driving was more common among young drivers who were male, lived in a rural or regional (compared to urban) area, scored high or moderately on the sensation seeking scale, risky driving behaviour scale and risk driving perception scale, those who reported high use of alcohol, use of marijuana and other drugs, driving after alcohol use and after marijuana use, and driving a modified vehicle. In contrast, pre-licensed driving was less common among young drivers who were never married (compared to married), lived in a moderate socioeconomic status area and those born in Asian countries (compared to Australia/New Zealand). Indigenous status was not significant.

## Discussion

A range of demographics and risk behaviours were associated with pre-licensed driving. Demographic factors included being male, consistent with previous literature on a range of risk taking measures [15-18] as well as previous research on underage driving in NSW and QLD [1, 19]. Living in a rural area was also a factor, which might be expected due to fewer transport options, lower policing and driving on public roads around farm properties [20]. In contrast, pre-licensed driving was lower among those living in moderate (versus high) socioeconomic areas, those born in Asian countries and those never married, although this latter finding is likely spurious due to the small proportion of married participants (<5%). Previous research in the United States has shown that high SES youth are more likely to have access to a vehicle once licensed [21], which might also apply during the pre-licensed period, although it is unclear then why the lowest SES group were also less likely to drive pre-licensure. Previous results from the DRIVE Study also found young drivers born in Asian countries to be less involved in risky driving behaviour [22]. Although the relative risk indicated higher risk of pre-licensed driving by Indigenous young drivers, this was not significant, which may be due to the small number of Indigenous respondents (1.3%).

**Table 1. Sample demographics and characteristics by pre-licensed driving status**

Variable	Value	Total N=20822		Pre-licensed driving			
		N	%	No n=15769 (77.0%)		Yes n=4,698, (23.0%)	
		N	%	N	%	N	%
Gender	Male	9457	45.4	6820	43.3	2490	53.0
Marital status	Never married	19191	92.6	14581	92.8	4298	91.9
	Married	1012	4.9	747	4.8	242	5.2
	Other <sup>1</sup>	527	2.5	381	2.4	135	2.9
Remoteness of residence	Urban	15477	74.3	12145	77.0	3091	65.8
	Regional	4401	21.1	3068	19.5	1246	26.5
	Rural	944	4.5	556	3.5	361	7.7
Indigenous status	Yes	271	1.3	184	1.2	80	1.7
Socioeconomic status	Low	6957	33.4	5135	32.6	1675	35.7
	Moderate	6895	33.1	5243	33.3	1526	32.5
	High	6970	33.5	5391	34.2	1497	31.9
Country of birth	Australia/ NZ <sup>2</sup>	17605	86.2	13371	85.0	4234	90.4
	Asia	1155	5.7	1030	6.6	125	2.7
	Europe	220	1.1	175	1.1	45	1.0
	Other	1428	7.0	1159	7.4	279	6.0
Risky driving behaviour	Low	6859	34.7	6096	40.1	742	16.4
	Moderate	6465	32.7	5014	33.0	1434	31.6
	High	6463	32.7	4084	26.9	2362	52.1
Risky driving perceptions	Low	6220	31.6	5329	35.3	865	19.2
	Moderate	6158	31.3	4791	31.7	1352	30.0
	High	7301	37.1	4991	33.0	2294	50.9
Sensation seeking	Low	6267	31.9	5372	35.6	877	19.4
	Moderate	6400	32.5	5004	33.2	1377	30.5
	High	7006	35.6	4718	31.3	2268	50.2
Alcohol use	High	2661	13.2	1598	10.3	1058	23.0
Marijuana use	Yes	2795	13.9	1604	10.4	1184	25.7
Other drug use	Yes	1366	6.8	751	4.9	613	13.3
Alcohol use before driving	Yes	1309	6.6	713	4.7	591	13.0
Marijuana use before driving	Yes	630	3.2	299	2.0	329	7.2
Car modification	Yes	2542	13.0	1645	11.0	890	19.6
	No	16191	82.6	12667	84.3	3494	77.1
	Unknown	860	4.4	709	4.7	150	3.3

1 = Separated/Divorced/Widowed; 2 = New Zealand

**Table2. Factors associated with pre-licensed driving**

Variable	Value	Binomial model			p-value
		RR	95% CI		
Gender	Male	1.1	1.04	1.22	<0.01
	Female	reference			
Marital status	Never married	0.8	0.64	0.92	<0.01
	Other <sup>1</sup>	0.9	0.69	1.23	0.58
	Married	reference			
Remoteness of residence	Regional	1.6	1.47	1.78	<0.01
	Rural	2.9	2.49	3.48	<0.01
	Urban	reference			
Socioeconomic status	Low	0.9	0.85	1.03	0.17
	Moderate	0.8	0.77	0.93	<0.01
	High	reference			
Country of birth	Asia	0.5	0.42	0.67	<0.01
	Europe	0.8	0.54	1.16	0.23
	Other	1.0	0.85	1.17	0.88
	Australia/NZ <sup>2</sup>	reference			
Indigenous status	Yes	1.3	0.93	1.75	0.13
	No	reference			
Sensation seeking	High	1.4	1.21	1.51	<0.01
	Moderate	1.2	1.07	1.32	<0.01
	Low	reference			
Risky driving behaviours	High	2.9	2.58	3.30	<0.01
	Moderate	1.9	1.70	2.12	<0.01
	Low	reference			
Risky driving perceptions	High	1.3	1.20	1.50	<0.01
	Moderate	1.2	1.12	1.39	<0.01
	Low	reference			
Alcohol use	High	1.6	1.38	1.81	<0.001
	Low	reference			
Marijuana use	Yes	1.6	1.39	1.73	<0.01
	No	reference			
Other drug use	Yes	1.6	1.40	1.86	<0.01
	No	reference			
Alcohol use before driving	Yes	1.6	1.38	1.81	<0.01
	No	reference			
Marijuana use before driving	Yes	1.3	1.06	1.59	<0.01
	No	reference			
Car modification	Unknown	1.3	1.21	1.50	<0.01
	Yes	0.8	0.66	0.99	0.04
	No	reference			

1 = Separated/Divorced/Widowed; 2 = New Zealand

Driving risks and other adolescent risk taking were also associated with pre-licensed driving, lending some support to theories that driving risks might cluster with other health and safety risks during adolescence [5-6]. This included risky driving behaviours and less safe perceptions of driving risks once licensed, high alcohol use, use of marijuana and other recreational drugs, as well as overall risk-taking propensity in terms of sensation seeking. Alcohol use (measured at the time of crash) was also significantly associated with underage driving in the previous Australian studies [1, 2, 18]. Driving a modified vehicle was also significant in the present study suggesting young drivers of these vehicles may represent a high risk-taking group, which has previously been speculated, although with limited research [23].

As the young drivers included in this research were volunteers, and not a representative sample of the general population, estimates of population prevalence of exposures or outcomes were not calculated. However, the study population represented a broad cross-section of the young driver population and substantial heterogeneity in the distribution of potential risk factors was achieved, making it possible to explore the associations of interest [7]. Limitations of this research include self-report of a range of behaviors in a cross-sectional survey at one time period but with items reflecting different time periods, that is, pre-licensed driving at any time prior to the learner licence, measures such as substance use in the 12 months prior to completing the DRIVE questionnaire, and driving risks, risk perceptions and drink or drug driving at the time of the DRIVE questionnaire. Nonetheless, as there is limited research in this field, these findings among a large sample of recently licensed youth offer some insights into high risk groups to aid intervention development for the extremely high risk activity of pre-licensed driving.

With the success of graduated driver licensing initiatives in reducing new driver crash risk [24], much attention has been given to strengthening licensing requirements and restrictions [25-26]. However, this fails to address risks associated with pre-licensed driving. A concern with this trend is that there is potential to increase pre-licensed driving if licensing legislation is perceived as too prohibitive by youth, particularly disadvantaged youth (e.g., those without a vehicle or supervisor to complete a high number of supervised driving hours as a learner prior to provisional licensure).

This research suggests pre-licensed driving is more characteristic of young males, those living in rural areas, youth who are generally prone to risk taking (high sensation seekers) and report engaging in risky behaviours, such as risky driving, including drink driving and drug driving, and general alcohol and other drug use and those who drive modified vehicles, particularly youth born in Australia/New Zealand. These results identify important targets for interventions. Research to understand how youth access vehicles for pre-licensed driving would help further inform the inclusion of parents and other adults in interventions, likely involved due to the young age of participants and as previous research indicates adults commonly accompany underage drivers [1]. The next stage of this research will explore associations between pre-licensed driving and subsequent crash risk, with particular attention to these higher risk groups. These results can then be used to inform the development and evaluation of interventions to reduce pre-licensed driving and subsequent potential crash and injury risks.

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