CRIME AND JUSTICE BULLETIN

The use of penalty notices for first time drink- and drug-driving offences in NSW

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AIM

To understand whether the introduction of penalty notices in New South Wales (NSW) for first time low, special and novice range drink-driving and drug-driving offences reduced the number of court appearances and increased the certainty of licence sanctions for these offences.

METHOD

Data was obtained from the NSW Police Force's Computerised Operational Policing System (COPS) for all first time low, special and novice range exceed the prescribed concentration of alcohol (PCA) incidents and first time drug-driving incidents occurring between 5 December 2016 to 1 March 2020. We used a combination of interrupted time series analysis, and descriptive analysis respectively to determine the changes in CANs and dismissals post-reform. We used logistic regression to identify significant correlates of receiving a penalty notice among the first time PCA and drug-driving offenders in our sample.

RESULTS

The introduction of penalty notices significantly reduced the number of CANs issued for first time low, special and novice range PCA offences by 81.0%, or 4,779 fewer CANs than predicted. For first time drug-driving there was a significant, though smaller (29.8%) reduction in CANs (or 1,118 fewer CANs issued). These changes also translated into decreases in court dismissals and conditional discharges. Among first time low, special and novice range PCA offenders, the percentage receiving a court dismissal or conditional discharge decreased from 51.5% to 8.0% while among first time drug-driving offenders it decreased from 28.0% to 15.2%. Among both first time low, special and novice range PCA offenders and drug-driving offenders, having no concurrent offences and no prior proceedings to court in the previous 5 years predicted receipt of a penalty notice. The smaller reduction in court appearances for drug-driving was primarily due to those charged with this offence having more concurrent and prior offences.

CONCLUSION

The introduction of penalty notices significantly reduced the number of court appearances for first time low, special and novice range PCA offences and to a lesser extent, first time drug-driving offences, and decreased the percentage of offenders who received a court dismissal or conditional discharge for these offences.

INTRODUCTION

Drugs and alcohol are significant contributors to fatal road crashes and crashes resulting in serious injury. In 2021, 17% of all road fatalities and 8% of all serious injury crashes on New South Wales (NSW) roads involved alcohol (Transport for NSW, Centre for Road Safety, 2022a). The latest available data also indicates that nearly one-quarter of all road fatalities involved a driver with an illicit drug present in their system (Transport for NSW, 2023). While there have been some improvements observed in alcohol-related crashes over the last decade, road trauma associated with illicit drug use appears to be on the rise (Transport for NSW, Centre for Road Safety, 2017a; 2017b).

One of the most effective strategies employed by authorities to limit the harm caused by drink-driving is Random Breath Testing (RBT). Introduced in NSW in 1982, RBT was shown to be associated with a 48% reduction in the number of fatal crashes, a 19% reduction in crashes involving serious injury and a 26% reduction in all single-vehicle night-time (SVNT) crashes in its first 10 years of implementation (Henstridge et al., 1997). Importantly, the benefits of RBT were found to be directly related to the number of breath tests that police administered over this period, with reductions in serious and SVNT crashes diminishing as the number of breath tests declined in the late 1980s but subsequently restored following increased enforcement in the early 1990s. Similar declines in road trauma were observed in other Australian jurisdictions following the introduction of RBT (Erke et al., 2009).

The use of roadside testing to curb drug-driving came much later (in 2007 in NSW) due to the complexities in developing an easy to administer oral screening test to detect the presence of illicit drugs (Ramsey & Fitzgerald, 2017). Currently, mobile drug tests are used in NSW to detect cannabis, methamphetamine, cocaine, and MDMA. A preliminary oral fluid test (POFT) is initially conducted at the roadside and if a driver tests positive, then a sensitive oral fluid test (OFT) is undertaken and this result is used for evidence. Cameron et al. (2022) used Victorian testing data from 2010 to 2016 to assess the impact of increases in POFTs and detection rates (the percentage of POFTs which have a positive OFT) on the odds of fatalities and serious injuries involving cannabis (THC) and methamphetamine. They found that both the rate of cannabis road fatalities and the rate of serious injury crashes involving cannabis significantly declined as the number of POFTs increased (a 4.2% reduction and 3.8% reduction, respectively). Logistic regression was used to measure changes in the proportion of injured drivers detected with the drug in a given year and region. The rate of methamphetamine fatalities significantly declined as the detection rate increased. The effect for methamphetamine was very strong, with a 21% reduction in road fatalities per one percentage point increase in the detection rate. A weaker, though still significant decline was also evident for injury crashes involving methamphetamine (6.6% reduction).

In contrast, there is very little evidence that harsher penalties in the form of higher fines and imprisonment have much of a deterrent effect on drink-driving offences (Terer & Brown, 2014). For example, Briscoe (2004a; 2004b) examined the impact of doubling the statutory prison terms, fines and licence disqualification periods for drink-driving offences on road crashes and reoffending rates in NSW. She found no evidence that the 1998 legislative changes were associated with a reduction in alcohol-related road crashes in NSW, although a small reduction in reoffending rates was apparent for drivers residing in regional and remote areas. Research by Weatherburn and Moffatt (2011), using a different methodology known as a two-stage regression approach, confirms that higher fines do not reduce drink-driving recidivism rates.

There is, however, good evidence (from jurisdictions with effective enforcement) that licence disqualification is associated with reduced crashes and reoffending. Siskind (1996) examined driving records for Queensland males who received a licence disqualification for a drink-driving offence in 1988. He followed these drivers for three years after the index event and compared traffic crashes, drink-driving, and other traffic offending in the period where the driver's licence was disqualified with the non-disqualification period. Siskind found significantly lower rates of offending (of all types) and traffic crashes when drivers were disqualified versus when they could drive legally. Watson et al. (2017) also compared drink-driving and general traffic offending before, during and after licence disqualification periods for

drink-drivers convicted in Victoria between 1996 and 2002. The licence disqualification period was found to have significantly lower rates of drink-driving (28.3 vs. 93.7 per 1,000 person years) and other traffic offences (307.5 vs. 914.4 per 1,000 person years) compared with the pre-licence disqualification period. Lower rates of offending were also observed after the licence disqualification period had been served. The licence restoration period had significantly lower person years rates for drink-driving offences (53.7 per 1,000) and other traffic offences (664.0 per 1,000) when compared with the pre-licence disqualification period.

Given the evidence for the effectiveness of licence disqualification, many jurisdictions across the United States (U.S.) have introduced administrative licence suspension laws to provide for swift and certain penalties for drink-driving offences. These allow for law enforcement and/or licensing authorities to immediately suspend a driver's licence if they fail or refuse a Blood Alcohol Concentration (BAC) test, before the matter goes to court. Wagenaar and Maldonado-Molina (2007) examined the impact of these laws on alcohol-related crashes across 46 U.S. states between 1976 and 2002 and found that administrative suspensions significantly reduced alcohol-related fatal crashes by 5%. A more recent study by Fell and Scherer (2017) compared road fatalities in states in the U.S. where an administrative licence revocation law (ALR) was in place with those without ALRs. Examining road fatality data between 1982 and 2012, they found that jurisdictions with ALR laws had crash rates that were on average 13.1% lower than states without such laws, and that those with longer suspension periods had the lowest rates.

Automatic licence disqualification penalties are currently in place in NSW for both prescribed content of alcohol (PCA) and drug-driving offences. These provide for a disqualification period even in the absence of a specific court order. However, not all drivers with a proven drink- or drug-driving offence receive a licence disqualification because automatic periods do not apply if the court decides to dismiss the matter without conviction.[1] In 2018/19 just over one-quarter (28%) of the 16,665 defendants who were found guilty in NSW courts for drink-driving received an unconditional or conditional dismissal. In the case of drug-driving, 30% of the 6,356 defendants who were found guilty in NSW courts in 2018/19 received an unconditional or conditional dismissal (NSW Bureau of Crime Statistics and Research, 2023).

Concerned about this apparent lack of consistent application of licence disqualifications by the courts, as well as the delay between arrest and court determination, the NSW Government introduced penalty notices and administrative licence suspensions for first time drink- and drug-driving offenders in May 2019. This gave police the power to issue a fine of $561 for first time low and special range PCA offences[2] and first time illicit drug-driving offences in lieu of a Court Attendance Notice (CAN).[3] Penalty notices for PCA offences would be coupled with an immediate three-month licence suspension issued by NSW Police (on the spot). For illicit drug-driving penalty notices, Transport for NSW would issue a three-month licence suspension following laboratory confirmation of the presence of the drug (which can take at least 30 days). The purpose of these changes was to ensure that penalties for low level drink- and drug-driving offences "are both comparatively swift in delivery and consistent in application" (Minister Pavey, Second Reading Speech, *Road Transport Legislation Amendment (Penalties and Other Sanctions) Act 2018 (NSW)*). If successful, additional benefits would also flow onto the justice system, in the form of reduced court workload and police attendance at court. Several other Australian jurisdictions, including Victoria, South Australia, Western Australia, and Tasmania, have introduced similar penalty notice schemes for low-range drink-driving. Victoria, South Australia, and the Northern Territory also issue penalty notices for drug presence first offences.

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1   Section 10 of the Crimes (Sentencing Procedure) Act 1999 (NSW) permits a court, in certain circumstances, to find a person guilty and yet direct that the relevant charge be dismissed, or the offender be conditionally discharged.
2   Special range PCA also includes novice range.
3   Although offenders can still choose to have their matter dealt with in court if they wish to contest the penalty notice.

The current study

This study examines the initial phase of implementation of the penalty notice scheme for first time low and special range drink-driving, and first time drug-driving offences. It seeks to understand the extent to which the introduction of penalty notices in NSW reduced the number of court appearances and increased the certainty of a licence sanction being imposed for these offences. A secondary aim is to understand any disparities in the issuing of a penalty notice for these offences. More specifically, we sought to examine the reasons why first time drug-drivers received penalty notices at a lower rate than first time low and special range PCA offenders.

METHOD

Data

We initially obtained data from the NSW Police Force's Computerised Operational Policing System (COPS) for all criminal events with a person of interest's (POI) proceeding date occurring between 5 December 2016 and 1 March 2020 and which involved at least one PCA offence, drive under the influence of alcohol offence, or a drug presence offence. These events were then linked to the BOCSAR Re-offending Database (ROD) using the person of interest's Central Name Index (CNI) to obtain further information on prior criminal history. Events containing more than one of these incident types were excluded from the analysis.[4]

We restricted our sample to the 22,504 events involving a first-time low or special range PCA offence and the 22,657 events involving a first-time drug presence offence. The legislative changes were applicable to only these offences. Penalties for offenders who received a Court Attendance Number (CAN) were also extracted from ROD using the charge number. Linkage to ROD was successful for 18,609 (99.8%) of the events involving a first-time low or special range PCA offender who was issued a CAN and 20,510 (99.3%) of the events involving a drug presence offender who was issued a CAN.

The final dataset contained the following variables:[5]

- Person of interest (POI) proceeding date

- Incident start date

- Method of proceeding: Court Attendance Notice (CAN) or penalty notice

- Gender: Female, Male

- Age group: under 18 years, 18-24 years, 25-29 years, 30-39 years, 40-49 years, 50 years or older

- Police region: Central Metropolitan, North West Metropolitan, South West Metropolitan, Northern Region, Southern Region, Western Region

- Concurrent offences: 0, 1, 2 or more

- Concurrent driving-related offences: 0, 1 or more

- Concurrent drug-related offences: 0, 1 or more

- Prior police proceedings (of any type) in previous 5 years: 0, 1, 2 or more

- Prior police proceeded to court in previous 5 years: 0, 1, 2 or more

- Prior police penalty notices in previous 5 years: 0, 1, 2 or more

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4   These events comprised 0.9% of the records.
5   Information on a person's Aboriginality was not included in the analysis because 53.2% of person of interest records were classified as Aboriginality unknown. This is because NSW police typically do not ask this question for PCA and drug-driving offences.

- Number of prior proven court appearances in previous 5 years: 0, 1 or more

- Number of prior prison sentences in previous 5 years: 0, 1 or more

- Whether the principal penalty for the index offence was a s.10(1)(a) dismissal or s.10(1)(b) conditional discharge: Yes, No

- Whether the court imposed a licence disqualification period for the index offence: Yes, No

As the legislation now enables the police to immediately suspend the licence of first time low or special range PCA and drug-driving offenders who are issued a penalty notice, our intention was to also examine the extent to which the reforms resulted in greater certainty of licence sanctions for these offences. Unfortunately, NSW police could not provide us with data on the number of licence suspensions issued to those who received a penalty notice. As such, we were only able to compare the proportion of all offenders before and after the reforms who received a conditional or unconditional dismissal from the court for their index offence (thereby avoiding an automatic licence disqualification). We examined whether there was a post policy decrease in the number and percentage of offenders who received a dismissal or a conditional discharge under s. 10(1)(a) and s. 10(1)(b) of the Crimes (Sentencing Procedure) Act 1999 (NSW),[6] respectively, (and therefore avoided an automatic licence disqualification). The very small number of court penalties which could not be linked to ROD was removed from the denominator of CANs and penalty notices for each of these variables.[7]

Statistical analysis

Time series analyses of number of CANs

We used interrupted time series to estimate the impact of the reforms on court attendance notices for each offence type. The advantage of this method (over descriptive analyses of the number of CANs and penalty notices after the reforms) is that it can quantify the reduction in court workload, accounting for any existing trends in CANs (i.e., the number of offences) and any seasonal fluctuations in the data.

Given the relatively short length of the post-period, we analyse the number of CANs issued between 5 December and 1 March 2020 at a weekly frequency. Aggregating our dataset at the weekly level resulted in a time series of 169 weeks in total (128 pre-reform weeks and 41 post-reform weeks). The pre-reform series was from 5 December 2016 to 19 April 2019 and the post-reform series ranged from 20 May 2019 to 1 March 2020. We ended our analysis period prior to the onset of the COVID-19 pandemic, which likely changed the environment for drink- and drug-driving offending and the policing of these offences, and thus may invalidate a pre-post comparison. We discuss this limitation in greater detail later in this bulletin.

The outcome variable in this analysis was the weekly number of offenders who received CANs for each offence. Augmented Dickey-Fuller (ADF) tests were applied to the 128 pre-reform weeks to test whether each series was difference or trend stationary. Table 1 shows that both the low and special range PCA series (ADF test = -5.23, p < .001) and the drug-driving series (ADF test = -5.08, p < .001) were trend stationary and did not need to be differenced.

Since each series was trend stationary, the time series included terms for the underlying trend, change in level, change in trend, autocorrelation and seasonality (Chatfield, 2003). Autocorrelation function (ACF) and partial autocorrelation function (PACF) plots of the residuals at relevant lags were used to determine the orders of autoregressive or moving average terms that needed to be included in the models to account for autocorrelation. Autocorrelation checks of residuals were used to identify statistically significant autoregressive (AR) or moving average (MA) lags. Terms for these autocorrelation lags were added to the time series model until the Ljung-Box test to lag 24 was not statistically significant.

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6 On 24 September 2018, the new conditional release order without conviction replaced good behaviour bonds without conviction under s.10(1)(b) of the Crimes (Sentencing Procedure) Act. These new penalties were also counted as conditional dismissals.

7 These are 40 (0.2%) of first time low or special range PCA offences and 135 (0.7%) of drug-driving offences in court.

Seasonality was controlled for deterministically using the POI proceeding date. We considered accounting for seasonality via quarterly terms and monthly terms. These terms were included in the model and retained if significant. When comparing a model with only significant quarterly terms included versus one with only significant monthly terms included, we found the latter performed better (as measured by a lower value of the Akaike Information Criterion (AIC)).

Table 1. Test statistic and *p*-value for Augmented Dickey-Fuller unit root tests on weekly court attendance notices (CANs) for first time low or special range PCA and drug-driving offences [a]

Time series (weekly)	Number of lags	ADF test	*p*-value
Low or special range PCA first offence	2	-5.23	< .001 ***
Drug-driving first offence	3	-5.08 [b]	< .001 ***

[a] Time period: 5 December 2016 - 19 May 2019
[b] Includes significant deterministic trend term
* $p < .05$, ** $p < .01$, *** $p < .001$

Forecast values from the 128 pre-reform weeks were generated for the 41 post-reform weeks to quantify percentage changes in the number of CANs issued during the post-period. These forecast CAN values were compared with the actual 41 post-reform weeks to determine the overall reduction. The estimation method used was maximum likelihood and the forecasts were calculated using finite memory (unconditional) forecasting. As a robustness check, interrupted times series analyses were also conducted for the weekly number of first time low and special range PCA and drug-driving incidents. These weekly counts included all incidents where police proceeded against a POI either by way of a CAN or a penalty notice. This check was undertaken to see whether there was any evidence of changes in police activity (i.e., where police proceeded against more people because they could now issue penalty notices). This may affect the validity of our analysis if some of the people who received penalty notices would not otherwise have been proceeded against by police. These results are summarised after the time series analyses for CANs and shown in Appendix A.

Percentage who received a court dismissal or conditional discharge

In this analysis, the denominator is all offenders who received a CAN or a penalty notice (excluding the small number of court penalties which could not be linked to ROD). A decrease in the proportion of eligible matters dismissed by the court without conviction would provide preliminary evidence that the reforms have increased the certainty of a licence sanction for first time drink- and drug-driving offences.

Predictors of receiving a penalty notice from police

We use logistic regression to analyse the factors associated with receipt of a penalty notice. Regression models are estimated separately for each offence. For this analysis, we restrict our dataset to the period 20 May 2019 (after the commencement of the policy) to 1 March 2020 to avoid any confounding effect of the COVID-19 pandemic.[8] The predictor variables considered for inclusion in these logistic regressions are listed in the Data section above. We also consider regional effects by including a variable for NSW Police regions in the regression models.

The ability of the logistic regressions to discriminate between offenders who receive a penalty notice from those who do not was assessed using the area under the receiver operating characteristic (ROC) curve. A value of 0.5 indicates no discrimination, 0.5-0.7 poor discrimination, 0.7-0.8 acceptable discrimination, 0.8-0.9 excellent discrimination and greater than 0.9 outstanding discrimination (Hosmer et al., 2013).

Statistical software

Cross-tabulations, time series analyses and logistic regressions were conducted using SAS Version 9.4. ADF stationary tests on the pre-reforms time series data were conducted using Stata Version 18.

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8   The onset of the COVID-19 pandemic in March 2020 in Australia presented some challenges for this research project. In particular, Kim and Leung (2020) found marked reductions in the number of police recorded incidents for several offence types from March 2020 to late 2021. These declines coincided with public health restrictions put in place in NSW to minimise the spread of COVID-19.

RESULTS

Effect of penalty notices on the weekly number of court attendance notices (CANs)

First time low and special range PCA offences

Figure 1 presents the weekly number of CANs and penalty notices issued for first time low and special range PCA offences before and after the 2019 policy change. Our interrupted time series modelling (see Table 2 & Figure 1) shows that prior to the introduction of penalty notices, the level of CANs (as shown by the blue line in Figure 1) was relatively flat, at around 118 CANs per week. Immediately after the introduction of penalty notices on 20 May 2019, the number of CANs decreased significantly by an average of 85 CANs per week and then continued to decline by an additional 1.4 CANs per week for the remainder of the follow up period.[9] The declining trend in the post reform period suggests that the uptake of penalty notices by police increased over time. The green line to the right of the vertical line in Figure 1 represents our forecast of the weekly number of CANs based on observations from the pre-reform period. The number of CANs issued after the reforms commenced was 19.0% of what had been forecasted from the pre-reform values, suggesting that the introduction of penalty notices for first time low and special range PCA offences reduced court workload for these offence types by 81.0% (i.e., 4,779 fewer CANs).

Table 2. Low and special range PCA first offences: change in weekly number of CANs associated with introduction of penalty notices, 5 December 2016 to 1 March 2020

Variable	Estimate	Standard Error	95% confidence interval	t-value	p-value
Constant	118.17	3.62	(111.03, 125.31)	32.67	< .001 ***
Trend	0.10	0.04	(0.01, 0.19)	2.23	= .026 *
Change in level	-84.76	8.61	(-101.75, -67.76)	-9.85	< .001 ***
Change in trend	-1.51	0.33	(-2.16, -0.85)	-4.53	< .001 ***
January	26.34	6.86	(12.79, 39.88)	3.84	< .001 ***
February	27.67	7.31	(13.23, 42.11)	3.78	< .001 ***
April	23.94	7.50	(9.13, 38.76)	3.19	= .001 **
December	42.93	6.89	(30.33, 57.53)	6.38	< .001 ***
Autoregressive (lag 1)	0.29	0.08	(0.13, 0.45)	3.58	< .001 ***
Moving average (lag 2)	0.31	0.08	(0.16, 0.47)	3.97	< .001 ***
Moving average (lag 10)	0.19	0.08	(0.04, 0.34)	2.49	= .013 *

AIC = 1563.92; Ljung-Box test: χ^2_{21} = 18.45, p = .620
* p < .05, ** p < .01, *** p < .001

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9 The trend in the number of CANs after the introduction of penalty notices was obtained by summing the coefficients for the variables trend and change in trend: 0.10 - 1.51 = -1.4%.

Figure 1. Persons proceeded against by NSW police for low and special range PCA first offences by method of proceeding (weekly), 5 December 2016 to 1 March 2020
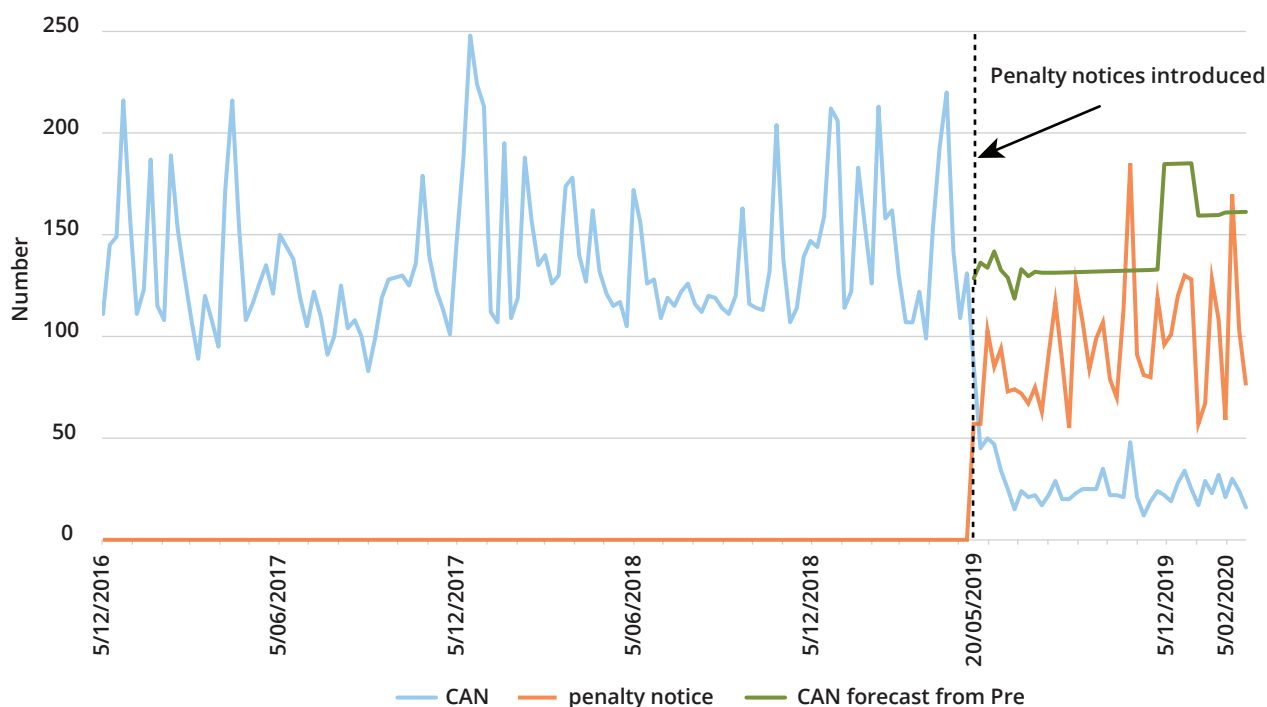
First time drug-driving offences

Figure 2 plots the weekly number of CANs and penalty notices issued to first time drug-driving offenders during the study period. Our time-series models (see Table 3) show that prior to the introduction of penalty notices, approximately 151 CANs were issued for drug-driving offences each week, with a significant downward trend of 0.39 CANs per week. In contrast to first time low and special range PCA offences, there was no significant immediate reduction in CANs for first time drug-driving offences following the 20 May 2019 policy start date.[10] However, recall that we count the number of weekly CANs based on the proceeding date rather than the offence date, and that there can be a significant delay in proceedings for drug-driving offences because mobile drug tests must be sent to the laboratory for confirmation (which can take 30 days or more).

Table 3.   Drug-driving first time offences: change in weekly number of CANs associated with introduction of penalty notices, 5 December 2016 to 1 March 2020

Variable	Estimate	Standard Error	95% confidence interval	t-value	p-value
Constant	150.49	10.11	(130.52, 170.46)	14.88	< .001 ***
Trend	-0.39	0.13	(-0.64, -0.14)	-3.09	= .002 **
Change in level	-13.46	13.66	(-40.43, 13.52)	-0.99	= .325
April	39.73	11.17	(17.68, 61.79)	3.56	< .001 ***
May	42.61	10.92	(21.04, 64.18)	3.90	< .001 ***
June	24.23	10.81	(2.89, 45.56)	2.24	= .025 *
Autoregressive (lag 1)	0.41	0.08	(0.26, 0.56)	5.35	< .001 ***
Moving average (lag 2)	-0.31	0.07	(-0.45, -0.17)	-4.33	< .001 ***
Moving average (lag 6)	0.21	0.07	(0.06, 0.36)	2.85	= .004 **
Moving average (lag 14)	-0.28	0.08	(-0.43, -0.13)	-3.62	< .001 ***

AIC = 1597.43; Ljung-Box test: χ^2_{20} = 15.84, p = .727

* $p < .05$, ** $p < .01$, *** $p < .001$

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10 While neither were statistically significant the fit of the model with only change in level was better than the one with only change in trend. It had a slightly lower AIC (1597.43 vs. 1597.50).

Given this, we re-ran the ARIMA analysis in Table 3, iteratively delaying the beginning of the policy reform by a week in order to pinpoint when the policy significantly changed the level of CANs for first time drug-driving offences. Table 4 shows our estimates of the change in the level of CANs corresponding to each of the delayed policy start dates. We only observe consistent statistically significant reductions in the level of CANs from five weeks after the reform date onwards. This is consistent with the additional time needed to confirm the roadside drug test in order to proceed against an offender.

Table 4. Drug-driving first time offences: effect of delaying when the effect of the reforms on CANs is measured from

Week beginning	Weeks delay from start of penalty notices	Change in level of CANs	p-value	CANs as a percentage of forecast
20 May 2019	0	-13.46	= .325	80.9%
27 May 2019	1	-11.71	= .403	80.4%
3 June 2019	2	-29.51	= .038 *	75.7%
10 June 2019	3	-9.27	= .512	79.5%
17 June 2019	4	-13.97	= .316	75.4%
24 June 2019	5	-30.66	= .021 *	70.2%
1 July 2019	6	-35.95	= .011 *	70.7%

* $p < .05$, ** $p < .01$, *** $p < .001$

Our forecast from the pre-reform period (as shown by the green line in Figure 2) suggests that the number of CANs would have continued to decline absent the policy. Comparing these forecasted values to actual weekly counts of first time drug-driving CANs after the introduction of penalty notices, we estimate that the reforms reduced court appearances for first time drug-driving offences by 19.1%. However, applying the forecasts from the model where the policy date is delayed by five weeks suggests that once the policy was fully operational, the number of CANs reduced by 29.8% (i.e., 1,118 fewer CANs).

Interrupted times series analyses were also conducted for the total weekly number of first time low and special range PCA and drug-driving incidents (results presented in Appendix A). For first time low and special range PCA we found that police proceeded against fewer offenders after the reforms commenced compared to what was forecast from the pre-reform period. The size of this reduction was 14.6% and argues against police increasing enforcement activity after the policy was introduced. By contrast, for first time drug-driving, police proceeded against more offenders after the reforms compared to what was forecast from the pre-reform period (30% increase). This suggests that for drug-driving, the police may have increased their enforcement activity after the introduction of penalty notices for these offences. This may affect the validity of our analysis if some of the people who received penalty notices for drug-driving would not otherwise have been proceeded against by the police.

Figure 2. Persons proceeded against by NSW Police for illicit drug-driving first offences by method of proceeding (weekly), 5 December 2016 to 1 March 2020
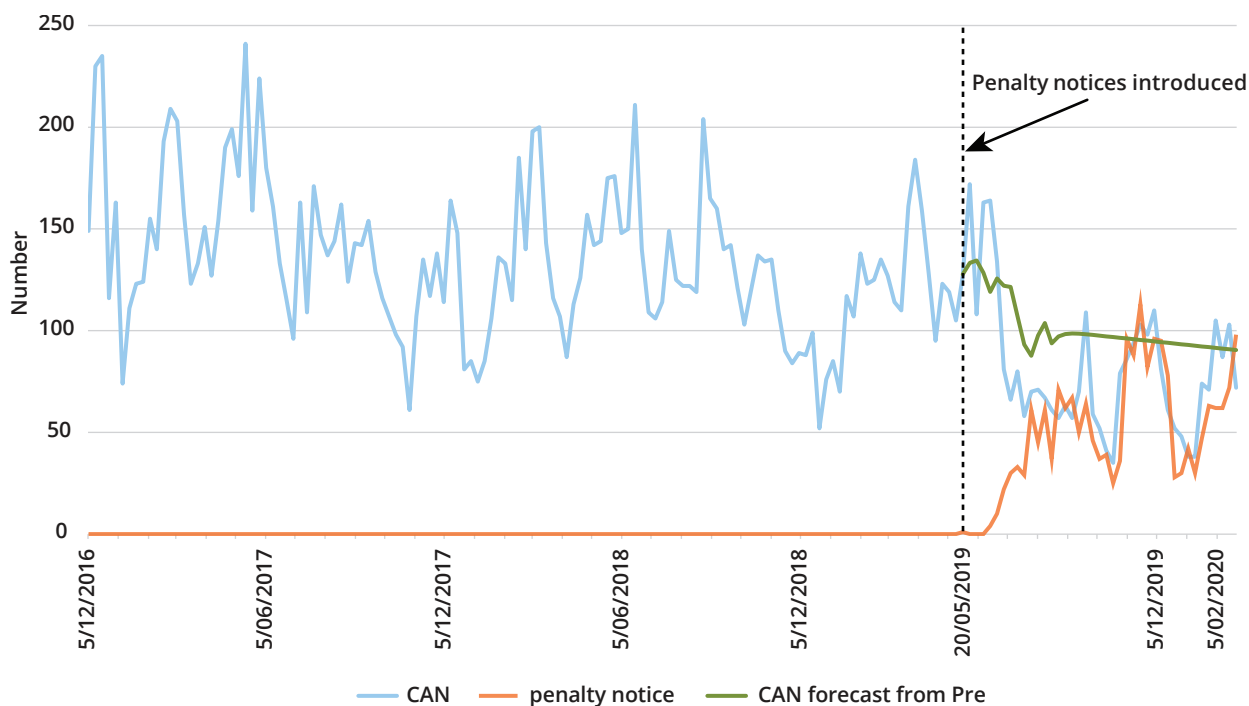
Effects of penalty notices on the percentage of court dismissals and conditional discharges

The time series analyses showed a large decline in the number of CANs after the introduction of penalty notices among first time low or special range PCA offences and a smaller decline among first time drug-driving offences. To investigate whether the reforms increased the certainty of a sanction for first time drink- and drug-drivers, we examined changes in non-conviction penalties before and after the reforms.

We found reductions in the percentage of all offenders proceeded against (by either CAN or penalty notice) who had a court penalty that was dismissed or who received a conditional discharge. There was a very large reduction in dismissals and conditional discharges among low or special range PCA offences from 51.5% to 8.0% (see Table 5).[11] For all first time drug-driving offenders there was a smaller, though significant, decline in the percentage who received a dismissal or conditional discharge in court from 28.0% to 15.2%.

Table 5. Effect of the introduction of penalty notices on the number and percentage of court dismissal/ conditional discharges for first time low or special range PCA and drug-drivers

Cohort	Period	n (%)	Court dismissal or conditional discharge (n)	Court dismissal or conditional discharge (%)	*p*-value
Low or special range PCA first offence	Pre	17,492 (77.9%)	9,001	51.5	< .001 ***
	Post	4,972 (22.1%)	396	8.0	
Drug-driving first offence	Pre	17,174 (76.3%)	4,802	28.0	< .001 ***
	Post	5,348 (23.7%)	813	15.2	

* p < .05, ** p < .01, *** p < .001

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11 The 'court dismissal or conditional discharge' columns also contain a small number of 'juvenile dismissals' and 'no action taken on a breach of bond'.

Predictors of receiving a penalty notice for first time low and special range PCA offenders, and first time drug-driving offenders

Bivariate analyses

Column 1 of Table 6 shows bivariate relationships between our candidate explanatory variables and whether a person received a penalty notice for a first time low or special range PCA offence during the post period (n = 4,974).[12] Gender was not significantly correlated with receipt of a penalty notice but age was, with 82.1% of those aged 50 or over receiving a penalty notice compared with 73.7% of those aged 18-24 years. Offenders with no concurrent offences in the index event were also more likely to receive a penalty notice. Variations across Police Regions were observed, with offenders proceeded against by police from the North West Metropolitan (86.9%), the Northern Region (78.8%), the Western Region (77.4%) and the Southern Region (74.5%) more likely to receive a penalty notice than those from the Central Metropolitan (70.9%) and the South West Metropolitan (70.6%) areas.

There was also a significant correlation between prior criminal history and receipt of a penalty notice for special and low range PCA offences. While 81.8% of those with no previous court appearances received a penalty notice this declined to 64.9% among those with one prior appearance and 49.8% of those with two or more. Among those with no penalty notices in the previous five years, 81.1% received a penalty notice compared with 77.7% of those with one prior penalty notice and 72.1% of those with two or more priors. Similarly, not having a prior proven court outcome in the previous five years was associated with receiving a penalty notice for the index offence (83.7% vs. 1.3%) as was not having a prior prison sentence (78.2% vs. 0.0%).

Column 2 of Table 6 shows bivariate relationships between our explanatory variables and the issuing of penalty notices for first time drug-driving offences during the post policy period (n = 5,377). There was no significant relationship between gender and receipt of a penalty notice but younger offenders were significantly more likely to receive a penalty notice than older offenders (e.g. 41.2% of those aged 18-24 years versus 34.2% of those aged 50 years or older). The direction and significance of the relationships between receipt of a penalty notice and concurrent offences, prior police proceedings, prior proven court outcomes, and prior prison sentences were similar to those observed for first-time low and special range PCA. That is, first time drug-driving offenders who had more concurrent offences at the index contact and more extensive criminal histories were less likely to be issued with a penalty notice. First time drug-drivers proceeded against by police from the North West Metropolitan (43.3%) had the highest proportion of penalty notices, followed by the Northern Region (38.6%), the Southern Region (38.5%), the Central Metropolitan (37.9%) and the Western Region (36.4%). South West Metropolitan (30.6%) had the lowest percentage of penalty notices issued to first time drug-drivers.

It is also worthwhile to compare the characteristics of the two offender cohorts. As seen from Table 6, a higher proportion of first time low and special range PCA offenders were aged 50 years or older compared with first time drug-drivers (22.4% vs. 9.9%). On the other hand, a higher proportion of first time drug-driving offenders had concurrent offences (including drug offences) at the index event compared with low and special range PCA offenders (24.8% vs. 14.8% for any concurrent and 7.7% vs. 0.5% for any concurrent drug offence). While over half of all first time drug-driving offenders had previously been proceeded against to court by police this was the case for just 18.3% of first time low and special range PCA offenders. Two or more penalty notices from police in the past five years was twice as likely for first time drug-driving offenders than for first time low and special range PCA offenders (60.1% vs. 30.6%) and first time drug-driving offenders were also more likely to have prior proven court outcomes (36.9% vs. 7.5%) and prior prison sentences (7.3% vs. 0.9%).

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12 In Table 6 the sum of each (%) column may not always add to 100.0% exactly due to rounding.

Table 6. Percentage of first time low and special range PCA incidents and drug-driving incidents which received a penalty notice from NSW Police during the post period, 20 May 2019 to 1 March 2020

Explanatory variable		(1) Low and special range PCA (n = 4,974) #			(2) Drug-driving (n = 5,377) ^		
Variable	Category	n (%)	Penalty notice (%)	*p*-value	n (%)	Penalty notice (%)	*p*-value
Gender	Female	1,147 (23.1%)	79.5	= .065	1,155 (21.5%)	36.0	= .264
	Male	3,825 (76.9%)	76.9		4,221 (78.5%)	37.8	
Age group	Under 18	80 (1.6%)	71.3	< .001 ***	72 (1.3%)	44.4	< .001 ***
	18-24	1,130 (22.7%)	73.7		1,152 (21.4%)	41.2	
	25-29	704 (14.2%)	73.9		992 (18.5%)	40.7	
	30-39	1,041 (20.9%)	78.3		1,558 (29.0%)	35.3	
	40-49	903 (18.2%)	79.0		1,067 (19.9%)	34.6	
	50+	1,113 (22.4%)	82.1		532 (9.9%)	34.2	
Concurrent offences	0	4,235 (85.1%)	82.7	< .001 ***	4,047 (75.3%)	42.6	< .001 ***
	1	514 (10.3%)	51.2		820 (15.3%)	25.6	
	2+	225 (4.5%)	39.1		510 (9.5%)	15.3	
Concurrent driving offences	0	4,280 (86.1%)	82.2	< .001 ***	4,451 (82.8%)	40.3	< .001 ***
	1+	694 (14.0%)	48.3		926 (17.2%)	23.5	
Concurrent drug offences	0	4,947 (99.5%)	77.8	< .001 ***	4,962 (92.3%)	39.0	< .001 ***
	1+	27 (0.5%)	18.5		415 (7.7%)	18.6	
Prior proceeded to court (5 years)	0	4,064 (81.7%)	81.8	< .001 ***	2,426 (45.1%)	48.2	< .001 ***
	1	510 (10.3%)	64.9		1,024 (19.0%)	34.4	
	2+	400 (8.0%)	49.8		1,927 (35.8%)	25.5	
Prior penalty notices (5 years)	0	2,262 (45.5%)	81.1	< .001 ***	1,137 (21.2%)	40.5	= .027 *
	1	1,188 (23.9%)	77.7		1,009 (18.8%)	38.3	
	2+	1,524 (30.6%)	72.1		3,231 (60.1%)	36.1	
Prior proven court outcomes (5 years)	0	4,601 (92.5%)	83.7	< .001 ***	3,391 (63.1%)	59.2	< .001 ***
	1+	373 (7.5%)	1.3		1,986 (36.9%)	0.3	
Prior prison sentences (5 years)	0	4,930 (99.1%)	78.2	< .001 ***	4,984 (92.7%)	40.4	< .001 ***
	1+	44 (0.9%)	0.0		393 (7.3%)	0.3	
Police Region	Central Metropolitan	705 (14.2%)	70.9	< .001 ***	1,287 (23.9%)	37.9	< .001 ***
	North West Metropolitan	1,007 (20.3%)	86.9		478 (8.9%)	43.3	
	South West Metropolitan	636 (12.8%)	70.6		746 (13.9%)	30.6	
	Northern Region	1,411 (28.4%)	78.8		1,086 (20.2%)	38.6	
	Southern Region	686 (13.8%)	74.5		1,064 (19.8%)	38.5	
	Western Region	527 (10.6%)	77.4		714 (13.3%)	36.4	

Gender: 2 missing; Age group: 3 missing; Police region: 2 missing
^ Gender: 1 missing; Age group: 4 missing; Police region: 2 missing
* *p* < .05, ** *p* < .01, *** *p* < .001

Logistic regressions

Table 7 shows the results from a logistic regression predicting the likelihood of a penalty notice for first time low and special range PCA offenders proceeded against during the post period. The analysis found that having one (OR = 0.25) or two or more concurrent offences (OR = 0.16) at the index event was associated with a significantly lower likelihood of being issued with a penalty notice. Those proceeded against by the police once (OR = 0.46) or two or more times (OR = 0.32) in the previous five years were also much less likely to receive a penalty notice than those who had no prior contact with the police. The likelihood of receiving a penalty notice was significantly higher in North West Metropolitan (OR = 3.32), Northern (OR = 1.91), Western (OR = 1.89) and Southern regions (OR = 1.38) compared to the Central Metropolitan region, net of other factors. Notably, neither gender nor age group significantly predicted receiving a penalty notice once other factors were controlled for. For this logistic regression model the area under the ROC was 0.72 which is considered to be acceptable discrimination. A parsimonious logistic regression containing only significant covariates was also estimated and the results are shown in Appendix B (Table B1).

Table 7.   Logistic regression of first time low and special range PCA incidents which received a penalty notice from NSW Police during the post period, 20 May 2019 to 1 March 2020 (n = 4,967)

Covariates	Category	Odds ratio	95% confidence interval	*p*-value
Gender	Female	1.00		
	Male	0.99	(0.83, 1.18)	= .937
Age group	Under 25	0.86	(0.70, 1.07)	= .184
	25-29	0.87	(0.68, 1.12)	= .285
	30-39	1.12	(0.89, 1.41)	= .326
	40-49	1.00	(0.79, 1.26)	=.965
	50+	1.00		
Concurrent offences	0	1.00		
	1	0.25	(0.21, 0.31)	< .001 ***
	2+	0.16	(0.12, 0.22)	< .001 ***
Prior proceeded to court (5 years)	0	1.00		
	1	0.46	(0.37, 0.57)	< .001 ***
	2+	0.32	(0.25, 0.40)	< .001 ***
Police Region	Central Metropolitan	1.00		
	North West Metropolitan	3.32	(2.55, 4.30)	< .001 ***
	South West Metropolitan	1.19	(0.92, 1.53)	= .185
	Northern Region	1.91	(1.53, 2.39)	< .001 ***
	Southern Region	1.38	(1.07, 1.78)	= .012 *
	Western Region	1.89	(1.43, 2.51)	< .001 ***

Likelihood ratio χ^2_{14} = 628.65, *p* < .001 ***; Akaike information criteria (AIC) = 4693.90; Area under receiver operating curve (ROC) = 0.72
* *p* < .05, ** *p* < .01, *** *p* < .001

Table 8 shows our estimates from a logistic regression model predicting the likelihood of a penalty notice for first time drug-driving offences proceeded against during the post period. Gender was not significantly predictive of receiving a penalty notice, but offenders aged under 25 years (OR = 1.48), 25-29 years (OR = 1.50) and 30-39 years (OR = 1.26) were significantly more likely to receive a penalty notice compared with offenders aged 50 years and older. First time drug-drivers with one (OR = 0.49), or two or more (OR = 0.26), concurrent offences at the index event were also significantly less likely to be issued a penalty notice than offenders with no concurrent offences. Compared with having never been proceeded against by police to court, having been proceeded against once (OR = 0.58), or two or more times (OR = 0.41), meant that receiving a penalty notice was significantly less likely. The likelihood of receiving a penalty notice for a first time drug-driving offence was significantly higher in North West Metropolitan (OR = 1.39) than the Central Metropolitan region, net of other factors. For this logistic regression model the area under the ROC curve was 0.67 which suggests poor discrimination. A parsimonious logistic regression containing only significant covariates was also estimated and the results are shown in Appendix B (Table B2).

Table 8. **Logistic regression of first time drug-driving incidents which received a penalty notice from NSW Police during the post period, 20 May 2019 to 1 March 2020 (n = 5,370)**

Covariates	Category	Odds ratio	95% confidence interval	p-value
Gender	Female	1.00		
	Male	1.11	(0.96, 1.28)	= .155
Age group	Under 25	1.48	(1.19, 1.85)	< .001 ***
	25-29	1.50	(1.19, 1.89)	< .001 ***
	30-39	1.26	(1.01, 1.56)	= .038 *
	40-49	1.11	(0.88, 1.39)	= .383
	50+	1.00		
Concurrent offences	0	1.00		
	1	0.49	(0.41, 0.58)	< .001 ***
	2+	0.26	(0.20, 0.34)	< .001 ***
Prior proceeded to court (5 years)	0	1.00		
	1	0.58	(0.49, 0.67)	< .001 ***
	2+	0.41	(0.35, 0.46)	< .001 ***
Police Region	Central Metropolitan	1.00		
	North West Metropolitan	1.39	(1.11, 1.73)	= .004 **
	South West Metropolitan	0.83	(0.68, 1.01)	= .063
	Northern Region	1.10	(0.92, 1.31)	= .284
	Southern Region	1.07	(0.90, 1.27)	=.463
	Western Region	1.10	(0.91, 1.35)	= .331

Likelihood ratio χ^2_{14} = 461.41, p < .001 ***; Akaike information criteria (AIC) = 6670.97; Area under receiver operating curve (ROC) = 0.67

* p < .05, ** p < .01, *** p < .001

DISCUSSION

This research aimed to examine the impact of the introduction of penalty notices for first time low and special range PCA and drug-driving offences on the volume of court appearances and the certainty of licence sanctions. The study found that the drink- and drug-driving reforms introduced in May 2019 were associated with an 81% decline in the number of CANs issued to first time low and special range PCA offenders. This represents 4,779 fewer CANs than would have been expected absent the policy change. A marked decline in court appearances was also evident for first time drug-driving offences, however the estimated reduction was much smaller at only around 30% or 1,118 fewer CANs than what was forecast based on the pre-policy period.

The smaller reduction in CANs for first time drug-drivers appears to be due to differences in the characteristics of offenders proceeded against for these types of offences. Compared with first time low and special range PCA offenders, first time drug-driving offenders typically had more concurrent offences at the index event, were more likely to have previously been proceeded against to court, had more proven court outcomes in the previous 5 years, and had a higher percentage of prior prison sentences. We found that offenders with these characteristics, particularly those with concurrent offences and prior court appearances, are significantly less likely to be issued a penalty notice by police.

However, we also find some variation across police regions that is independent of these factors. Both first time low and special range PCA offenders and first time drug-driving offenders were significantly more likely to be issued a penalty notice if they were dealt with by police from the North West Metropolitan region. Having said this, the model constructed to predict the receipt of a penalty notice only had acceptable discrimination (as indicated by the area under the ROC curve) for low and special range PCA offenders and performed poorly for drug-driving offenders. This suggests that there may be other factors that police are considering when determining how to proceed against drink- and drug-drivers. If these factors are also correlated with area of residence than this may account for the differences observed in methods of proceeding by police region.

Importantly, the analyses were consistent with the reforms having achieved their aim of increasing consistency in the application of licence sanctions for these driving offences. This was evidenced by a significant reduction in the percentage of all first time drink- and drug-drivers proceeded against who received a dismissal or conditional discharge from the courts (decreasing from 52% to 8% for first time low and special range PCA offences and from 28% to 15% for first time drug offences).

This research has several limitations. Firstly, we only examined the initial phase of implementation of the drink- and drug-driving reforms, comparing the pre-policy period with the post period before the onset of COVID-19. It is possible that the trends we observed in this early period of the reforms do not reflect longer term trends. Indeed, evidence from the Transport for NSW, Centre for Road Safety (2022b) suggests that as much as one-half of all first time drug-driving offenders are now receiving penalty notices in lieu of a CAN. While this is substantially higher than the 37.4% found in the current study, it is still not as high as the rate of penalty notices issued for first time low and special range PCA offences (approximately 77%), which indicates that there is still some scope for improvement.

Secondly, it is possible that the benefits generated by the reforms in terms of reduced court volumes could be partially offset by the appeal process. In NSW, a driver who is issued a penalty notice can elect to have their matter heard in a court if they believe that they did not commit the offence or there are reasons why their matter should be reconsidered. Data on the number of appeals of penalty notices for first time drink- and drug-driving offences was not available at the individual-level for this study. However, we were able to examine monthly appeal data. It showed that there were very few appeals after the reforms commenced relative to the number of penalty notices that were issued. Over the period June 2019 to June 2020 there were 201 appeals against penalty notices for first time low and special range PCA and 45 appeals against penalty notices for first time drug-driving.[13] This small number of appeals would have minimal impact on overall court volumes.

Thirdly, we may have under- or over-estimated the reduction in court appearances associated with the policy, as our robustness checks suggest that the number of these offences have changed over time. We tested this by repeating time series analyses using the total number of offenders proceeded against by police (by way of CAN or a penalty notice). Police proceeded against fewer offenders for first time low and special range PCA offences after the reforms compared to pre-period forecasts. The size of this reduction was relatively modest (14.6% lower), providing evidence against an over-estimation of the policy effect. By contrast, for first time drug-driving police proceeded against more offenders after the reforms than what was forecast from the pre-period (30% increase following the reforms). This means that the reduction in CANs associated with the policy may have been over-estimated (in relative terms) for first time drug-driving offences.

Fourthly, it is unfortunate that we were unable to obtain data from the police about how many offenders who received a penalty notice after the reforms also had their licence suspended. While we found a significant reduction in court dismissals and conditional discharges post reform, in the absence of police suspension data we cannot accurately quantify the overall net effect of the legislative changes on the issuing of licence sanctions for drink- and drug-driving offences. This is important as licence suspensions for these penalty notice offences are not mandatory but are issued at the discretion of the officer in charge. In their regular monitoring report, Transport for NSW, Centre for Road Safety (2022b) present the number of licence suspensions for these offences using data from the Driver Vehicle System (DRIVES) database[14]. They reported that for both first time low and special range PCA and drug-driving offences the number of licence suspensions recorded was lower than the number of penalty notices issued. Over the period June 2019 to March 2020 the number of licence suspensions for first time low and special range PCA was approximately 83% of penalty notices recorded over the same period. For first time drug-driving offences the number of licence suspensions was approximately 60% the number of penalty notices (Transport for NSW, Centre for Road Safety, 2021). We are collaborating with NSW Police and Transport for NSW to obtain licence suspension data for penalty notices in order to better understand the impact of the reforms on the certainty of licence sanctions.

While this research found significant benefits in terms of court volume and dismissals, the primary aim of the reforms was to reduce drink- and drug-driving behaviours by increasing the deterrent value of the penalty regime currently in effect in NSW. Further research should therefore consider the extent to which the introduction of penalty notices and immediate licence suspensions impacted reoffending rates and whether reoffending benefits are equally apparent for both the first time low, special or novice range PCA and drug-driving groups.

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13 Data sourced from NSW Bureau of Crime Statistics and Research's compilation of the number of penalty notice offences finalised in court, reference number 23-22459-202309.
14 DRIVES is a Transport for NSW database containing information about vehicle registration and driver licensing including driving infringements.

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APPENDIX

Appendix A

Effect of penalty notices on the weekly number of incidents proceeded against

The effect of introduction of penalty notices on the number of first time low and special range PCA incidents proceeded against is shown in Table A1. The initial value of proceeded against was approximately 116 with a slight increasing trend of 0.1 per week. The number of incidents proceeded against was higher during January, February, April, October and December. While the autoregressive term at lag 1 was not statistically significant there were significant moving average terms at lags of 2, 5 and 10. After the reforms the trend was significantly decreasing by 0.81 per week.[15]

Table A1. Low and special range PCA first time: changes in weekly number proceeded against associated with introduction of penalty notices, 5 December 2016 to 1 March 2020

Variable	Estimate	Standard Error	95% confidence interval	t-value	p-value
Constant	116.46	2.01	(112.49, 120.43)	57.97	< .001 ***
Trend	0.06	0.02	(0.02, 0.09)	3.43	< .001 ***
Change in trend	-0.87	0.11	(-1.09, -0.65)	-7.68	< .001 ***
January	29.30	6.71	(16.06, 42.54)	4.37	< .001 ***
February	34.65	7.20	(20.44, 48.86)	4.81	< .001 ***
April	36.07	7.95	(20.37, 51.78)	4.54	< .001 ***
October	25.82	7.73	(10.56, 41.09)	3.34	< .001 ***
December	51.67	6.93	(38.00, 65.35)	7.46	< .001 ***
Autoregressive (lag 1)	0.15	0.08	(-0.01, 0.31)	1.84	= .066
Moving average (lag 2)	0.40	0.08	(0.24, 0.56)	5.02	< .001 ***
Moving average (lag 5)	0.30	0.08	(0.13, 0.47)	3.55	< .001 ***
Moving average (lag 10)	0.28	0.08	(0.13, 0.43)	3.62	< .001 ***

AIC = 1599.24; Ljung-Box test: χ^2_{20} = 16.28, p = .699
* p < .05, ** p < .01, *** p < .001

Figure A1 shows what happened to first time lower-range PCA incidents which were proceeded against over the study period. Prior to the introduction of penalty notices the trend in the blue line for incidents proceeded against was increasing slowly. The red line to the right of the vertical line were the forecasts from the 128 pre-reform incidents proceeded against of what the 41 post-reforms incidents would have been. It was found that the actual number of incidents proceeded against after the introduction of penalty notices were 85.4% of what had been forecast from the pre-reform series. Figure 1A shows that the reduction in incidents proceeded against for lower-range PCA after the reforms was modest (14.6% lower).

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15 The trend in the number of incidents proceeded against after the introduction of penalty notices was obtained by summing the coefficients for the variables Trend and Change in trend: 0.06 – 0.87 = -0.81.

Figure A1. Lower-range PCA first time: changes in weekly number proceeded against associated with introduction of penalty notices, 5 December 2016 to 1 March 2020
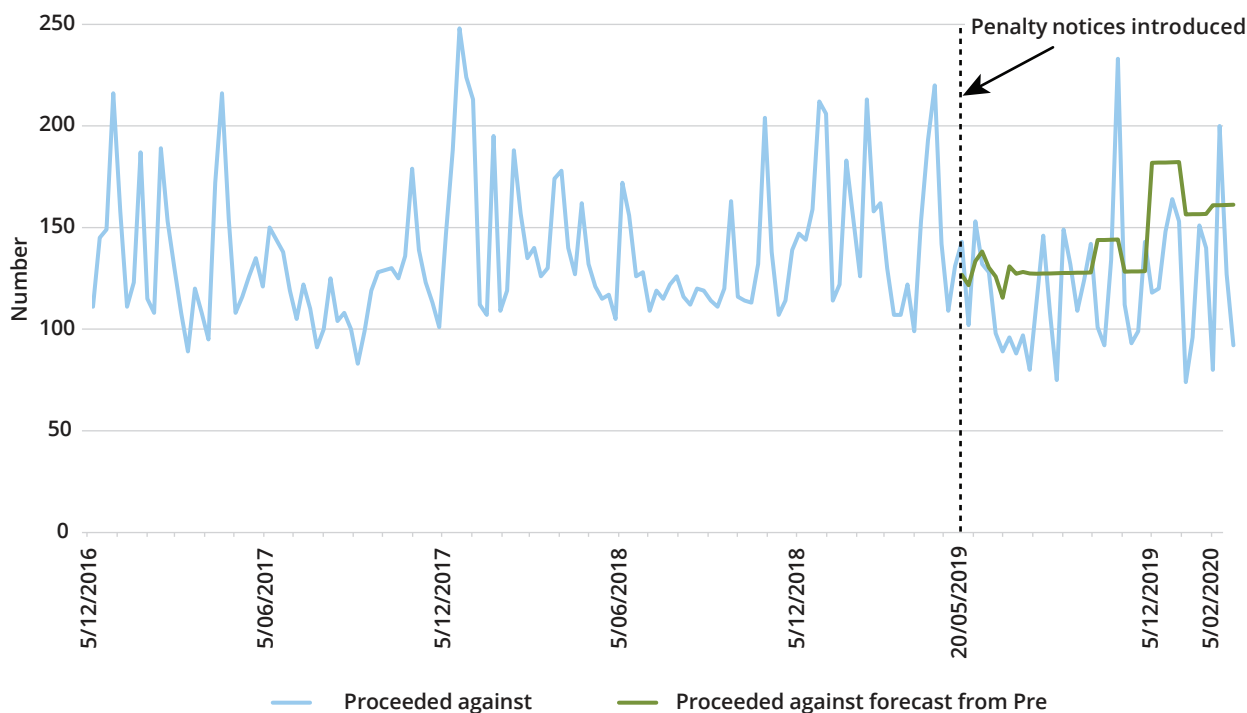

Table A2 shows the effect of the introduction of penalty notices on the number of first time drug incidents proceeded against. The initial value of proceeded against was approximately 151 with a decreasing trend of 0.3 per week. The number of incidents proceeded against was higher during April and May and exhibits movement consistent with an AR(1) and MA(2, 6, 14) process. After penalty notices were introduced the trend in drug incidents proceeded against is now increasing by 0.9 per month.[16]

Table A2. Drug-driving first time: changes in weekly number proceeded against associated with introduction of penalty notices, 5 December 2016 to 1 March 2020

Variable	Estimate	Standard Error	95% confidence interval	t-value	p-value
Constant	150.71	11.33	(128.34, 173.09)	13.30	< .001 ***
Trend	-0.33	0.14	(-0.61, -0.05)	-2.33	= .020 *
Change in trend	1.21	0.62	(-0.01, 2.43)	1.97	= .049 *
April	33.75	11.85	(10.34, 57.16)	2.85	= .004 **
May	32.00	11.25	(9.80, 54.21)	2.85	= .004 **
Autoregressive (lag 1)	0.44	0.07	(0.29, 0.59)	5.95	< .001 ***
Moving average (lag 2)	-0.26	0.07	(-0.40, -0.12)	-3.57	< .001 ***
Moving average (lag 6)	0.19	0.08	(0.04, 0.33)	2.47	= .014 *
Moving average (lag 14)	-0.31	0.08	(-0.47, -0.15)	-3.91	< .001 ***

AIC = 1618.24; Ljung-Box test: χ^2_{20} = 17.51, p = .620

* $p < .05$, ** $p < .01$, *** $p < .001$

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16 The trend in the number of drug incidents proceeded against after the introduction of penalty notices was obtained by summing the coefficients for Trend and Change in trend: -0.33 + 1.21 = 0.88.

Figure A2. Drug-driving first time: changes in weekly number proceeded against associated with introduction of penalty notices, 5 December 2016 to 1 March 2020
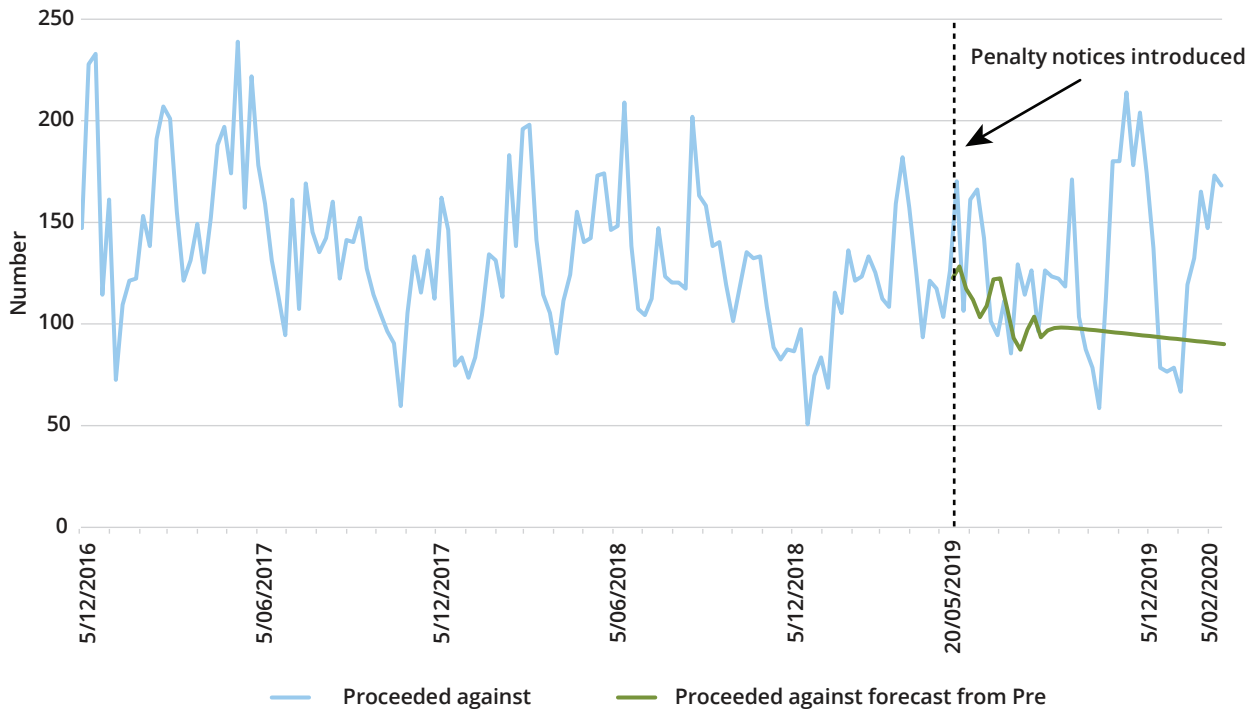

Figure A2 shows what happened to first time drug-driving incidents which were proceeded against. Prior to the introduction of penalty notices the trend in the blue line for incidents proceeded against was decreasing. The red line to the right of the vertical line were the forecasts from the 128 pre-reform incidents proceeded against which showed a decrease during the 41 post-reforms weeks. The actual number of incidents proceeded against after the introduction of penalty notices was 30.0% higher than what had been forecast from the pre-reform series. This suggests that for first time drug-driving police may have increased their enforcement activity because they can issue penalty notices.

APPENDIX B

Parsimonious logistic regressions for the post period

Table B1. Logistic regression of first time low and special range PCA incidents which received a penalty notice from NSW Police during the post period, 20 May 2019 to 1 March 2020, parsimonious model (n = 4,972)

Covariates	Category	Odds ratio	95% confidence interval	p-value
Concurrent offences	0	1.00		
	1	0.25	(0.21, 0.31)	< .001 ***
	2+	0.16	(0.12, 0.21)	< .001 ***
Prior proceeded to court (5 years)	0	1.00		
	1	0.46	(0.37, 0.56)	< .001 ***
	2+	0.32	(0.25, 0.41)	< .001 ***
Police Region	Central Metropolitan	1.00		
	North West Metropolitan	3.27	(2.52, 4.24)	< .001 ***
	South West Metropolitan	1.19	(0.93, 1.53)	= .174
	Northern Region	1.89	(1.52, 2.36)	< .001 ***
	Southern Region	1.35	(1.05, 1.74)	= .019 *
	Western Region	1.85	(1.40, 2.46)	< .001 ***

Likelihood ratio χ^2_9 = 621.69, p < .001 ***; Akaike information criteria (AIC) = 4695.88; Area under receiver operating curve (ROC) = 0.72
* $p < .05$, ** $p < .01$, *** $p < .001$

Table B2. Logistic regression of first time drug-driving incidents which received a penalty notice from NSW Police during the post period, 20 May 2019 to 1 March 2020, parsimonious model (n = 5,371)

Covariates	Category	Odds ratio	95% confidence interval	p-value
Age group	Under 25	1.47	(1.18, 1.84)	< .001 ***
	25-29	1.49	(1.19, 1.87)	< .001 ***
	30-39	1.25	(1.00, 1.55)	= .047 *
	40-49	1.10	(0.87, 1.38)	= .432
	50+	1.00		
Concurrent offences	0	1.00		
	1	0.49	(0.41, 0.59)	< .001 ***
	2+	0.26	(0.20, 0.34)	< .001 ***
Prior proceeded to court (5 years)	0	1.00		
	1	0.58	(0.49, 0.67)	< .001 ***
	2+	0.41	(0.35, 0.46)	< .001 ***
Police Region	Central Metropolitan	1.00		
	North West Metropolitan	1.38	(1.11, 1.73)	= .005 **
	South West Metropolitan	0.82	(0.67, 1.01)	= .057
	Northern Region	1.08	(0.91, 1.29)	= .374
	Southern Region	1.05	(0.88, 1.25)	=.571
	Western Region	1.09	(0.89, 1.32)	= .416

Likelihood ratio χ^2_{13} = 458.63, $p < .001$ ***; Akaike information criteria (AIC) = 6672.68; Area under receiver operating curve (ROC) = 0.67
* $p < .05$, ** $p < .01$, *** $p < .001$