

## Drink-driving and recidivism in NSW

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*This bulletin provides information on re-offending among drink-drivers in NSW. Overall, 15.5 per cent of drink-drivers returned to court for another drink-driving offence within five years, and 14.3 per cent returned to court within five years charged with a non-PCA driving offence, such as a registration, a roadworthiness or a driving licence offence. Reconviction rates were found to be higher among men, Indigenous offenders, offenders aged less than 25 years, offenders who lived in areas with the highest level of socio-economic disadvantage, offenders that received a driver licence disqualification of between one and six months, and offenders with two or more convictions in the five-year period prior to their index offence. It is estimated that, within five years of their index offence, more than a third (35.5%) of drivers with these characteristics will be reconvicted of another drink-driving offence, and nearly half (49%) will be reconvicted for a driving licence, a motor vehicle registration or a motor vehicle roadworthiness offence.*

*Keywords: PCA, drink-driving, re-offending*

### INTRODUCTION

Drink-drivers make up a substantial proportion of all persons charged in NSW Local Court appearances. In 2007, one in five people with a finalised<sup>1</sup> charge in a NSW local court were charged with exceeding the prescribed concentration of alcohol (PCA, <sup>2</sup> NSW Bureau of Crime Statistics and Research 2008). There is little up-to-date information, however, on the characteristics of drink-drivers in NSW, or the risk factors associated with their re-offending.

The current study has two key aims. The first aim is to describe the socio-demographic and criminal history characteristics of persons appearing in NSW local courts for drink-driving offences and the penalties imposed on them. The second aim is to examine the risk factors associated with their re-offending. The next section provides some background by very briefly describing past research on the risk of re-

offending among drink-drivers. The data sources and methods used to conduct the present study are then described. The subsequent section presents the findings and the concluding section summarises and discusses the main points.

### PAST RESEARCH

Estimates of re-offending among drink-drivers vary widely, ranging from eight per cent within a two-year follow-up period (Jones & Lacey 1999) to approximately 15 per cent within a three-year period (Hommel 1981) and 31-44 per cent over a 12.5 year study period (Beerman et al. 1988; NHTSA 1995, 2008). One possible reason for these wide variations in estimates is the differing length of the follow-up periods in these studies, with longer study periods allowing offenders more time to re-offend. However, each of these estimates is still likely to be conservative as they do not include those drivers who drink and drive but who are not detected by the police.

In one of the earliest Australian studies of drink-driving, Homel (1981) followed up 1,000 drivers convicted for driving while exceeding the prescribed concentration of alcohol in NSW in 1972. He found that 149 of the 1,000 drink-drivers (14.9%) were reconvicted for a drink-drive offence within a period of three years from the date of their conviction or the date they were released from prison.

Both Australian and international research has found that some sub-groups are at greater risk of repeat drink-driving. The best predictors of being re-arrested or returning to court for drink-driving are being young, male, Indigenous, having prior arrests for any offence (e.g. Gould & Gould 1992; Moffatt & Poynton 2007; Ryan et al. 1996), having a prior arrest for drink-driving (e.g. Donovan et al. 1990; Jones & Jokschi 1991; Marques et al. 2003) and the extent of the offender's alcohol problems (e.g. Yu 2000). Repeat drink-drivers have also been found to have a higher prevalence of alcohol use and drug use disorders, conduct

disorder, post-traumatic stress disorder, generalised anxiety disorder and bipolar disorder compared with the general population (e.g. Shaffer et al. 2007).

While a range of legal sanctions are available to judicial officers for drink-drivers, there is little evidence that the most severe penalty of imprisonment is effective in reducing re-offending or accident rates among drink-drivers (e.g. DeYoung 1997; Homel 1980, 1981; Martin, Annan & Forst 1993; Voas & Fisher 2001; Wagenaar et al. 2007). There is substantial evidence, however, that licence disqualification or restriction is effective in reducing both re-offending rates and accident rates of convicted drink-drivers (e.g. Chaloupka, Saffer & Grossman 1993; Hagen 1977; McArthur & Kraus 1999; Mann et al. 1991; Nichols & Ross 1990; Sadler, Perrine & Peck 1991; Siskind 1996; Votey & Shapiro 1983; Zaal 1994). Siskind (1996), for example, examined the driving records of 25,000 Queensland drivers cited for a drink-driving offence in 1988 who received at least one subsequent licence restriction. During Siskind's average disqualification follow-up period of 3.9 years, crash and offence rates were reduced by two-thirds. The measures which have been found to be the most effective in reducing further offences are a combination of punishment in the form of license disqualification/restriction and drink-driving rehabilitation or remedial programs (e.g. DeYoung 1997; McKnight & Voas 1991; Mills et al. 2008; Nichols 1990; Wells-Parker et al. 1995). Remedial programs are designed to change drivers' attitudes, improve their knowledge and provide them with skills to prevent drink-driver recidivism.

The next section describes the data used to examine whether the rates of drink-driving re-offending in NSW have changed since Homel's early research and to describe the socio-demographic and criminal history characteristics of drink-drivers in NSW.

## METHOD AND ANALYSIS

The data for this study were drawn from ROD, the re-offending database constructed and maintained by the NSW Bureau of Crime Statistics and Research (Hua & Fitzgerald 2006). The cohort consisted of the 23,373 offenders who were convicted for a PCA offence in a NSW Local Court in 2002. This offence was defined as the offender's 'index offence'.<sup>3</sup> The characteristics of this cohort were explored to determine which sub-groups of offenders were more at risk of subsequent reconvictions for PCA or other non-PCA driving offences.

### OUTCOMES

The two outcomes explored for this study were:

**PCA re-offences:**<sup>4</sup> Whether the offender had one or more finalised court appearances following their index appearance where a new PCA offence was proven<sup>5</sup> against them. For some analyses, PCA was further classified (see PCA range below).

**Non-PCA driving re-offences:**<sup>6</sup> Whether the offender had one or more finalised court appearances following their index appearance for a proven driving licence, road vehicle registration or roadworthiness offence.

The following offender characteristics were included to explore whether they were related to risk of committing new PCA or other non-PCA driving offences.

### SOCIO-DEMOGRAPHIC CHARACTERISTICS

**Sex:** Sex of the offender.

**Age:** Offender's age, in years, at the time of the index offence in 2002.

**Indigenous status:** Whether the offender identified as being of Aboriginal or Torres Strait Islander descent at any court appearance recorded on ROD.

**Level of disadvantage:** Offenders were assigned to one of four SEIFA quartiles based on the postcode of their residential address at the time of the index court appearance. SEIFA, or 'Socio-Economic Indexes for Areas', ranks geographic areas in terms of their socio-economic characteristics (Australian Bureau of Statistics 2008a). The indexes are summary measures of variables that represent different aspects of relative socio-economic disadvantage and/or advantage in a geographic area. They are created by combining information collected in the five-yearly Census of Population and Housing regarding people, families and dwellings within the area.

The quartiles are:

- lowest quartile (the highest level of disadvantage);
- second quartile (second highest level of disadvantage);
- third quartile (third highest level of disadvantage); and
- highest quartile (the lowest level of disadvantage).

### CHARACTERISTICS OF THE CURRENT COURT APPEARANCE

**PCA range:** The PCA range of the offender's index offence at the time of arrest. The following sub-categories of PCA offence are differentiated by the offender's blood alcohol concentration:

- 'High' range PCA:  $\geq 0.15$  grams per 100 millilitres
- 'Mid' range PCA:  $\geq 0.08$  and  $< 0.15$  grams per 100 millilitres
- 'Low' range PCA:  $\geq 0.05$  and  $< 0.08$  grams per 100 millilitres
- 'Special' range PCA:  $\geq 0.02$  and  $< 0.049$  grams per 100 millilitres.

**Principal penalty:** Offender's principal, or most severe, penalty for the index offence. The groupings employed for the current study were based on the Bureau's penalty hierarchy for the principal offence. The following ranking lists penalties from

the most serious to the least serious (NSW Bureau of Crime Statistics and Research 2008, p.141):

- custodial penalty (including home detention and periodic detention), suspended sentence (with or without supervision), Community Service Order/bond (with or without supervision);
- fine;
- good behaviour bond without conviction; <sup>7</sup> no conviction recorded; <sup>8</sup> and
- driver licence disqualification. <sup>9</sup>

**Length of licence disqualification:** The number of months (if any) of the licence disqualification received as a penalty for the index PCA offence. The licence disqualification was not necessarily the principal penalty and offenders could have received other penalties.

**Fine:** Whether, at the court finalisation date for the index PCA offence, the offender received any fine for the index PCA offence. The fine was not necessarily the principal penalty and offenders could have received other penalties.

**Number of concurrent driving licence, registration or roadworthiness offences:** Whether, at the court finalisation date for the index PCA offence, the offender had one or more concurrent driving licence, registration or roadworthiness offences.

**Number of concurrent offences other than PCA, driving licence, registration or roadworthiness offences:** Whether, at the court finalisation date for the index PCA offence, the offender had one or more concurrent offences other than PCA, driving licence, registration or roadworthiness offences.

## PRIOR OFFENDING

**Number of prior convictions:** Total number of finalised court appearances where one or more offences were proven in the five years prior to the index offence.

**Number of prior PCA convictions:** Total number of finalised court appearances involving one or more proven PCA offences in the five years prior to the index offence.

**Number of prior non-PCA driving licence, registration or roadworthiness offences:** Total number of finalised court appearances involving one or more proven driving licence, registration or roadworthiness offences in the five years prior to the index offence.

The analyses were undertaken in two stages: bivariate and multivariate. Cross-tabulations with Chi-square tests of association were first carried out to determine the bivariate relationships between each of the offender characteristics and the likelihood that a particular offender would be reconvicted within five years for:

- a PCA offence; or
- a non-PCA driving licence, registration or roadworthiness offence.

Cross-tabulations were also carried out to determine the bivariate relationships between principal penalty and PCA range; length of licence disqualification (as the principal penalty or in addition to the principal penalty) and PCA range; and length of licence disqualification and principal penalty.

Multivariate logistic regression was used to determine the effect of offender characteristics on reconviction. <sup>10</sup> The goal was to determine which socio-demographic, current appearance and prior offending characteristics predict who will be reconvicted. The first part of the modelling phase was to determine which of the three possible indicators of 'prior convictions' would be considered in the logistic regression model. The possible indicators were number of prior convictions, number of prior PCA convictions and number of prior non-PCA driving licence, registration or roadworthiness offences. <sup>11</sup> The 'prior convictions' variable that was best at

discriminating between those who re-offended from those who did not, was selected for consideration in the logistic regression model.

Once the strongest 'prior convictions' variable was selected, a computer-driven backward elimination procedure was used to determine which explanatory variables to include in the final multivariate logistic regression models. All independent variables were included in the models as class variables, where one category was selected as the reference category and each of the other categories within that variable was compared against this reference category. Separate models were built predicting the likelihood of receiving a subsequent conviction for a PCA offence and other non-PCA driving offences. Any variable that was significant at the five per cent level for the effect in either the PCA re-offence or the non-PCA re-offence models was retained in both models in order to allow for direct comparisons.

Model adequacy was assessed by calculating the area under the Receiver Operating Characteristic (ROC) curve statistic, which is called the AUC statistic. <sup>12</sup> The AUC statistic takes a value between 0.5 and 1.0 where, as a rule of thumb, Hosmer and Lemeshow (2000) suggest that scores greater than or equal to 0.9 provide 'outstanding' discrimination, scores between 0.8 and 0.9 provide 'excellent' discrimination, scores between 0.7 and 0.8 provide 'acceptable' discrimination and models yielding AUC scores equal to 0.5 predict the outcome at no better than chance.

Potential interaction effects between PCA range and length of licence disqualification were examined by estimating logistic regression models stratified by length of licence disqualification. The direction of the parameter estimates for PCA range were examined to determine if they varied across different lengths of licence disqualification.

## RESULTS

The results are presented in three sections. The first section describes the characteristics of the offenders convicted for a PCA offence in any NSW Local Court in 2002 (the offender's 'index offence') and the bivariate relationships between these offender characteristics and re-offending within five years of their index offence. The second section describes the relationship between principal penalty and PCA range; length of licence disqualification (as the principal penalty or in addition to the principal penalty) and PCA range; and length of licence disqualification and principal penalty. The third section describes the results of the logistic regression analyses. Offenders were excluded from the analysis if information regarding their sex and age was missing (sex: n=1, age: n=3) or if they were given 'other' penalties (such as a nominal sentence, payment of compensation: n=18).<sup>13</sup> This resulted in a final sample size of 23,351 offenders.

### CHARACTERISTICS OF OFFENDERS AND RISK OF RE-OFFENDING

Table 1 shows the characteristics of all offenders convicted for a PCA offence in NSW Local Courts in 2002, including the PCA range of their index offence, their socio-demographic characteristics, the principal penalty received for their index offence, length of licence disqualification for the index offence (if any, either as the principal penalty or in addition to the principal penalty), whether they received a fine (as either the principal penalty or in addition to the principal penalty), offences concurrent to their index offence and their proven offences in the five years prior to their index offence. Table 1 also shows, for each offender characteristic, the number (and proportion) of offenders who were reconvicted for any PCA offence or any non-PCA driving licence, registration or roadworthiness offence within five years of their index offence.

As Table 1 shows, of the 23,351 offenders convicted for a PCA offence in a NSW Local Court in 2002:

- More than half (51.8%) were convicted for a 'medium' range PCA offence, one-fifth (22.1%) were convicted for a 'high' range PCA offence and a further one-fifth (22.3%) were convicted for a 'low' range PCA offence. The remaining offenders (3.8%) were convicted for a 'special' range PCA offence.
- The majority of offenders were male (83.9%).
- The majority of offenders were non-Indigenous (90.5%).
- Three in five (60.4%) PCA offenders were aged 34 years or less; their average age being 33.3 years (standard deviation=12.1, median=31 years).
- Slightly more offenders lived in postcodes within the second highest quartile of socio-economic disadvantage (28.3%), based on the SEIFA disadvantage index.
- A fine was the principal (i.e. the most severe) penalty imposed on more than half (56.2%) of all offenders convicted for a PCA offence in NSW in 2002. The second most common principal penalties imposed were either a bond without conviction or no conviction recorded, being received by one in four (25.9%) offenders. About one in nine (11.2%) offenders received either some form of prison sentence (either imprisonment, home detention or periodic detention),<sup>14</sup> a suspended sentence, a community service order or a bond. Only 6.7 per cent of all offenders had their driver licence disqualified as the principal penalty for the PCA offence.
- About three in five (74.1%) PCA offenders received a driver licence disqualification for their index offence, either as their principal penalty or in addition to their principal penalty. Among offenders who received a

- driver licence disqualification, for 42.0 per cent, the length of the disqualification period was one to six months, for 31.5 per cent the period was seven to 12 months, and for the remaining 26.5 per cent the period was 13 months or more.
- About two in three (67.6%) PCA offenders received a fine as the principal penalty or in addition to the principal penalty for the index offence. For 83.1 per cent of offenders who received a fine, this fine was their principal penalty.
- At the court finalisation date for their index PCA offence, the majority of offenders had no concurrent offences. However, 18.7 per cent of offenders had one or more concurrent driving licence, registration or roadworthiness offences; and 11.4 per cent had one or more concurrent offences other than PCA, driving licence, registration or roadworthiness offences.
- In the five years prior to their index offence, 71.0 per cent of offenders had no prior proven offences of any type, and the vast majority of offenders had no proven PCA offences (86.7%) and no driving licence, registration or roadworthiness offences (91.8%).

Table 1 also shows the bivariate relationships between each of these characteristics and risk of reconviction. Within five years of their index court appearance, of the 23,351 offenders, 3,626 (15.5%) were convicted for one or more new PCA offences and 3,352 (14.3%) were convicted for one or more new driving licence, registration or roadworthiness offences. All but one of the bivariate relationships were statistically significant at the 0.001 level, indicating that PCA and non-PCA offences are related to each of the offender characteristics examined. The exception was that the PCA range for the index offence was not related to the likelihood of a reconviction for a PCA

**Table 1: Characteristics of offenders convicted for a PCA offence in NSW Local Courts in 2002 (at index offence)**

Characteristic			Reconvicted for any PCA offence within five years		Reconvicted for any non-PCA driving licence, registration or roadworthiness offence within five years	
	N	% of total	N	% reconvicted	N	% reconvicted
<b>Total</b>	<b>23,351</b>	<b>100</b>	<b>3,626</b>	<b>15.5</b>	<b>3,352</b>	<b>14.3</b>
<b>PCA range for index offence (2002)</b>						
Low	5,201	22.3	782	15.0	666	12.8
Medium	12,096	51.8	1,890	15.6	1,678	13.9
High	5,161	22.1	793	15.4	782	15.1
Special	893	3.8	161	18.0	226	25.3
				<i>p</i> =0.1440*		<i>p</i> <0.0001
<b>Sex</b>						
Male	19,584	83.9	3,261	16.6	3,007	15.3
Female	3,767	16.1	365	9.7	345	9.2
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Indigenous status</b>						
Non-Indigenous	21,135	90.5	3,253	15.4	2,830	13.4
Indigenous	1,454	6.2	348	23.9	510	35.1
Unknown	762	3.3	25	3.2	12	1.6
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Age (mean=33.3, SD=12.1, median=31)</b>						
≤24 years	6,831	29.2	1,247	18.3	1,153	16.9
25 - 34 years	7,269	31.1	1,137	15.6	1,152	15.8
35 - 44 years	4,938	21.1	754	15.3	688	13.9
45 - 54 years	2,849	12.2	363	12.7	278	9.8
55+ years	1,464	6.3	125	8.5	81	5.5
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>SEIFA disadvantage index</b>						
Lowest level of disadvantage	5,246	22.5	727	13.9	567	10.8
Second lowest level of disadvantage	4,974	21.3	807	16.2	706	14.2
Second highest level of disadvantage	6,605	28.3	1,074	16.3	933	14.1
Highest level of disadvantage	5,335	22.8	910	17.1	1,032	19.3
Unknown postcode	1,191	5.1	108	9.1	114	9.6
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Principal penalty for index PCA offence (2002)</b>						
Prison, suspended sentence, CSO, bond	2,618	11.2	435	16.6	506	19.3
Fine	13,119	56.2	2,145	16.3	2,029	15.5
Bond without conviction, no conviction recorded	6,046	25.9	757	12.5	248	4.1
Driver licence disqualified	1,568	6.7	289	18.4	569	36.3
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Length of driver licence disqualification for index PCA offence (as the principal penalty or in addition to principal penalty)</b>						
0 months	6,041	25.9	758	12.5	246	4.1
1-6 months	7,277	31.2	1,192	16.4	1,066	14.6
7-12 months	5,453	23.3	963	17.7	981	18.0
13+ months	4,580	19.6	713	15.6	1,059	23.1
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Fine for index PCA offence (as the principal penalty or in addition to principal penalty)</b>						
No fine	7,562	32.4	1,028	13.6	590	7.8
Fine	15,789	67.6	2,598	16.4	2,762	17.5
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Concurrent driving licence, registration or roadworthiness offences</b>						
0 concurrent offences	18,983	81.3	2,811	14.8	1,920	10.1
1 or more concurrent offences	4,368	18.7	815	18.7	1,432	32.8
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Concurrent offences other than PCA, driving licence, registration or roadworthiness offences</b>						
0 concurrent offences	20,680	88.6	3,132	15.1	2,585	12.5
1 or more concurrent offences	2,671	11.4	494	18.5	767	28.7
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Total number of prior offences (irrespective of offence type)</b>						
0 prior offences	16,579	71	2,254	13.6	1,604	9.7
1 prior offence	3,998	17.1	778	19.5	822	20.6
2 or more prior offences	2,774	11.9	594	21.4	926	33.4
				<i>p</i> <0.0001		<i>p</i> <0.0001
<b>Total number of prior PCA offences (irrespective of range)</b>						
0 prior PCA offences	20,255	86.7	3,080	15.2	2,629	13.0
1 or more prior PCA offences	3,096	13.3	546	17.6	723	23.3
				<i>p</i> =0.0005		<i>p</i> <0.0001
<b>Total number of prior driving licence, registration or roadworthiness offences</b>						
0 prior offences	21,432	91.8		15.0	2,614	12.2
1 prior offence	1,123	4.8		20.8	370	32.9
2 or more prior offences	796	3.4		21.7	368	46.2
				<i>p</i> <0.0001		<i>p</i> <0.0001

\* *P*-values for  $\chi^2$  test of association.

offence (p=0.1440). Within five years of their index offence, those more likely to have at least one new PCA conviction or a new driving licence, registration or roadworthiness offence were:

- men;
- offenders aged 24 years or less;
- Indigenous offenders;
- offenders living in areas with the highest level of disadvantage;
- offenders who had offences concurrent with their index PCA offence;
- offenders who received a fine (either as their principal penalty or in addition to their principal penalty);
- offenders who received a longer driver licence disqualification either as the principal penalty or in addition to the principal penalty (offenders more likely to have a subsequent PCA offence were those with a

disqualification period of between 7 and 12 months for the index offence; and offenders more likely to have a subsequent non-PCA driving offence were those with a disqualification period of 13 months or more for the index offence); and

- offenders who had a greater number of proven offences (offences of any type, PCA offences or driving licence, registration or roadworthiness offences) in the five years prior to their index offence in 2002.

**PRINCIPAL PENALTY FOR INDEX OFFENCE**

Table 2 shows the principal penalty imposed on PCA offenders for their index offence by the PCA range of that offence.

As Table 2 shows, the principal penalty imposed for the index PCA offence varied according to the PCA range for which the offender was convicted. For

example, the most severe penalty in the ranking was imposed on 27.0 per cent of offenders convicted for a high range PCA offence, compared with 9.4 per cent of offenders convicted for a medium range PCA offence, and only 1.4 per cent and 1.5 per cent of offenders convicted for a low range and special range PCA offence, respectively. By contrast, a fine was imposed on approximately one in two offenders convicted for a low range (49.8%) or special range (49.9%) PCA offence and approximately three in five offenders convicted for a medium range (59.5%) or a high range (55.9%) PCA offence .

As Table 2 also shows, a bond without conviction or no conviction recorded was the outcome for two in five (41.7%) offenders convicted for a low range PCA offence, compared with approximately three in ten (28.7%) offenders convicted for a special range PCA offence, one in

**Table 2: Principal penalty imposed for index PCA offence by PCA range for index offence\***

Principal penalty for index PCA offence (2002)	PCA range for index offence									
	Low range		Medium range		High range		Special range		Total	
	N	%	N	%	N	%	N	%	N	%
Custodial sentence, suspended sentence, community service order, bond	71	1.4	1,142	9.4	1,392	27	13	1.5	2,618	11.2
Fine	2,588	49.8	7,202	59.5	2,883	55.9	446	49.9	13,119	56.2
Bond without conviction/no conviction recorded	2,168	41.7	3,065	25.3	557	10.8	256	28.7	6,046	25.9
Driver licence disqualification	374	7.2	687	5.7	329	6.4	178	19.9	1,568	6.7
<b>Total</b>	<b>5,201</b>	<b>100.0</b>	<b>12,096</b>	<b>100.0</b>	<b>5,161</b>	<b>100.0</b>	<b>893</b>	<b>100.0</b>	<b>23,351</b>	<b>100.0</b>

\* P-value for  $\chi^2$  test of association was less than 0.0001.

**Table 3: Length of driver licence disqualification period by PCA range for index offence\***

Length of driver licence disqualification period	PCA range for index offence									
	Low range		Medium range		High range		Special range		Total	
	N	%	N	%	N	%	N	%	N	%
0 months	2,165	41.6	3,066	25.4	558	10.8	252	28.2	6,041	25.9
1 - 6 months	2,545	48.9	4,206	34.8	42	0.8	484	54.2	7,277	31.2
7 - 12 months	303	5.8	3,282	27.1	1,795	34.8	73	8.2	5,453	23.4
13+ months	188	3.6	1,542	12.8	2,766	53.6	84	9.4	4,580	19.6
<b>Total</b>	<b>5,201</b>	<b>100.0</b>	<b>12,096</b>	<b>100.0</b>	<b>5,161</b>	<b>100.0</b>	<b>893</b>	<b>100.0</b>	<b>23,351</b>	<b>100.0</b>

\* P-value for  $\chi^2$  test of association was less than 0.0001.

**Table 4: Principal penalty imposed for index PCA offence by length of driver licence disqualification\***

Principal penalty for index PCA offence	Length of driver licence disqualification period								Total receiving driver licence disqualification	
	0 months		1 - 6 months		7 - 12 months		13+ months		N	%
	N	%	N	%	N	%	N	%		
Custodial sentence, suspended sentence, community service order, bond	2	0.0	258	3.5	738	13.5	1,620	35.4	2,616	15.1
Fine	12	0.2	6,710	92.2	4,312	79.1	2,085	45.5	13,107	75.7
Bond without conviction/ no conviction recorded	6,027	99.8	2	0.0	11	0.2	6	0.1	19	0.1
Driver licence disqualification	0	0.0	307	4.2	392	7.2	869	19.0	1,568	9.1
<b>Total</b>	<b>6,041</b>	<b>100.0</b>	<b>7,277</b>	<b>100.0</b>	<b>5,453</b>	<b>100.0</b>	<b>4,580</b>	<b>100.0</b>	<b>17,310</b>	<b>100.0</b>

\* P-value for  $\chi^2$  test of association was less than 0.0001.

four (25.3%) convicted for a medium range PCA offence, but only one in nine (10.8%) convicted for a high range PCA offence.

Table 3 shows the length of the driver licence disqualification by the PCA range for the index offence.

As Table 3 shows, the length of the driver licence disqualification imposed on offenders varied by the PCA range of the index offence. The longest disqualification period of 13 months or more was imposed on 53.6 per cent of offenders convicted for a high range PCA offence, compared with 12.8 per cent of offenders convicted for a medium range PCA offence, 9.4 per cent of offenders convicted for a special range PCA offence and only 3.6 per cent of offenders convicted for a low range PCA offence. By contrast, the shortest disqualification period of between one and six months was imposed on more than half (54.2%) of the offenders convicted for a special range PCA offence, approximately half (48.9%) of the offenders convicted for a low range PCA offence, one in three (34.8%) of the offenders convicted for a medium range PCA offence, but only 0.8 per cent of offenders convicted for a high range PCA offence.

Table 4 shows the principal penalty imposed for the index offence by the length of the driver licence disqualification.

Three in four (74.1%, 17,310) PCA offenders received a driver licence disqualification, either as their principal penalty, or in addition to their principal penalty. For 9.1 per cent of offenders who received a driver licence disqualification, this was their principal penalty. Thus the remaining 90.9 per cent of offenders who received a driver licence disqualification received a principal penalty other than a licence disqualification (83.3% of these received a fine, 16.6% received a prison sentence, suspended sentence, community service order or a bond as their principal penalty).

As Table 4 also shows, the principal penalty imposed on offenders for the index offence varied by the length of the licence disqualification period. For example, the most severe penalty in the ranking (that is, a custodial sentence, suspended sentence, community service order or a bond) was imposed on 35.4 per cent of offenders who received the longest disqualification period of 13 months or more. This principal penalty was imposed on only 3.5 per cent of PCA offenders who received a licence disqualification of between one and six months and on 13.5 per cent of those who received a disqualification period of between seven and 12 months.

A fine was imposed on offenders who received shorter disqualification periods. This principal penalty was imposed

on nine in ten (92.2%) offenders who received a licence disqualification period of between one and six months and four in five (79.1%) offenders who received a licence disqualification period of between seven and 12 months.

### MULTIVARIATE ANALYSES

The 'prior conviction' variable that was best at predicting those who re-offended (based on the AUC statistic) was the total number of prior convictions.<sup>15</sup> Hence, the total number of prior convictions was considered for inclusion in all of the logistic regression models. The following variables were not significant in either of the adjusted models: principal penalty for index PCA offence; fine for index PCA offence (as the principal penalty or in addition to the principal penalty); concurrent driving licence, registration or roadworthiness offences; and concurrent offences other than driving licence, registration or roadworthiness offences.

Table 5 shows the results of the logistic regression analysis predicting PCA reconvictions, irrespective of the PCA range.

After adjusting for all other characteristics in the model, Table 5 shows that, within five years of their index offence:<sup>16</sup>

- The odds of female offenders being convicted for another PCA offence

**Table 5: Logistic regression model predicting reconviction for PCA offences within five years of index offence**

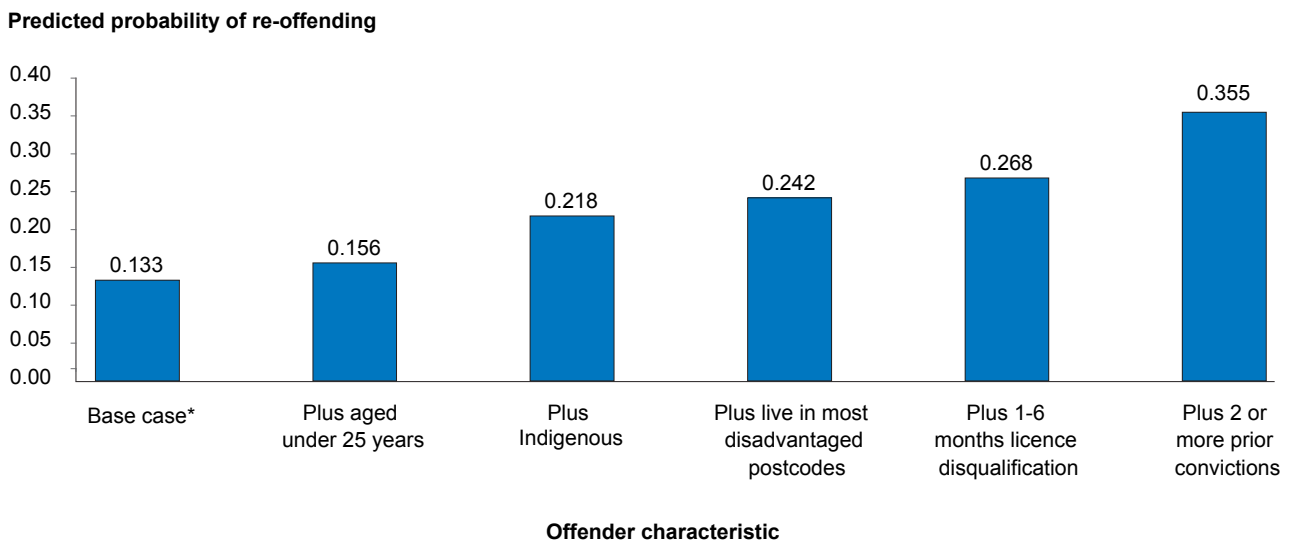
<b>Characteristic</b>	<b>Parameter estimate (Standard Error)</b>	<b>P value</b>	<b>Odds ratio (OR) (95% CI)</b>	<b>Effect P value</b>
Constant	-1.876 (0.064)	<0.0001		
<b>Sex</b>				
Male	0.000		1.000	<.0001
Female	-0.575 (0.059)	<0.0001	0.563 (0.501, 0.633)	
<b>Indigenous status</b>				
Non-Indigenous	0.000		1.000	<.0001
Indigenous	0.407 (0.068)	<0.0001	1.502 (1.314, 1.718)	
Unknown	-1.532 (0.205)	<0.0001	0.216 (0.145, 0.323)	
<b>Age at index offence (years)</b>				
25 – 34	0.000		1.000	<.0001
≤ 24	0.190 (0.046)	<0.0001	1.209 (1.105, 1.324)	
35 – 44	0.002 (0.052)	0.9679	1.002 (0.905, 1.109)	
45 – 54	-0.168 (0.066)	0.0110	0.846 (0.743, 0.962)	
55+	-0.586 (0.101)	<0.0001	0.557 (0.457, 0.678)	
<b>Level of disadvantage (SEIFA index)</b>				
Lowest level of disadvantage	0.000		1.000	<.0001
Second lowest level of disadvantage	0.134 (0.056)	0.017	1.144 (1.024, 1.277)	
Second highest level of disadvantage	0.117 (0.053)	0.0281	1.124 (1.013, 1.247)	
Highest level of disadvantage	0.139 (0.056)	0.0121	1.149 (1.031, 1.281)	
Missing +	-0.512 (0.110)	<0.0001	0.599 (0.483, 0.743)	
<b>PCA range for index offence</b>				
Medium range	0.000		1.000	0.3379
Low range	-0.035 (0.049)	0.4796	0.966 (0.878, 1.063)	
High range	0.083 (0.054)	0.1198	1.087 (0.979, 1.207)	
Special range	0.026 (0.094)	0.7784	1.027 (0.854, 1.234)	
<b>Length of licence disqualification for index PCA offence (months)</b>				
0	0.000		1.000	<.0001
1 to 6 months	0.133 (0.052)	0.0104	1.142 (1.032, 1.264)	
7 to 12 months	0.128 (0.059)	0.0302	1.136 (1.012, 1.275)	
13+ months	-0.200 (0.072)	0.0053	0.819 (0.711, 0.942)	
<b>Total number of convictions in five years prior to index offence</b>				
0 prior offences	0.000		1.000	<.0001
1 prior offence	0.355 (0.049)	<0.0001	1.426 (1.295, 1.571)	
2+ prior offences	0.410 (0.060)	<0.0001	1.507 (1.340, 1.694)	

+ The substantive findings did not change by excluding offenders in this category from the analysis.

Note: The AUC statistic was 0.618 and hence was not above the criteria of 0.7 needed for 'acceptable' discrimination but was above 0.5 and hence the model could predict any PCA re-offence better than chance (Hosmer & Lemeshow 2000).



**Figure 1: Marginal effect of each additional risk factor on risk of any subsequent drink-driving convictions**



\* Base case is an offender who was: male, aged 25-34, non-Indigenous, lived in the least disadvantaged quartile of postcodes, was convicted of a mid-range PCA offence at index, received no licence disqualification as a penalty for their index offence and who had no prior convictions

were much lower than for male offenders (OR = 0.56).

- Indigenous offenders had higher odds of being convicted for another PCA offence than non-Indigenous offenders (OR = 1.50), while those for whom Indigenous identification was unknown had much lower odds of a subsequent PCA offence (OR = 0.22).
- Offenders aged 24 years or less had greater odds of reconviction compared to offenders aged 25 to 34 years (OR = 1.21). Older offenders had lower odds of reconviction than offenders aged 25 to 34 years (OR = 0.85 and 0.56 for those aged 45 to 54 years and 55 years or more, respectively). The odds of reconviction did not differ between those offenders aged 45 to 54 years and those aged 25 to 34 years.
- Compared with offenders who lived in areas with the lowest level of socio-economic disadvantage, offenders

who lived in areas with higher levels of disadvantage had higher odds of reconviction (OR ranged from 1.12 to 1.15 for the three areas of higher disadvantage).

- The odds of reconviction for another PCA offence did not differ across the PCA ranges for the index offence.
- Offenders receiving a driver licence disqualification period of 13 months or more for their index PCA offence (either as the principal penalty or in addition to the principal penalty) had lower odds of reconviction for a PCA offence than those who did not receive a licence disqualification (OR = 0.82). Offenders with shorter licence disqualification periods had higher odds of reconviction for a PCA offence than those who did not receive a licence disqualification (for a disqualification period of one to six months and also for a disqualification period of seven to 12 months OR = 1.14).

- Offenders who had a greater number of convictions in the five-year period prior to their index PCA offence in 2002 had the highest odds of being convicted for another PCA offence (OR = 1.43 for those with one prior conviction, OR = 1.51 for those who had two or more prior convictions).

There was no evidence of an interaction between PCA range and length of licence disqualification when modelling PCA re-offence. PCA range was not related to PCA re-offence for any period of licence disqualification, including 0 months.

Figure 1 shows the marginal effect of each of these risk factors on the likelihood that a drink-driver will be convicted for another PCA offence within five years of their index PCA offence. To estimate the marginal effect of each risk factor, a 'base case' was defined as the modal group for each variable, (i.e. the group most frequently observed). If the frequency was very similar across groups, then the reference group applied in the logistic

regression was used.<sup>17</sup> The base case was defined as a male, non-Indigenous person, aged between 25 and 34 years, who lived in a postcode which fell within the least disadvantaged quartile, had been convicted for a mid-range PCA offence at the index offence, did not receive a driver licence disqualification for the index offence (either as the principal penalty or in addition to the principal penalty), and who had no convictions in the five-year period prior to the index offence.

Figure 1 shows that the estimated risk of any subsequent drink-driving conviction for an offender with these 'base case' characteristics was 13.3 per cent. If the offender had each of these characteristics but was also young (aged under 25 years) and Indigenous, the risk of having a PCA conviction within five years of the index offence increased to 21.8 per cent. Adding a penalty of a driver licence disqualification of between one and six months and living in the most disadvantaged areas increased the risk of reconviction to 26.8 per cent. Finally, offenders who are young, Indigenous, lived in the most disadvantaged areas, had a licence disqualification of up to six months and had two or more convictions for any offence in the five years preceding the index offence were estimated to have a 35.5 per cent chance of a repeat drink-driving conviction within five years.

Table 6 shows the results of the logistic regression analysis predicting reconviction for a non-PCA driving offence within five years of the index (2002) PCA offence. The offences included are registration, roadworthiness or driving licence offences.

The logistic regression model in Table 6 suggests that, after adjusting for all other characteristics in the model, within five years of their index PCA offence:<sup>18</sup>

- The odds of female offenders being convicted for a non-PCA driving offence were lower than for male offenders (OR = 0.72).
- Indigenous offenders had higher odds of being convicted for a non-PCA driving offence than non-Indigenous offenders (OR = 2.12), while those for whom Indigenous identification was unknown had lower odds of a subsequent non-PCA driving conviction (OR = 0.15).
- Offenders aged 45 to 54 years (OR = 0.74) or aged 55 years or more (OR = 0.52) had lower odds of reconviction for a non-PCA offence compared with those aged between 25 and 34 years. Younger offenders (aged 24 years or less) had higher odds of reconviction for a non-PCA offence compared with those aged between 25 and 34 years. The odds of reconviction did not differ between those offenders aged 35 to 44 years and those aged 25 to 34 years.
- Offenders who lived in areas with the highest level of socio-economic disadvantage had higher odds of reconviction for a non-PCA driving offence compared with those offenders who lived in areas with the lowest level of disadvantage (OR = 1.50). Offenders who lived in postcodes within the second lowest level of disadvantage had slightly higher odds of re-offending than those living in areas in the lowest quartile (OR = 1.19).
- Compared with offenders who were convicted for a medium range PCA offence in 2002, offenders who had been convicted for a low range PCA offence (OR = 1.24) or 'special' range PCA offence (OR = 2.23) had greater odds of being reconvicted for a non-PCA driving offence. The odds of reconviction for a non-PCA driving offence was lower for offenders convicted for a high range PCA offence in 2002 (OR = 0.79).
- Offenders who received a driver licence disqualification for their index PCA offence (either as their principal penalty or in addition to their principal penalty) had higher odds of reconviction for a non-PCA driving offence than offenders who did not receive a licence disqualification for the index offence. For example, offenders with a disqualification period of 13 months or more had the highest odds of reconviction (OR = 4.77).
- Offenders who had convictions in the five years prior to their index offence had greater odds of being reconvicted for a non-PCA driving offence compared with offenders who had no prior offences (for offenders who had one prior offence, OR = 1.64; and for offenders who had two or more prior offences, OR = 2.40).

There was no evidence of an interaction between PCA range and length of licence disqualification when modelling non-PCA driving re-offence. Across all lengths of licence disqualification (for 0 months, 1-6 months, 7-12 months or 13 months or more), offenders convicted for a low or special range PCA offence had greater odds of being reconvicted for a non-PCA driving offence compared to offenders who were convicted for a medium range PCA offence. High range PCA offenders had lower odds of being reconvicted for a non-PCA driving offence compared to offenders who were convicted for a medium range PCA offence.<sup>19</sup>

Figure 2 shows the marginal effect of each of these risk factors on the likelihood that a drink-driver will be convicted for a non-PCA driving offence within five years of their index PCA offence. Again, the base case was defined here as an offender who was male, non-Indigenous, aged between 25 and 34 years, lived in a postcode which fell within the least disadvantaged quartile, had been convicted for a mid-range PCA offence at the index offence, did not receive a driver licence disqualification for their index PCA offence (either as the principal penalty or in addition to the principal penalty), and who had no convictions in the five-year period prior to the index offence.

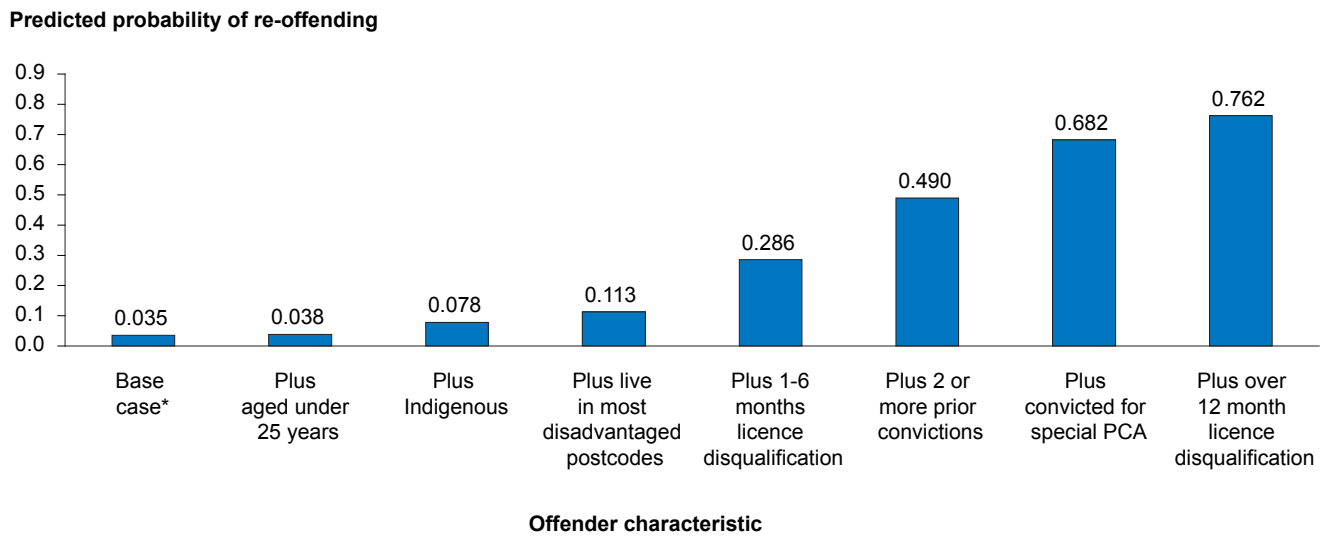
**Table 6: Logistic regression model predicting reconviction for non-PCA driving offences within five years of index offence**

<b>Characteristic</b>	<b>Parameter estimate (Standard Error)</b>	<b>P value</b>	<b>Odds ratio (OR) (95% CI)</b>	<b>Effect P value</b>
Constant	-3.322 (0.087)	<0.0001		
<b>Sex</b>				
Male	0.000		1.000	<.0001
Female	-0.332 (0.063)	<0.0001	0.717 (0.634, 0.812)	
<b>Indigenous status</b>				
Non-Indigenous	0.000		1.000	<.0001
Indigenous	0.752 (0.064)	<0.0001	2.121 (1.871, 2.406)	
Unknown	-1.905 (0.293)	<0.0001	0.149 (0.084, 0.264)	
<b>Age at index offence (years)</b>				
25 – 34	0.000		1.000	<.0001
≤ 24	0.102 (0.049)	0.0374	1.107 (1.006, 1.218)	
35 – 44	-0.089 (0.055)	0.1056	0.915 (0.822, 1.019)	
45 – 54	-0.299 (0.074)	<0.0001	0.742 (0.641, 0.858)	
55+	-0.652 (0.123)	<0.0001	0.521 (0.410, 0.663)	
<b>Level of disadvantage (SEIFA index)</b>				
Lowest level of disadvantage	0.000		1.000	<.0001
Second lowest level of disadvantage	0.176 (0.063)	0.0051	1.192 (1.054, 1.348)	
Second highest level of disadvantage	0.095 (0.060)	0.1114	1.100 (0.978, 1.236)	
Highest level of disadvantage	0.405 (0.060)	<0.0001	1.500 (1.334, 1.686)	
Missing +	-0.294 (0.112)	0.0085	0.745 (0.599, 0.928)	
<b>PCA range (index offence)</b>				
Medium	0.000		1.000	<.0001
Low	0.217 (0.055)	<0.0001	1.242 (1.114, 1.384)	
High	-0.240 (0.055)	<0.0001	0.787 (0.706, 0.877)	
Special	0.803 (0.090)	<0.0001	2.233 (1.872, 2.662)	
<b>Length of licence disqualification for index PCA offence (months)</b>				
0	0.000		1.000	<.0001
1 to 6 months	1.148 (0.075)	<0.0001	3.151 (2.722, 3.648)	
7 to 12 months	1.455 (0.080)	<0.0001	4.282 (3.660, 5.011)	
13+ months	1.562 (0.088)	<0.0001	4.769 (4.015, 5.665)	
<b>Total number of convictions in five years prior to index offence</b>				
0 priors	0.000		1.000	<.0001
1 prior offence	0.493 (0.051)	<0.0001	1.637 (1.481, 1.808)	
2+ prior offences	0.874 (0.057)	<0.0001	2.397 (2.145, 2.678)	

+ The substantive findings did not change by excluding offenders in this category from the analysis.

Note: The AUC statistic was 0.734 indicating an 'acceptable' level of discrimination in predicting any non-PCA driving offence in the five years after the index PCA offence (Hosmer & Lemeshow 2000).

**Figure 2: Marginal effect of each additional risk factor on likelihood of subsequent non-PCA driving offences**



\* Base case is an offender who was: male, aged 25-34, non-Indigenous, lived in the least disadvantaged quartile of postcodes, was convicted of a mid-range PCA offence at index, received no licence disqualification as a penalty for their index offence and who had no prior convictions

Figure 2 shows that the estimated risk of reconviction for a non-PCA driving offence for an offender with these characteristics was 3.5 per cent. If the offender had each of these characteristics but was also young and Indigenous, the risk of having a subsequent non-PCA driving licence, registration or roadworthiness offence within five years of the index offence more than doubled to 7.8 per cent. Adding to these risk factors, living in a postcode with the highest level of socio-economic disadvantage, a driver licence disqualification of one to six months as a penalty for that index offence, and two or more convictions for any offence in the five years preceding the index offence increased the estimated risk to 49.0 per cent. Adding a conviction for special range PCA as the index offence increased the risk of re-offending to 68.2 per cent. Finally, extending the length of the driver licence disqualification to more than 12 months increased the estimated chance of being convicted for a non-PCA driving licence, registration or

roadworthiness offence within the next five years to 76.2 per cent.

## SUMMARY AND CONCLUDING REMARKS

The current bulletin described the characteristics of people convicted for drink-driving in 2002 in NSW and analysed how these characteristics relate to the likelihood of reconviction within five years. Overall, 14.3 per cent of PCA offenders returned to court within five years charged with a non-PCA driving offence, such as driving licence, registration or roadworthiness offence, and 15.5 per cent of PCA offenders returned to court for another drink-driving offence within five years. The latter rate is consistent with some previous research conducted both overseas (e.g. Davies & Smith 2003) and locally on PCA offenders. For example, Homel (1981) found that 14.9 per cent of NSW drink-drivers were reconvicted

for another drink-driving offence within three years. However, the five-year reconviction rate of 15.5 per cent found among NSW drink-drivers in the current study is much lower than the rate found by other researchers in this field (e.g. Beerman et al. 1988, found that 44% of drink-drivers re-offended over a 12.5 year study period).

Nonetheless, the PCA reconviction rates are still of concern. Official recorded reconviction data are only a proxy measure of re-offending and are likely to substantially underestimate the real situation. Arrest and conviction data only provide a measure of the detected drink-driving activity rather than an accurate measure of actual drink-driving activity as many offences are likely to go undetected. For example, Liu et al. (1997) found that the number of arrests for driving while intoxicated for 1993 in the United States was 82 times lower than the number of alcohol-impaired driving episodes estimated from self-reports.

In Australia, more than 20 years ago, Homel, Carseldine and Kearns (1988, p. 128) estimated that the police charge rate for drink-drivers is 'at most 1.5%, and the average rate is only about 0.4 or 0.5%'. More recently, of the 166 recidivist drink-drivers interviewed by Freeman (2004), three in five (60.3%) self-reported that, in the six months prior to being apprehended, they had 'driven on a public road [at least once] when ... over the legal limit' (p. 263); and three in ten (31.3%) self-reported that this had happened on six or more occasions. Therefore, using reconviction or arrest rates as a proxy for re-offending among drink-drivers is likely to capture only the tip of the iceberg.

As with past research (e.g. Ryan et al. 1996), the current study found some sub-groups of drink-drivers are more at risk of re-offending than others. The following NSW groups were found to be most at risk of returning to court for PCA and non-PCA driving offences:

- men;
- Indigenous offenders;
- younger offenders (aged less than 25 years);
- offenders who lived in areas with the highest level of socio-economic disadvantage;
- offenders who received a driver licence disqualification of between one and six months either as the principal penalty for their index offence or in addition to their principal penalty; and
- offenders with two or more convictions in the five-year period prior to their index offence.

Offenders who had all of these risk factors had an estimated 35.5 per cent chance of being convicted for drink-driving and an estimated 49.0 per cent chance of being convicted for a non-PCA driving offence within five years of their index offence. The estimated chance of being convicted for a non-PCA driving offence increased

to 68.2 per cent if offenders had been convicted for a special range PCA offence. While having been convicted for a low range PCA offence at index also increased their chance of non-PCA driving re-offence, this was to a lesser extent than if convicted for a special range PCA offence. However, a high range PCA conviction as the index PCA offence was a protective factor – the odds of reconviction for a non-PCA driving offence was lower for offenders convicted for a high range PCA offence in 2002.

While other researchers have found that licence disqualification or restrictions are effective in reducing re-offending rates, the findings from the current study are mixed. On the one hand, receiving a licence disqualification for a period of 13 months or more was found to reduce the risk of further PCA offences. In other words, those receiving the longest licence disqualification periods had the least risk of having a subsequent PCA offence within five years. This is consistent with Homel's (1981, p. 236) conclusion that 'long disqualification periods ... have a greater deterrent effect than shorter periods'. On the other hand, longer license disqualification periods were found to significantly increase the risk of subsequent non-PCA driving offences. Offenders who were given disqualification periods of 13 months or more were found to be more than four times as likely as those whose licence was not disqualified to return to court within five years charged with a non-PCA driving offence. At face value, it would appear that longer periods of licence disqualification may place offenders at greater risk of subsequent driving convictions. However, there may be another explanation for the seemingly higher risk of re-offending among offenders given long periods of licence disqualification. In these analyses, attempts were made to adjust for re-offending risk factors other than the length of licence disqualification

(e.g. age, sex, Indigenous status, PCA range of index offence and number of prior offences), but there may be other risk factors which could not be taken into account because the information was simply not available. When making sentencing decisions, magistrates are likely to have access to information on additional factors which may be contributing to the increased risk of re-offending. The heightened risk of non-PCA offending for those with longer disqualification periods may be an artefact of some unmeasured factor correlated with these periods.

## ACKNOWLEDGEMENTS

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## NOTES

1. A finalised charge is one that has been fully determined by the court and for which no further court proceedings are required.
2. PCA refers to the blood alcohol concentration (BAC) range prescribed by the law as being an offence.
3. If an offender had more than one conviction for a PCA offence in 2002, only the first conviction was counted as the index offence. All subsequent convictions were counted as re-offending.
4. Australian Standard Offence Classification (ASOC) Subdivision 143 (Regulatory driving offences), offence 1431 (exceed the prescribed content of alcohol or other substance limit) (Australian Bureau of Statistics 2008b).

5. 'Offence proven' includes all charges finalised by a plea of guilt or by a guilty finding either at a defended hearing where the accused person was present or ex-parte (NSW Bureau of Crime Statistics and Research 2008, p.120).
6. Australian Standard Offence Classification (ASOC) Subdivision 141 (Driver licence offences), offences 1411 (driving while licence disqualified or suspended), 1412 (driving without a licence) and 1419 (driving licence offences, not elsewhere classified); Subdivision 142 (Road vehicle registration and roadworthiness offences), offences 1421 (registration offences) and 1422 (roadworthiness offences) (Australian Bureau of Statistics 2008b).
7. The term 'good behaviour bond without conviction' refers to a Section 10(1)(a) dismissal. In these cases, no conviction is recorded if the offender completes his/her bond and the attached conditions, if any. However, if the bond is not completed, the offender is brought back to court and re-sentenced. A matter which has been dealt with under Section 10 does not form part of a person's criminal record, but it may be disclosed to a court when he/she is being sentenced for further offences.
8. The term 'no conviction recorded' refers to a finding of guilt but no conviction is recorded and the offender does not enter into a bond.
9. On the Bureau's penalty hierarchy for principal offence, licence disqualification is ranked lower than other penalties. Licence disqualification (like compensation) is a secondary penalty and should only be imposed in conjunction with another penalty. For example, most people who receive a fine also receive a licence disqualification. However, some magistrates may impose only a licence disqualification.
10. Survival analysis using the Cox proportional hazards model was used to investigate any differences between offender characteristics and the time from the finalisation date of the index PCA offence to the first subsequent PCA (or non-PCA) re-offence. The results of the survival analysis reflected those found in the logistic regression model, therefore only the results of the logistic regression are reported.
11. These three variables could not all be included in the same model due to problems with multi-collinearity.
12. Model adequacy was assessed using Receiver Operating Characteristic (ROC) curve analysis. ROC curves plot the proportion of true positives (that is, those predicted to re-offend and who are observed to re-offend) against false positives (that is, those predicted to re-offend who do not actually re-offend) at any given cut-off point for re-offending. The area under the curve (AUC) statistic based on the ROC curve was calculated to determine how well the model discriminated between those who had a driving re-offence and those who did not have a driving re-offence. Put simply, the AUC can be interpreted as the likelihood that an offender who has a subsequent conviction will have a higher predicted probability of re-offending than a person who does not have a further conviction (Hosmer & Lemeshow 2000, p.162).
13. Offenders who had missing information on Indigenous status or postcode (and therefore SEIFA disadvantage quartile) were included in the analysis as separate categories. These groups were relatively large (762 or 3.3% of offenders had unknown Indigenous status and 1,191 or 5.1% of offenders had missing information regarding postcode). It is suspected that the reasons why this information was missing was systematic, for example, the offenders were not proceeded against in person.
14. A total of 8 per cent of offenders were imprisoned (where imprisoned includes full-time custody, periodic detention and home detention) either for their index PCA offence or in the follow-up period with 1.3 per cent imprisoned at their index PCA offence and 7.6 per cent imprisoned for at least one day in the follow-up period.
15. For the logistic regression model with the outcome 'any PCA re-offence', the AUC statistic was 0.554 when the sole explanatory variable was total number of prior offences (irrespective of offence type), 0.511 when the sole explanatory variable was total number of prior PCA offences (irrespective of range) and 0.518 when the sole explanatory variable was total number of prior driving offences (registration, roadworthiness or driving licence offences). For the logistic regression model with the outcome driving re-offence (registration, roadworthiness or driving licence offences), the AUC statistic was 0.646 when the sole explanatory variable was total number of prior offences (irrespective of offence type), 0.549 when the sole explanatory variable was total number of prior PCA offences (irrespective of range) and 0.581 when the sole explanatory variable was total number of prior driving offences (registration, roadworthiness or driving licence offences).
16. Excluding from the logistic regression model offenders who received a custodial sentence for either their index PCA offence or for one or more days during the five-year follow-up period did not change the size or direction of the results and therefore only the model without exclusions is presented.
17. This was required for the SEIFA disadvantage quartile with the least disadvantaged quartile being

selected as the level used for the 'base case' and for the length of licence disqualification with the no disqualification group being selected as the level used for the 'base case'.

18. Excluding from the logistic regression model offenders who received a custodial sentence for either their index PCA offence or for one or more days during the five-year follow-up period did not change the size or direction of the results and therefore only the model without exclusions is presented.
19. The increased risk of a non-PCA re-offence for low range PCA offenders when compared to medium range PCA offenders was not statistically significant for those who did not receive a licence disqualification or for those who received a seven to 12 month licence disqualification period. The decreased risk of a non-PCA driving re-offence for high range PCA offenders when compared to medium range PCA offenders was not statistically significant for those who received no licence disqualification or for those who received a one to six month licence disqualification period.

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