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# **A comparison of the crash involvement of unlicensed motorcycle riders and unlicensed drivers in Queensland**

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## **Abstract**

Despite on-going improvements in traffic law enforcement practices and technology, unlicensed driving and riding remain serious road safety problems in Australia. Previous research into the crash involvement of unlicensed motor vehicle operators has identified unlicensed motorcyclists as a significant high-risk group within the larger unlicensed population. The current investigation compared the crash involvement of unlicensed riders and drivers in Queensland for the period 2000 - 2004. Results indicated that like unlicensed drivers, unlicensed motorcycle riders are over-represented in fatal and serious injury crashes. However, the proportion of unlicensed riders involved in motorcycle crashes is higher than is the case for unlicensed drivers, at all crash severity levels. The three main types of unlicensed riders involved in serious casualty crashes are those with disqualified/suspended licences, those with inappropriate licences, and those who have never been licensed. In terms of contributing factors, serious crashes involving unlicensed drivers and riders both showed an increased involvement of alcohol or drugs, speeding, inexperience and inattention compared to those involving their licensed counterparts. However, relatively more of the crashes involving unlicensed riders occurred in lower speed zones (ie. 60 km/h or less roads) than was the case for unlicensed drivers. The results are discussed in terms of directions for future research and policy.

## **Introduction**

Unlicensed driving remains a serious problem in many countries, despite ongoing improvements in traffic law enforcement practices and technology. In the USA, over 10% of the drivers involved in fatal crashes do not hold a valid licence, while approximately 20% of all fatal crashes involve at least one of these drivers (Griffin & DeLaZerda, 2000). In Australia, unlicensed drivers represent over 5% of the drivers involved in fatal crashes, while crashes involving unlicensed drivers and riders account for almost 10% of the national road toll (FORS, 1997a).

Unlicensed driving represents a major problem for road safety in two respects. Firstly, it undermines the effectiveness of driver licensing systems by preventing the allocation of demerit points and reducing the impact of licence loss, which has otherwise been demonstrated to be a very effective deterrent to illegal behaviour (Siskind, 1996; Nichols & Ross, 1990). Secondly, there is a growing body of evidence linking unlicensed driving to a cluster of high-risk behaviours including drink driving, speeding, failure to wear seat belts and motorcycle use (Griffin & DeLaZerda, 2000; Harrison, 1997; Watson, 1997, 2004a). Consistent with this, Watson (2004a,b) utilised a quasi-induced exposure method to demonstrate that unlicensed drivers were almost three times more likely to be involved in a crash than licensed drivers. In the event of a crash, those involving unlicensed drivers were twice as likely to result in a fatality or serious injury.

The majority of the research in this area has focussed on either unlicensed drivers as a whole or on unlicensed car drivers. Nonetheless, there is a small body of evidence suggesting that unlicensed motorcycle riding is a particular issue of concern for road safety. A Queensland study of motorcycle crashes undertaken in the 1970s found that over 40% of riders killed (where licence status was known) were effectively unlicensed (Beggs & Siskind, 1978). A more recent examination of unlicensed driving in Queensland (for the years 1994 to 1998) found that motorcycle riders were over-represented in crashes compared to their licensed counterparts (Watson, 2004a). In particular, while motorcycle riders represented 30% of all the unlicensed operators involved in serious casualty crashes during the period, they constituted only 10% of the licensed operators involved in such crashes. Similarly, an Australian-wide study conducted by FORS (1997a,b) found that 19% of the motorcycle riders involved in fatal crashes were unlicensed, compared to 5% for other vehicle operators. In a case control study of 222 Victorian motorcyclist crashes conducted by Haworth *et al* (1997), only 6% of the cases were found to be unlicensed at the time of the crash. However, 17% of the crashes could be attributed to this group.

Survey research also confirms the relatively high prevalence of unlicensed riding among motorcycle riders. A 1995 national survey of 200 Australian motorcyclists found that upwards of 20% reported being unlicensed (although some of this may have been accounted for by off-road riding) (Krige, 1995). Research undertaken in New Zealand by Reeder *et al* (1997) found that of the young adult male riders surveyed, 86% reported riding on public roads before being licensed. This particularly highlights the underage, 'never licensed' group of riders as a potential high risk group within all unlicensed riders.

This study was undertaken to further explore the crash involvement patterns of unlicensed riders and to compare these with both licensed riders and other unlicensed drivers. The primary aim was to identify particular risk factors associated with unlicensed riding and to explore differences among the various types of unlicensed riders.

## **Method**

The data for the study was extracted from the Queensland Road Crash Database. This database is maintained by Queensland Transport and includes details of all crashes reported to police that occur on public roads in the state. Five years of data (2000 – 2004) was obtained to ensure that general trends were identified and to provide sufficient numbers to permit meaningful comparisons among the different types of unlicensed drivers. Age, gender and licence information was obtained for all controllers of motorised vehicles (including cars, car derivatives, trucks, buses and motorcycles) involved in crashes during the period, irrespective of whether they were judged by the police to be at fault for the crash or not. This ensured that the overall crash involvement of unlicensed drivers was assessed and avoided any biases related to the reporting or prosecution practices of the police.

The licence classification used in the database by Queensland Transport comprises various groups of licensed and unlicensed drivers, as well as those holding overseas licences, and those of unknown licence status. The licensed drivers included those who hold a current open, provisional or restricted licence or a learner's permit. The unlicensed driver categories included: 'expired', 'inappropriate class of licence', 'disqualified/suspended', 'never held a licence' and 'other unlicensed'. The police use this latter category when they are satisfied that the driver does not hold a valid licence but the exact circumstances are unclear.

Information was obtained on the four primary levels of crash severity ie. fatality, hospitalisation, minor injury and property damage only. However, for the purposes of the current analysis, a ‘serious injury’ category was created that included those crashes resulting in either a fatality or hospitalisation. Due to the large numbers of crashes analysed and the multiple tests performed, a conservative statistical significance level of  $p < .01$  was used. However, results that were significant at  $p < .05$  are still reported. It should also be noted that the term ‘rider’ is generally used in this paper to refer to motorcycle riders, while the controllers of all other motorised vehicles are referred to as ‘drivers.’

## Results

Table 1 provides a breakdown of the licence status of all the drivers and riders involved in crashes in Queensland between 2000 and 2004. As can be seen, a substantial number of the drivers and riders were unlicensed. Consistent with other evidence, the representation of unlicensed drivers and riders was greater in the more serious crashes. For example, unlicensed riders represented 12.3% of all the riders involved in fatal crashes, but only 4.8% and 3.2% of minor injury and property damage only crashes, respectively. It is also apparent from the data that the proportion of unlicensed riders involved in motorcycle crashes is higher than it is the case for unlicensed drivers, at all crash severity levels. It should also be noted that the proportion of unlicensed riders increases at a greater rate as crash severity increases than is the case for unlicensed drivers.

**Table 1: Licence status of drivers and motorcycle riders involved in crashes in Queensland: 2000 - 2004 by severity of the crash**

Licence type	Severity of Crash									
	Fatal		Hosp.		Other injury		Property damage only		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Drivers</i>										
Licensed	1613	87.9	28473	92.1	68490	93.1	67747	92.1	166323	92.5
Unlicensed	137	7.5	1286	4.2	1741	2.4	2316	3.1	5480	3.0
International	31	1.7	470	1.5	939	1.3	1187	1.6	2627	1.5
Unknown	55	3.0	692	2.2	2367	3.2	2288	3.1	5402	3.0
Sub total	1836	100	30921	100	73537	100	73538	100	179832	100
<i>Riders</i>										
Licensed	180	85.3	2903	88.0	3069	92.9	110	88.7	6262	90.3
Unlicensed	26	12.3	318	9.6	158	4.8	4	3.2	506	7.3
International	1	.5	32	1.0	29	.9	2	1.6	64	.9
Unknown	4	1.9	45	1.4	47	1.4	8	6.5	104	1.5
Sub total	211	100	3298	100	3303	100	110	100	6936	100
<b>Total</b>	<b>2047</b>	<b>100</b>	<b>34219</b>	<b>100</b>	<b>76840</b>	<b>100</b>	<b>73648</b>	<b>100</b>	<b>186768</b>	<b>100</b>

Source: Queensland Road Crash Database, Queensland Transport

Table 2 provides a breakdown of the crashes involving unlicensed drivers and riders, in terms of their reason for being unlicensed. The three main types of unlicensed riders involved in serious casualty crashes, in order of magnitude, were: those with disqualified/suspended licences; those with inappropriate licences; and those who have never been licensed. In contrast, the predominant types of unlicensed drivers were: those with a disqualified/suspended licence; those classified as ‘other unlicensed’; and those with a licence that had expired. These patterns were relatively consistent for both drivers and riders across the various crash severities.

**Table 2: Unlicensed drivers and riders involved in crashes in Queensland: 2000-2004 by offender type**

Licence type	Severity of Crash									
	Fatal		Hosp.		Other injury		Property damage only		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Drivers</i>										
Never licensed	16	11.7	189	14.7	207	11.9	402	17.4	814	14.9
Inapp. class	13	9.5	46	3.6	78	4.5	68	2.9	205	3.7
Disq/Suspend	57	41.6	499	38.8	693	39.8	857	37.0	2106	38.4
Expired	18	13.1	188	14.6	289	16.6	341	14.7	836	15.3
Other unlic	33	24.1	364	28.3	474	27.2	648	28.0	1519	27.7
Sub total	137	100	1286	100	1741	100	2316	100	5480	100
<i>Riders</i>										
Never licensed	6	23.1	65	20.4	32	20.3	0	.0	103	20.4
Inapp. class	8	30.8	103	32.4	49	31.0	1	25.0	161	31.8
Disq/Suspend	9	34.6	89	28.0	29	18.4	2	50.0	129	25.5
Expired	1	3.8	10	3.1	12	7.6	0	.0	23	4.5
Other unlic	2	7.7	51	16.0	36	22.8	1	25.0	90	17.8
Sub total	26	100	318	100	158	100	4	100	506	100
<b>Total</b>	<b>163</b>	<b>100</b>	<b>1604</b>	<b>100</b>	<b>1899</b>	<b>100</b>	<b>2320</b>	<b>100</b>	<b>5986</b>	<b>100</b>

Source: Queensland Road Crash Database, Queensland Transport

Table 3 below presents the gender and age distribution of the licensed and unlicensed drivers and riders involved in serious casualty crashes during the period. As can be seen, males represent the majority of the drivers and riders involved in serious casualty crashes, regardless of licence status. However, males are particularly over-represented among both unlicensed drivers and riders. Indeed, only 4.4% of the unlicensed riders involved in serious casualty crashes were female. (Although it should be noted that the gender difference between licensed and unlicensed riders was only significant at  $p < .05$ , largely due to the predominance of males among riders in general.) The data also confirm that the crashes involving unlicensed drivers and riders are more likely to involve younger operators and a considerably small proportion of road users aged 60 or above. Of particular concern is the comparatively large proportion of unlicensed riders in the under 17 category. This provides an indication of the

extent of ‘under-age’ riding, given that the legal age for obtaining a provisional motorcycle licence in Queensland is 17 years of age. Further analyses indicated that 81.4% of those riders involved in serious casualty crashes who had never been licensed were under the age of 17.

**Table 3: Age and gender of drivers and riders involved in serious casualty crashes in Queensland: 2000-2004 by licence status**

Variable	Drivers			Riders		
	Licensed (%)	Unlicensed (%)	Sig <sup>1</sup>	Licensed (%)	Unlicensed (%)	Sig <sup>1</sup>
<b>Gender</b>	(n=30582)	(n=1428)		(n=3116)	(n=344)	
Males	63.5	79.2	<i>p</i> <.001	92.2	95.6	<i>p</i> <.05
Females	36.5	20.8		7.8	4.4	
<b>Age (years)</b>	(n=30582)	(n=1428)		(n=3116)	(n=344)	
Under 17	0.3	9.7	<i>p</i> <.001	0.3	18.3	<i>p</i> <.001
17- 24	26.6	35.8		23.4	40.4	
25 – 59	60.3	51.5		73.2	39.5	
60 and over	12.8	3.1		3.1	1.7	

1. Statistical significance based on Chi Square analyses

**Table 4: Contributing factors to serious casualty driver and rider crashes in Queensland: 2000-2004 by licence status**

Variable	Drivers			Riders		
	Licensed (%)	Unlicensed (%)	Sig <sup>1</sup>	Licensed (%)	Unlicensed (%)	Sig <sup>1</sup>
<b>Alcohol/drugs</b>						
Yes	8.4	36.3	<i>p</i> <.001	7.2	22.7	<i>p</i> <.001
No	91.6	63.7		92.8	77.3	
<b>Speeding</b>						
Yes	3.5	15.0	<i>p</i> <.001	8.6	17.4	<i>p</i> <.001
No	96.5	85.0		91.4	82.6	
<b>Fatigue</b>						
Yes	5.1	10.6	<i>p</i> <.001	2.4	2.6	ns
No	94.9	89.4		97.6	97.4	
<b>Inattention</b>						
Yes	16.5	25.6	<i>p</i> <.001	17.0	25.6	<i>p</i> <.001
No	83.5	74.4		83.0	74.4	
<b>Inexperience</b>						
Yes	11.4	17.2	<i>p</i> <.001	8.7	19.5	<i>p</i> <.001
No	88.6	82.8		91.3	80.5	
<b>At fault</b>						
Yes	56.1	86.6	<i>p</i> <.001	62.1	82.8	<i>p</i> <.001
No	43.9	13.4		37.9	17.2	

1. Statistical significance based on Chi Square analyses

Table 4 above compares the factors contributing to the serious casualty crashes involving drivers and riders by licence status. As can be seen, serious crashes involving both unlicensed drivers and riders are significantly more likely to involve alcohol or drugs, speeding, inattention and inexperience. This illustrates the general involvement of more risky driving behaviours in the unlicensed road user population. Consistent with this, unlicensed riders and drivers were more likely to be judged at fault for the crashes in which they were involved than their licensed counterparts. However, unlike unlicensed drivers, unlicensed riders were not over-represented in crashes involving driver fatigue.

Table 5 provides a breakdown of circumstances characterising the serious casualty crashes involving licensed and unlicensed drivers and riders. Generally, unlicensed drivers and riders were more likely than their licensed counterparts to be involved in crashes that occurred at night, on the weekend, in areas with no traffic control present and as a single vehicle (although some of these differences were not significant for riders). Hit pedestrian crashes were generally an uncommon occurrence for both drivers and riders, though unlicensed drivers were significantly less likely to be involved in such crashes than licensed drivers. Interestingly, while the distribution of crashes across speed zones was very similar between licensed drivers and riders, unlicensed riders were more likely to be involved in crashes that occurred in 60km/hr or less speed zones than unlicensed drivers. In addition, a higher proportion of unlicensed riders were involved in multi-vehicle crashes compared to unlicensed drivers.

**Table 5: Circumstances of driver and rider serious casualty crashes in Queensland: 2000-2004 by licence status**

Variable	Drivers			Riders		
	Licensed (%)	Unlicen. (%)	Sig <sup>1</sup>	Licensed (%)	Unlicen. (%)	Sig <sup>1</sup>
<b>Time of day</b>						
Day (6am - 5:59pm)	72.8	54.0	<i>p</i> <.001	76.2	66.6	<i>p</i> <.001
Night (6pm - 5:59am)	27.2	46.0		23.8	33.4	
<b>Day of week</b>						
Monday-Friday	74.8	65.4	<i>p</i> <.001	66.3	61.0	ns
Saturday-Sunday	25.2	34.6		33.7	39.0	
<b>Prevailing speed zone</b>						
60 km/h or less	59.7	56.6	<i>p</i> <.001	61.9	68.3	<i>p</i> <.05
70 – 90 km/h	17.8	15.8		18.4	13.7	
100/110 km/h	22.5	27.6		19.7	18.0	
<b>Traffic control</b>						
Present	31.5	19.0	<i>p</i> <.001	23.7	15.1	<i>p</i> <.001
Not present	68.5	81.0		76.3	84.9	
<b>Type of crash</b>						
Single vehicle crash	30.6	57.0	<i>p</i> <.001	40.2	45.6	ns
Multi-vehicle crash	69.4	43.0		59.8	54.4	
<b>Hit pedestrian crash</b>						
Yes	6.2	3.6	<i>p</i> <.001	1.2	2.0	ns
No	93.9	96.4		98.8	98.0	

1. Statistical significance based on Chi Square analyses

Table 6 further explores the characteristics of licensed and unlicensed rider crashes across speed zones, by examining the five most frequent crash types in each. As can be seen, the pattern of crash types was generally similar for licensed and unlicensed riders across the various speed zones. *Angle*, *hit fixed object*, *bike overturn* and *rear-end* crashes were frequently involved. *Angle* crashes were the most frequently noted crash type for licensed and unlicensed riders in all speed zones of 90 km/hr or less. Interestingly, in the 60 km/hr or less speed zones, there was a relatively higher involvement of *hit fixed object* impacts in the crashes involving unlicensed riders than their licensed counterparts. This suggests a greater incidence of loss of control in the crashes involving unlicensed riders.

**Table 6: Five most frequently noted crash types of serious motorcycle crashes in Queensland: 2000-2004 by licence status and prevailing speed zone**

Licensed		Unlicensed	
Variable	(%)	Variable	(%)
<b>60km/hr or less</b>		<b>60km/hr or less</b>	
Angle	44.0	Angle	30.2
Bike overturn	16.6	Hit fixed	23.9
Rear-end	12.7	Bike overturn	18.1
Hit fixed	9.9	Rear-end	9.1
Sideswipe	8.9	Head-on	4.1
<b>70-90km/hr</b>		<b>70-90km/hr</b>	
Angle	25.1	Angle	27.0
Bike overturn	23.6	Hit fixed	19.0
Hit fixed	16.7	Bike overturn	17.5
Rear-end	13.4	Rear-end	11.1
Sideswipe	10.8	Head-on	9.5
<b>100-110km/hr</b>		<b>100-110km/hr</b>	
Bike overturn	27.8	Bike overturn	27.8
Hit fixed	19.9	Hit fixed	24.1
Rear-end	13.5	Angle	15.2
Hit animal	10.9	Sideswipe	10.1
Angle	10.0	Rear-end	7.6

## Discussion

As with previous analyses of crash data involving unlicensed drivers (Watson, 1997, 2004a,b), a number of caveats should be kept in mind when interpreting the findings of this study. The Queensland Crash Database only includes crashes reported to the police (which drivers are required to do if someone is injured in the crash, a vehicle is towed away or property damage exceeds \$2,500). As such, the under-reporting of crashes may introduce a potential source of bias. For example, it is possible that the crashes involving unlicensed drivers and riders are systematically under-reported, particularly in instances where no other road users are involved. Also, it is possible that police judgements relating to the causes of crashes are influenced by the licence status of the drivers and riders involved (Watson, 2004a).

A key finding of the current investigation is that unlicensed riders are a high risk group requiring further attention within the total unlicensed driving population. As a whole, unlicensed motor vehicle operators tend to be over-represented in more severe road crashes. However, this pattern is particularly the case for unlicensed riders. For example, while 7.5% of the drivers involved in fatal crashes in Queensland between 2000 and 2004 were unlicensed, the equivalent proportion for motorcycle riders was over 12% (ie. 1 in 8 of the motorcycle riders involved in fatal crashes were unlicensed). The extent to which unlicensed riders are over-represented in serious crashes may in part due to a greater tendency to under-report their involvement in minor crashes. In other words, it may be relatively easier for unlicensed riders to avoid reporting minor crashes than is the case for unlicensed drivers. However, it may also be indicative of the greater vulnerability of motorcycle riders to serious injury, particularly when engaging in risk-taking behaviour.

In this regard, the serious crashes involving both unlicensed drivers and riders were more likely to involve risk factors such as alcohol/drugs, speeding, inattention and inexperience. In particular, the involvement of alcohol or drugs was approximately four times higher among unlicensed drivers and three times higher among unlicensed riders, compared to their licensed counterparts. Consistent with the over-representation of these risk factors, both unlicensed drivers and riders were more likely to be considered at fault for the crashes in which they were involved. There were a number of other strong similarities in the crashes involving unlicensed drivers and riders, including the strong representation of males, younger operators and disqualified/suspended drivers. In terms of when their crashes occur, unlicensed drivers and riders both showed a greater likelihood of being involved in a crash on a weekend and during night time hours.

However, there were also some important differences in the crash involvement patterns of unlicensed drivers and riders. There was a much higher representation of *never licensed* and *inappropriately licensed* operators among the unlicensed riders than drivers. In this regard, over four-fifths (81.4%) of the *never licensed* riders involved in serious crashes were under the age of 17. While not clear from the data, it is likely that the majority of the *inappropriately licensed* riders would have held a licence for a car, but not for a motorcycle. Together, the strong representation of these two groups in serious crashes illustrates the limitations of overly relying on licensing based countermeasures (such as compulsory pre or post-licence training) to improve motorcycle safety. In this regard, there is a need to evaluate the impact of Queensland's competency-based motorcycle training and licensing scheme, known as Q-Ride, on the rate of unlicensed riding (Parliamentary Travelsafe Committee, 2005). One of the aims of this scheme is to encourage car drivers who may be riding unlicensed to undertake training, in order for them to fast-track through the licensing system. An investigation of crashes occurring in rural north Queensland has also revealed a significant number of off-road motorcycle riders who do not hold an appropriate licence (Steinhardt, Sheehan, & Siskind, 2006). Whether this group is also involved in on-road unlicensed riding needs to be investigated further.

A further area of difference between unlicensed drivers and riders appears to relate to the speed zones in which their crashes occur. Over 68% of the serious crashes involving unlicensed riders occurred in 60 km/h or less speed zones (compared to 62% of the crashes involving licensed riders and 57% of those involving unlicensed drivers). This issue needs further investigation. As a starting point, it is interesting to note the higher representation of *hit fixed object* impacts in the crashes involving unlicensed riders than their licensed counterparts. This suggests a greater incidence of loss of control in the crashes involving unlicensed riders, which may be indicative of greater risk-taking and/or inexperience.

Together, the findings of this study demonstrate that both unlicensed driving and riding continue to represent a problem for road safety in Queensland, and presumably in other jurisdictions within Australia. Moreover, unlicensed riders represent a special sub-group of concern, who are similar to unlicensed drivers in some ways, but unique in others. As such, it is likely that some countermeasures targeting unlicensed driving as a whole will be effective with motorcycle riders. For example, Watson (2002, 2004a,b) has highlighted the need to enhance the detection of unlicensed driving through the introduction of compulsory carriage of licence and the more regular checking of licences by the police. Similarly, Transport South Australia has listed the investigation of ways to reduce unlicensed riding as a high priority task in their Motorcycling Road Safety Strategy. Regular licence checks at popular riding locations and targeted enforcement are suggested as integral in this aim (Department for Transport Energy and Infrastructure, 2005). Similar calls for stricter enforcement of licensing regulations have been made in regards to underage, unlicensed riding in New Zealand (Reeder et al., 1997).

In addition, more specific countermeasures are likely to be required to target the involvement of under-age and inappropriately licensed motorcycle riders in crashes. To assist in this, further research is required to establish the extent to which these behaviours are 'opportunistic' in nature or more systematic among certain groups. Without a good understanding of the factors contributing to these behaviours it will be difficult to develop effective countermeasures.

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