Understanding Policing Delivery

The Assessment of Factors Influencing Police Prosecution Decision-Making

UPD
UNDERSTANDING POLICING DELIVERY

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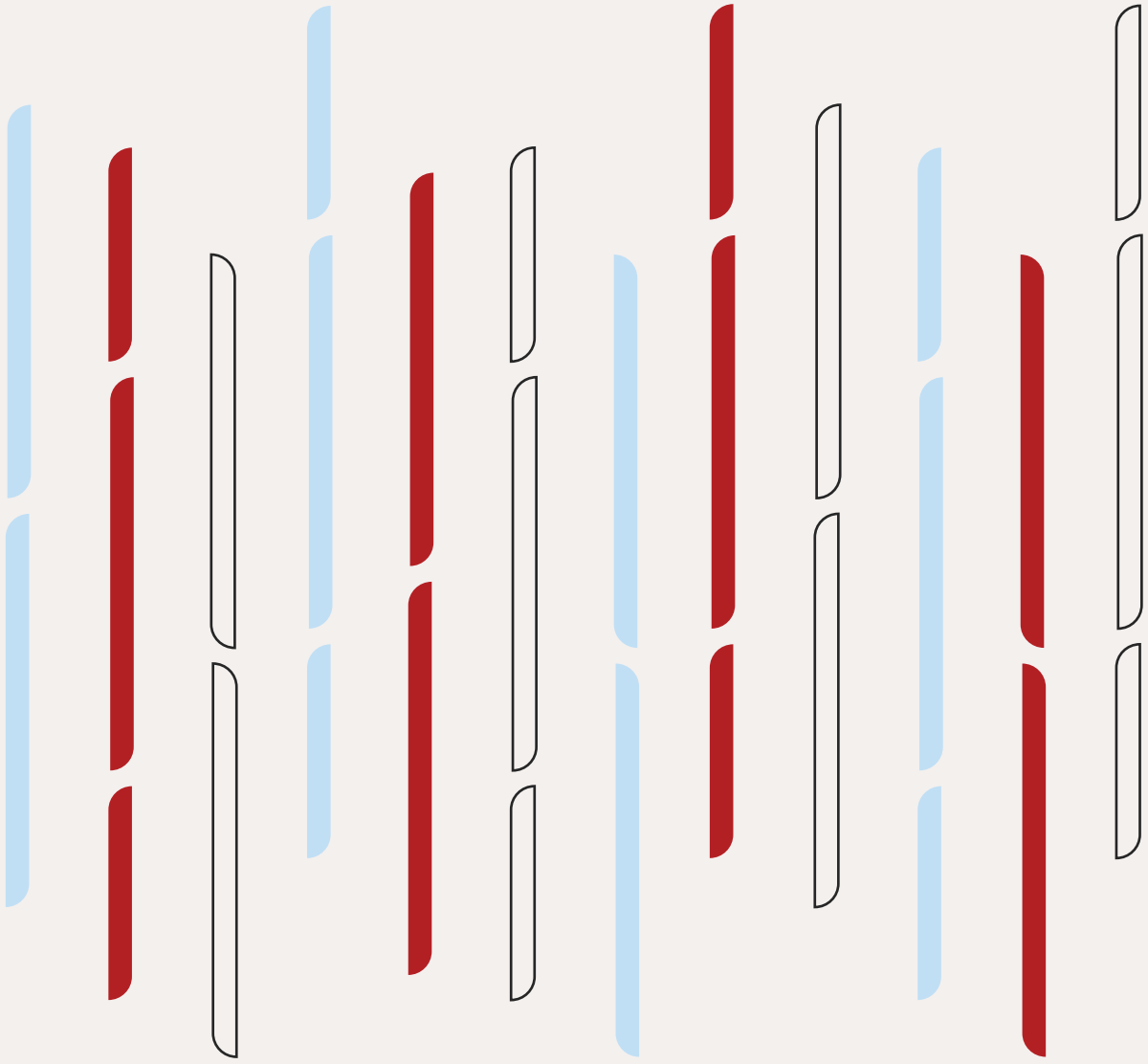

Understanding Policing Delivery

Understanding Policing Delivery is an independent research programme looking at fair and equitable policing for Māori and other communities.

Both the Articles and the Principles of Te Tiriti o Waitangi serve as foundational to the programme, along with the values of Kaitiakitanga, Manaakitanga, Whakamana, Whanaungatanga, and Aroha ki te Tangata.

In the context of Understanding Policing Delivery, whanaungatanga has driven our way of working. Embodied as the creation and maintenance of strong relationships between the different rōpū who have embarked on this journey of work together

With contributions from the UPD Operational Advisory Group and UPD Ethics Committee.

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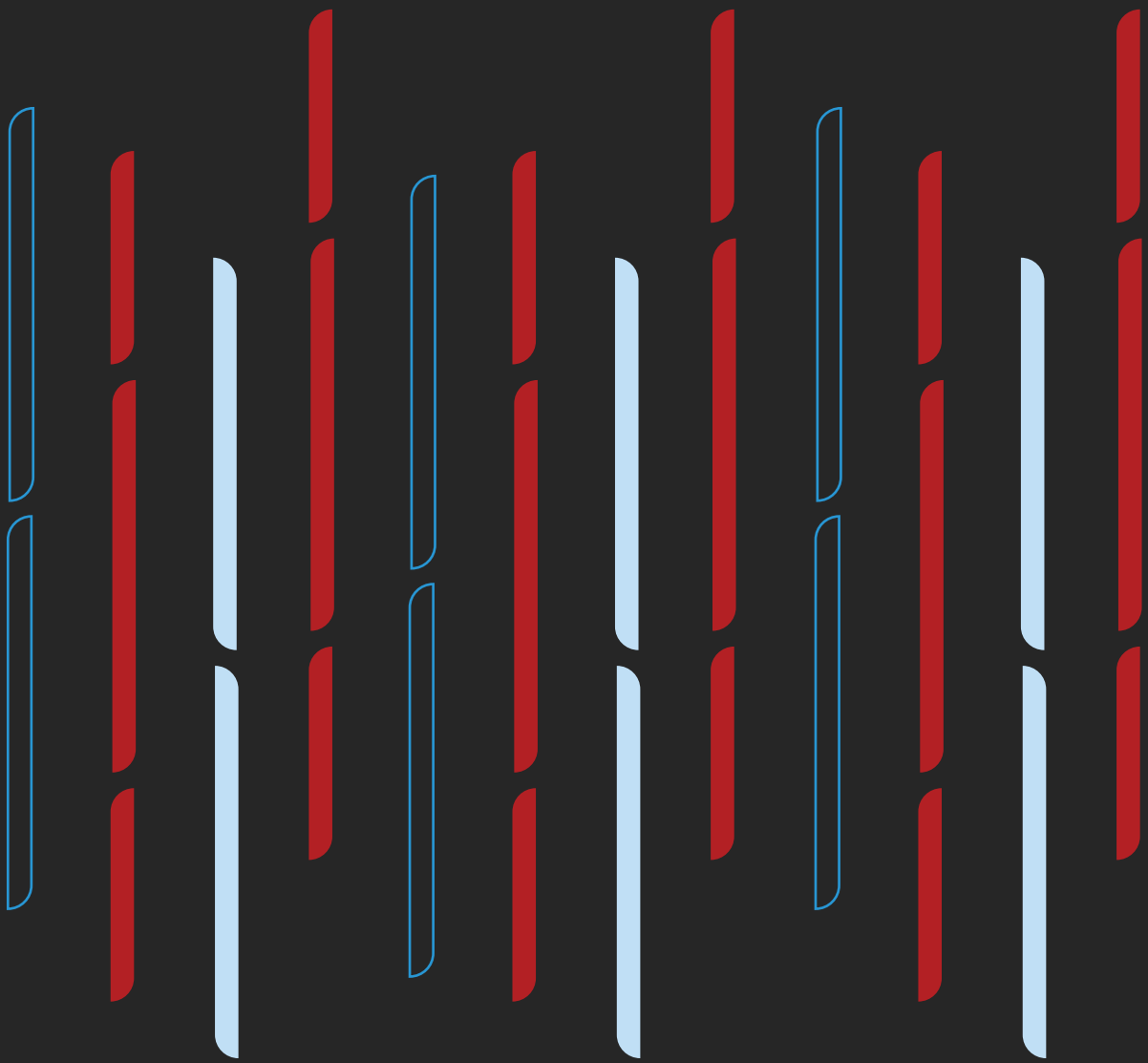
I would also like to thank New Zealand Police for their support and providing the data sets and relevant literature that made this work possible. Thank you for being open to this project and I hope that the insights provided in this report will go some way into helping improve outcomes for the better!

To all those that participated in the sense-making hui, the OAG officers, prosecutors, data experts, those that work with both victims and offenders, and those on the front-line, thank you for your illuminating perspectives as to what happens on the ground in prosecution processes. I am full of admiration for the day-to-day work you do and the passion you have for your work. It gives us all comfort knowing there are great people involved in such difficult and complex, but important mahi.

Ngā mihi nui ki a koutou!



Executive summary

This study is a quantitative look into the factors that are involved in the decision to prosecute, and to quantify if - and how - these factors influence the likelihood of prosecution.

This study builds off two previous works undertaken within Ngā Pirihimana o Aotearoa/New Zealand Police and has a comprehensive sample of 141,230 unique offenders with observed proceedings between 1st January 2017 and 31st December 2022. Many factors were accounted for, including several key demographic variables such as ethnicity, age and sex.

This report provides a summary of the previous reports and official statistics and provides details on the methodology for the modelling process.

Key Findings

Below, we briefly highlight some of the key findings of this report.

Age

- Age was found to be a strong demographic factor.
- As age increases, generally the likelihood of prosecution increases, though that likelihood decreases as offenders become 65 or older.
- Those aged between 30-45 years were 67% more likely to be prosecuted than 18–30-year-olds. Those aged between 46-64 years were 57% more likely to be prosecuted then 18–30-year-olds.

Ethnicity

- According to official statistics, Māori were 5 times more likely to be involved in a prosecution proceeding than New Zealand Europeans, and 4.2 times more likely than non-Māori in general. Māori were prosecuted at a slightly higher rate (74.46%) than the average (70.67%).
- On average, Māori are 11% more likely to be prosecuted than New Zealand Europeans, given all other variables remain constant.
- There was no other significantly different likelihood of prosecution across all other ethnicity groups measured.
- The likelihood of prosecution for Māori was significantly higher than New Zealand Europeans for Common Assault (29% more likely) and Theft from Retail Premises (40% more likely).
- The likelihood of prosecution for NZ Europeans was 37% higher than Māori for Possessing Illicit Drugs.

Sex

- Although men are much more involved in prosecution proceedings, we did not have enough evidence to conclude that the likelihood of prosecution for men was higher than women.

Location

- There were significant differences in the likelihood of prosecution across all Policing districts.

Gang Membership or Association

- Being a member of a gang or an associate greatly increased the likelihood of prosecution.
- The likelihood of prosecution for a gang member was 93% higher than for non-gang members.
- Gang members were over 4 times more likely to be prosecuted than non-gang members for Common Assault, 3 times more likely for Possessing Illicit Drugs, and 2.5 times more likely for Trespassing and Disorderly Conduct.

Prior Convictions and Offending History

- Offenders with prior convictions were 47% more likely to be prosecuted than those with no prior convictions.
- As the number of prior proceedings over the last 12 months and 72 months increased, the likelihood of prosecution increased.
- An offender with 10 or more proceedings over 72 months were 3.1 times more likely to be prosecuted than those with no proceedings.

Discussion

The purpose of this study was to use administrative data to investigate factors that may influence the likelihood of prosecution, and to quantify that influence. Our findings show that the age of an offender, prior convictions, recent and long-term history of proceedings and gang membership were significant factors that influence the likelihood of prosecution.

Though ethnicity was not a strong predictor, the results found that Māori were still significantly more likely to be prosecuted relative to a New Zealand European offender. Though this seems to have decreased over time compared with the previous two studies, it is still concerning given that the official statistics show that Māori are over five times more likely to be involved in the prosecutions process than New Zealand Europeans, and 4.2 times more likely than non-Māori. We did not find evidence to suggest that sex was an influential factor, which differed from the previous two studies.

Our findings cannot dictate a causal relationship between factors and prosecution decisions, only evidence of an association. Where associations exist, however, it does warrant further investigations into why these discrepancies exist, and what can be done to correct them. Mixed research methods where quantitative studies along with more in-depth qualitative methods are used to investigate these findings may reveal greater insights.

It is worth mentioning that this study investigates one critical aspect of the prosecution process. In that sense, it is precise but narrow, only focusing on the decision whether to prosecute an offender or not. There are a range of processes that take place before the decision to prosecute that may influence the decision for which we do not have the data, such as the nature of the interaction with Police at the time of arrest, or the characteristics of the officers that performed the arrest. We are limited to the data that we have and is available, but this does not necessarily capture the entire picture of the event.

1. Introduction

As part of the Understanding Policing Delivery (UPD) project, this study investigates the factors that influence police prosecution decision-making. We are especially interested in quantifying the effects of several key demographic factors and attributes of the prosecution process. To clarify, when we speak about police prosecutions, we mean both police choosing to prosecute and decisions to prosecute by prosecutors. However, the study primarily reflects the actions of frontline staff, as they file the majority of charges. Therefore, the findings speak predominately to frontline practice.

This study builds upon two earlier investigations that tested for evidence of conscious or unconscious bias against offenders based on their demographic characteristics [2,3]. Prior research such as [5] and [7] suggests that various factors may influence the likelihood of Police prosecuting an offender, such as the seriousness of the offence, sex, age, prior records and a history of engagement with Police.

We use official statistics to build an overall picture of prosecutions in New Zealand and administrative data obtained through New Zealand Police and the Evidence-Based Policing Centre (EBPC) to model and quantify how various factors may influence the likelihood of a prosecution taking place.

The structure of this report is as follows: after briefly giving details of the UPD project, we provide a review of the two previous studies and present official statistics from New Zealand Police and the Ministry of Justice in Section 2. Section 3 provides details of the dataset, including details of the factors/variables, and information regarding the modelling techniques used in this study. The result of the modelling is provided in Section 4, including descriptive statistics, model outputs, and analysis and interpretation, concluding with a comparison of these results versus the previous two studies. We give our concluding remarks in Section 5, along with recommendations for further work.

1.1 Understanding Policing Delivery

The overall aim of Ngā Pirihimana o Aotearoa/ New Zealand Police is to deliver policing services that are fair, impartial, ethical and just, in accordance with the principle of 'police legitimacy'. As such, the UPD programme aims to understand whether, where and to what extent systemic bias may exist in New Zealand policing services and their overall structure. The findings of this programme will be used to develop and ensure police policy is fair and equitable to all.

The UPD programme looks at three key research areas:

- Who Police stop and speak to, and how police engage with them,
- Decision-making around the use of force,
- Decision-making around prosecutions.

The research will explore issues of fairness, equity, and bias with respect to many at-risk communities. However, Police-Māori relations is a major focus of the UPD. This study focuses solely on key research area three - decision-making around prosecutions.

2. Review

In this Section, we highlight the findings of the two previous studies mentioned in the Introduction. We also report some of the official statistics of proceedings and prosecutions in New Zealand.

2.1 Previous Study Findings

Two studies using Police administrative data were carried out in 2018 [2] and 2020 [3]. The purpose of these studies was to investigate factors that may be associated with the likelihood of prosecuting a given offender. Multiple logistic regression models were used to quantify the effect of certain factors with the likelihood of prosecution. We highlight below the findings of these studies.

The 2018 report investigated prosecutions between the 1st of January 2012 and the 31st of December 2017. The dataset used contained 111645 unique offenders. Of these, 75% were male, 48% European or New Zealand European, 35% Māori, with 10% Pasifika. The 2020 report covered the period between 1st of January 2014 to the 31st of December 2019. The sample contained 85201 unique offenders. The demographic makeup of the sample was similar to the 2018 study, with 75% being Male, 45% New Zealand European or European, 38% Māori, 10% Pasifika.

2.1.1 Age

The results for the effect of age on the likelihood of prosecution were similar for both studies. Age was found to be the strongest demographic predictor of the likelihood of prosecution, controlling for all other factors in the model.

In both studies, age was categorised into four categories, 17-18, 19-20, 21-29, and 30+. Both studies found that likelihood of prosecution increased with age, and those over 30 were twice as likely to be prosecuted compared to 17–18-year-olds.

2.1.2 Ethnicity

For both studies, ethnicity was categorised into four groups – New Zealand European (reference level), Māori, Pasifika, and Other[1]. The 2018 report found that Māori were 19% more likely to be prosecuted compared to NZ Europeans, with no other significant difference in likelihood between all other ethnicity groups. The 2020 report showed that Māori were 11% more likely to be prosecuted compared to NZ Europeans.

1. "Other" contains the ethnicities Asian, Middle Eastern, Latin American (MELAA), Other ethnicities, and ethnicities unknown or not collected.

The report also found that Pasifika were 9% less likely to be prosecuted compared to Europeans, and 21% less likely compared to Māori.

2.1.3 Sex

On average, males were 12% more likely to be prosecuted than females for the same offence. For the particular crimes measured, Police were far more likely to prosecute males over females.

The 2018 report stated that for 'Threatening Behaviour', Police were 64% more likely to prosecute males. The 2020 report found that, for 'Resist or Hinder Officer or Justice Official', males were 45% more likely to be prosecuted.

Both studies found that sex was not a significant factor in other crime types such as 'Possess Illicit Drugs', and 'Theft from Retail Premises'.

2.1.4 Gang Membership, Reporting, and Location

For non-demographic factors, being a gang member or associate increased the likelihood of prosecution. The 2018 study found it increased the likelihood of prosecution by 75%, whereas the 2020 study reported an increase of 134% after controlling for all other factors. The reporting channel of an offence also appeared to influence the decision made to prosecute. Crimes discovered by Police decreased the likelihood of prosecution around 30% compared to when a crime was reported by a member of the public. Both studies showed that there was significant variation across all 12 Police districts.

Both studies found that the most significant predictors of prosecution for offenders relate to the criminal history and the age of the offender. Offenders with 10 or more prior proceedings in the past 6 years are significantly more likely to be prosecuted than those with no criminal history. Older offenders aged 21 or over are, in general, more likely to be prosecuted than younger offenders aged between 17 and 20.

The studies found evidence that sex and ethnicity affect the prosecution decision for certain crime types (even after controlling for other factors, such as criminal history). While not apparent for all offence types measured, they found that the odds of prosecution for males, on average, are significantly greater than females for some offence types (Assault, Disorderly Conduct). Similarly, the odds of prosecution for Māori were greater than for Europeans for some, but not all offence types measured.

2.1.5 Summary

The authors concluded that this is not conclusive proof of conscious or unconscious bias against males or Māori. The models used show that there is evidence that there is an association between certain factors and the likelihood of prosecution, but not necessarily that these factors cause the likelihood of a prosecution to increase. Further analysis is required to determine whether, and to what extent, these discrepancies are an issue.

The authors noted that the fact that Māori and Pasifika are at different ends of the prosecution scale raises questions about why this is, and the extent to which skin colour, ethnicity, or cultural factors play a part in any differences. The models constructed controlled for many factors but these factors do not cover all possible factors, only factors that are available through administrative data and that were controlled for in the model.

2.2 Official Statistics

Data and official statistics pertaining to proceedings and prosecutions can be found from the Police data website [6] and the Ministry of Justice website [4]. We use information from these to inform the current state of prosecutions in New Zealand with respect to demographic characteristics of age, sex, ethnicity, and location. The data and statistics presented below has a time period between 1st of January 2017, and 31st of December 2022. Tables and Figures can be found in the Appendix A of this report.

Table A1 indicates a total of 824,333 total recorded offences that led to a proceeding between 2017 and 2022. Of these, approximately 70.6% of these proceedings resulted in a prosecution. There is variability between proceedings and due to the high-level description of each ANZSOC[2] Division offence, there is variability between the lower-level sub-offences within each division (ANZSOC Group). The number of total recorded proceedings dropped every year as shown by Figure A1, and dropped overall from 157,648 in 2017, to 117,058 in 2022. The rate of prosecutions generally remained steady about the average, though there was a slight decrease from the average in 2020 at 66.2% and an increase at 74.9% in 2022.

With respect to demographics, variability was found between categories in ethnicity (Table and Figure A2), age and sex (Table and Figure A3), and Police districts (Table and Figure A4). Despite making up roughly 16.5% of the population according to [8], Māori made up 44%

2. ANZSOC – Australian New Zealand Standard Offence Classification.

of total proceedings, 46.7% of all prosecutions, and were prosecuted at the highest rate at 74.5%. New Zealand Europeans make up roughly 70% of the total population but only accounted for 35.1% of all proceedings, 35% of all prosecutions, with a prosecution rate of 70.4%. Pasifika, making up 9% of the population, made up 8.8% of all proceedings and 9.1% of all prosecutions. Offenders of Asian descent, who make up 15.1% of the population, only made up 1.4% of all proceedings and were prosecuted at the lowest rate at 66.3%. Comparing Māori to non-Māori, Māori are 4.2 times more likely to be involved in a proceeding, and over five times more likely than New Zealand Europeans. Pasifika are twice as likely to be involved in a proceeding than NZ Europeans.

Males made up over 76% of proceedings and were prosecuted at a higher rate than females, 72.5% vs 65% respectively. Prosecution rates vary with age, with higher rates than average generally for those aged between 20-49. Prosecution rates varied between Police districts, with Southern (60.2%), Central (66.3%), and Tasman (67.2%) below average, and Waitematā (72.2%), Northland (73.9%), Canterbury (75.5%) and Eastern (75.8%) above average.

The review of past studies and official statistics show there is variability in prosecutions leading to unequal outcomes in prosecution rates. To understand how certain factors contribute to the variability, we use statistical modelling techniques that can quantify differences in categories whilst controlling for other factors.

3. Methodology

In this section, we provide details of the dataset and outline the statistical methods used to perform the analysis. The methodology we undertake is very similar to that used in the two previous studies mentioned earlier, with some slight differences regarding the variable choice and variable categorisations used in the model, which we outline in the upcoming sections. Those less interested in the technical details of the statistical modelling details and process and more interested in the results and analysis can skip to Section 4 (Results).

3.1 Data and Variables

Administrative data of recorded prosecutions was provided to us by the EBPC through the National Intelligence Application (NIA). A comprehensive sample of 141,230 unique offenders between 1st January 2017 and 31st December 2022 was provided. The offence that is recorded in the dataset contains the most serious offence that was committed over the period. A filtering process was undertaken for modelling purposes, and thus a total of 62,313 prosecutions were used in the modelling.

The dataset contains over 30 different variables, with the single variable of interest (response variable) being whether an offender was prosecuted or not, and predictor variables that cover demographic characteristics of the offender, attributes of the proceeding (such as location), and the history of engagements with police, such as prior convictions, number of proceedings over time, and the seriousness of the offence, which was measured through the National Offence Index (NOI)[3] score.

3. See https://www.abs.gov.au/statistics/classifications/national-offence-index/latest-release for more on the NOI score.

3.1.1 Response Variable

The unit of analysis is a proceeding. A proceeding is counted for each day an offender is dealt with by Police for one or more offences. The proceeding is categorised by the most serious offence that the offender is dealt with on that day. Seriousness is classified using a seriousness score relating to the type of offence.

This seriousness score aligns with the NOI scale used in official statistics collections: Recorded Crime Victims Statistics and Recorded Crime Offenders Statistics, published in New Zealand and Australia. The proceeding with the most serious NOI score is the only proceeding that is captured in the dataset.

The response variable, or outcome, is the binary decision of whether a suspect is prosecuted or not. In practice, this generally involves two-steps. First a suspect is apprehended, in which case they may be arrested, receive a warning, or be summonsed. If arrested (and in some cases, if summonsed), a second decision is made on whether to prosecute the suspect or not. The second decision is the focus of this study. This decision is made by front-line staff, whether they are first-responders, supervisors or custody suite sergeants. The recording of offender characteristics at the arrest stage and a recording of the offence details, which is mandatory under the New Zealand Police National Recording Standards (NRS)[4], provides a quality sample for modelling and analysis.

The two previous studies focused on all adults aged 17 years and over who were arrested during the period. Those 16 or younger were classified as youth, and generally were dealt with using an alternative action to prosecution.

However, since legislative changes in July 2019 resulted in 17-year-old offenders being classified as youth, we decided to only look at adult offenders who were 18 years or older and arrested over the measured period. If a suspect was apprehended on more than one day within the study period, then we select the day associated with the first apprehension only and exclude the subsequent apprehensions.

3.1.2 Predictor Variables

Predictor variables/factors are those available through administrative data, and we are interested in either measuring the effect of that variable or would like to control for. Variables include demographic characteristics of the offender, attributes of the proceeding, and the offender's previous offending and contact with police, as described below[5].

Demographic variables included:

1. Age: at the time of the proceeding. Age was treated in separate models as a continuous variable, and as a categorical variable with categories 18-30, 31-45, 46-64, and 65+.

4. See https://www.police.govt.nz/sites/default/files/publications/national-recording-standard-nrs.pdf for the latest version of the NRS (March 2024).
5. For the full list of predictor variables available, see Appendix.

2. Sex: with categories male, or female.
3. Ethnicity: which is categorical variable with categories New Zealand European, Māori, Pasifika, or Other.
4. Gang Membership: whether the offender was known to be a member or associate of a gang (yes) or not (no). For unknown or missing data, these were categorised as no[6].
5. Prior convictions: either yes, or no.

Variables for proceeding attributes were:

6. Officer discovered: whether the crime was discovered by a Police officer or some other method, such as reported by a member of the public.
7. Location: given by Police district.
8. Offence type: at the ANZSOC group level. Since there are over 100 categories of crime, we condensed the list down to crimes with between roughly 10% to 90% prosecution rates, with close to 1000 offences or more.

Offender's details about previous offending or contact with police included:

9. Prior history: any prior contact with police (contact person, subject of investigation, witness, etc.). Note that there were several different variables measured here.
10. Total proceedings over 72 months: total number of proceedings in the 6 years prior to the offence recorded (long-term history).
11. Total proceedings over 12 months: total number of proceedings in the year prior to the offence recorded (recent history).
12. NOI: the most serious prior offence, as measured by the NOI seriousness score. Note that the log of the NOI is used as assuming a linear relationship is not appropriate.

Though many of these variables are not of direct interest, such as location, we include them as a control if they add value to the model overall. This study has a focus on factors influencing decision-making at an individual level, therefore we needed to be able to separate changes in prosecution rates that are common across all decisions within a certain area, from the impact due to the variables of interest. If we did not include these controls and the distribution of the variables of interest differs across location, then the coefficients would reflect some of the broader changes that we wish to exclude.

3.1.3 More on Offence Types

High-level categories of crime are categorised according to the ANZSOC division categories. Due to the variability within the division categories, we use the lower-level ANZSOC group offences in the model. There are 103 different types of ANZSOC group categories, 74 had less than 500 observations. We did not want to include offences that had close to, or 100% prosecution rate, or close to, or 0% prosecution rate, as prosecution (or not) would be a function of only the offence itself and not influenced by any offender characteristics. Choosing offences where the prosecution rate was between 10% to 90% ensures that there was some discretion exercised by Police officers when deciding to prosecute or not. We have 12 ANZSOC group offences that were included in the model (see Table 3.1), which were also the same offences used in the 2020 prosecution study.

6. We understand that the implication of our assumption here may result in an underestimate of the number of gang members and associates involved in a prosecution process. However, we did not feel comfortable trying to impute or estimate whether a suspect or offender was a member or associate of a gang, thus the default for an 'unknown' was set at 'No'.

Code	ANZSOC_Group	Proceedings	Prosecutions	Percentage
213	Common Assault	11721	9317	79.49%
412	Dangerous or Negligent Operation of a Vehicle	4402	3364	76.42%
532	Threatening Behaviour	5388	4498	83.48%
823	Theft From Retail Premises	4212	2437	57.86%
829	Theft (Except Motor Vehicles) N.E.C.	2579	1810	70.18%
1041	Possess Illicit Drug	4225	2060	48.76%
1099	Other Illicit Drug Offences N.E.C.	849	610	71.85%
1122	Misuse of Regulated Weapons/Explosives	2888	2261	78.29%
1219	Property Damage N.E.C.	5787	4689	81.03%
1311	Trespass	3198	1443	45.12%
1319	Disorderly Conduct N.E.C.	14202	1233	8.68%
1562	Resist or Hinder Police Officer or Justice Official	2862	1217	42.52%

Table 3.1: ANZSOC group offence codes, description, and number of proceedings, prosecutions, and the percentage of prosecutions. These offences were those that were included in the model.

3.2 Modelling

Statistical modelling was used to quantify the effects of a range of variables on the likelihood of Police prosecuting an offender. Since the result of a proceeding results in a single binary outcome (prosecute or not to prosecute), and we wish to measure the association of factors involved in the outcome, we use a multiple logistic regression model. There are other methods we could choose; however logistic regression is widely used and standard statistical model for binary outcomes was the same approach the previous studies used.

The measure of the likelihood to prosecute is given by an odds ratio (OR). Odds are defined as follows; given an event E, and the probability of the event E occurring (denoted as p), the odds are given by the equation below,

$$Odds(E) = \frac{p}{1-p}$$

thus, the odds are the probability of an event occurring, divided by the probability of the event not occurring. The OR indicates how likely an outcome is to occur in one context relative to another. Let A and B denote two separate conditions, then the OR can be expressed by the following,

$$OR = \frac{Odds(A)}{Odds(B)}$$

Condition B is the reference (or baseline) level. In the context of multiple logistic regression, the interpretation of the OR is that a change from condition B to condition A changes the odds of an outcome, given all other factors are measured in the model remain constant. To interpret the values of the OR,

- If OR=1, then a change from B to A has no effect on the likelihood of the outcome,
- If OR>1, then a change from B to A increases the likelihood of the outcome,
- If OR<1, then a change from B to A decreases the likelihood of the outcome.

3.2.1 Model Technicalities

Here we provide some brief remarks about the technical aspects of the modelling process. This piece can be skipped by readers who are interested in the results of the prosecutions modelling.

Construction of a multiple regression model requires the addition, or elimination, of variables that add information to the model (in the case of addition), or that are surplus to requirements (in the case of elimination). We wish to choose the smallest subset of variables that explains the highest amount of variation in the data. To do this, we use stepwise regression methods, and the Akaike's Information Criterion (AIC), as the measure for model comparisons.

We used a forward stepwise regression, starting with the null model and allowing the process to add significant predictor variables to the model until the addition of more variables lessens the quality of the fit (provides a higher AIC score).

For a full list of the variables, including what variables were used in the model, see Table B1 in Appendix B. The stepwise regression process gave the model that used the variables that are outlined in the previous section indicating the predictor variables, eliminating several other variables (we have not mentioned them in this study due to their elimination from the model).

A particular issue that arises with models with many predictor variables is multicollinearity — where a predictor variable is correlated with other predictor variables, thus their effect on the response variable can be somewhat misrepresented.

However, the effect of multicollinearity is diminished as the number of observations increases. Although we have a large sample size, we used generalised variance inflation factors to test if multicollinearity exists in our models. Our results showed that there was no evidence of multicollinearity between the predictor variables in the model.

4. Results

We present the results and analysis in two parts. First, we provide descriptive statistics pertaining to the full dataset. We then present results of the modelling that we undertook, which provides us with information regarding the influence that certain predictor variables have on the likelihood of prosecution.

Several different models were constructed for the full model. Models that disaggregated down to look at the 12 different offence types were also constructed to understand how the factors measured influenced prosecution decision-making given that a particular offence had occurred.

4.1.1 Descriptive Statistics

Table 4.1 shows the descriptive statistics for the final sample used in the modelling. The statistics describe the numbers and percentages of the number of each category of variable, and their corresponding prosecution percentage, across the 12 different offence types in Table 3.1.

We have a total of 62313 unique proceedings, of which 56% resulted in a prosecution. The ethnicity makeup of the final sample is 43% New Zealand European, 40.5% Māori, 10.5% Pasifika. The 6% 'Other' is made up of those of Asian descent, categorised as MELAA, and those who were classed as "Other" ethnicity or those whose ethnicity was unknown. Prosecution rates vary over these four categories, with Māori higher than average at just under 60%, and Pasifika with low prosecution rates at 46.7%.

Males make up 76% of the sample. The prosecution rates are very similar for males and females. With respect to age groups, 18–30-year-olds make up over half of the sample but are prosecuted at the lowest rate, at just under 50%. Those with prior convictions make up over 55% of the sample and were prosecuted at a higher rate than those without a prior conviction. The majority of the sample is made up of those that were not known as a gang member or associate (95.8%), and those known to be a gang member or associate were prosecuted at far higher rates.

Statistics for Police districts show that there is a large amount of variation across locations. Bay of Plenty had a high number of offenders in the sample (12.3%), with Canterbury and Wellington making up over 10% of the sample each. Prosecution rates varied greatly, with Northland, Central, Waitematā and Eastern being particularly high.

	Proceedings		Prosecutions	
	#	%	#	%
All	**62313**	**100%**	**34939**	**56.07%**
Ethnicity				
1. NZ European	26809	43.02%	14825	55.30%
2. Māori	25224	40.48%	15103	59.88%
3. Pasifika	6562	10.53%	3065	46.71%
4. Other	3718	5.97%	1946	52.34%
Sex				
0. Female	14951	23.99%	8322	55.66%
1. Male	47362	76.01%	26617	56.20%
Age Group (Years)				
1. 18-30	34378	55.17%	17011	49.48%
2. 31-45	17849	28.64%	11705	65.58%
3. 46-64	9297	14.92%	5797	62.35%
4. 65+	789	1.27%	426	53.99%
Prior Convictions				
0. No	27932	44.83%	13015	46.60%
1. Yes	34381	55.17%	21924	63.77%
Gang Member				
0. No	59700	95.81%	32937	55.17%
1. Yes	2613	4.19%	2002	76.62%
Police District				
Northland	55.17%	4.06%	1648	65.19%
Waitematā	76.62%	6.54%	2646	64.88%
Auckland City	55.17%	8.90%	2374	42.81%
Counties Manukau	76.62%	9.77%	3439	56.51%
Waikato	55.17%	9.22%	2778	48.37%
Bay of Plenty	76.62%	12.28%	4309	56.30%
Eastern	55.17%	6.24%	2453	63.04%
Central	76.62%	9.06%	3788	67.09%
Wellington	55.17%	10.27%	3512	54.86%
Tasman	76.62%	4.79%	1701	57.00%
Canterbury	55.17%	10.98%	3638	53.17%
Southern	76.62%	7.89%	2653	53.99%

Table 4.1: Descriptive statistics for the final sample used for modelling.

4.2 Modelling Results

Table 4.2 shows the outputs for the multiple logistic regression model. For categorical factors, the reference level or group is given, which is the baseline condition, therefore the group for which other groups are compared to. Odds ratios (OR) are presented as well as 95% confidence intervals for the OR. The LCL and UCL represents the lower confidence limit (LCL) and upper confidence limit (UCL) of the 95% confidence interval respectively. P-values are also recorded as the measure of statistical significance, and we regard a p-value of less than 0.05 to be a statistically significant result (the value can be found under the 'sig' column). A statistically significant result in this context means that there is evidence that the odds ratio is not equal to 1 in the population, assuming all other variables in the model remain constant.

As an example of how to read and interpret the model outputs, notice that under Police district, Canterbury is the reference level, and Waikato has an OR of 0.99, the LCL is 0.82, the UCL is 1.18, and the p-value is 0.87. This is saying that, with Canterbury as the reference level, Waikato has 99% of the odds that Canterbury has. Therefore, moving from Canterbury to Waikato decreases the likelihood of prosecution by 1%, controlling for all other variables in the model. Now, this is an estimate based on the sample we have. Extending this estimate to the broader population, we are 95% confident that the true OR could be between 0.82, and 1.18 - meaning that the OR could plausibly be 1. Recall from Section 3.2 that if the OR is 1, then there is no difference in the likelihood of prosecution between Waikato and Canterbury. The p-value is greater than the level of significance, therefore there is no evidence that the likelihood of prosecution between Waikato and Canterbury are different, assuming all other variables in the model remain constant.

For each offence group in the model, we constructed several models. Below we go through the findings for the variables from Table 4.2. We also mention results where we perform the same model but on each offence type, to understand how the likelihood of prosecution differs between offences.

4.2.1 Age

Age was shown to be a factor with a strong influence in the likelihood of prosecution. Given the age categories in the two previous studies (17-18, 19-20, 21-29, 30+), as age increased, the likelihood of prosecution increased, given all other variables in the model. We found this to be true when we categorised age in this way (note however, we did not include 17-year-olds in our modelling). We also tried modelling age in a continuous way rather than as a variable with distinct categories and found that for an increase in one year of age, the likelihood of prosecution increased by 2% (95% CI: 1.01, 1.04), which was a statistically significant result.

Treating age as a continuous variable and assuming a linear relationship may be too broad of an assumption to make. However, we thought the age categorisations used previously were either too narrow (17-18, 19-20, 21-29), or too broad (30+). We categorised them into categories of 18-30, 31-45, 46-64, 65+, and found that generally, as age increases, the likelihood of prosecution increases but only up to a point. We found that, moving from 18-30 to 31-45 increased the likelihood of prosecution by 67% and moving to 46-64 increased the likelihood of prosecution by 57%. The likelihood of prosecution, comparing 18-30 and 65+, decreased the likelihood of prosecution by 23%, though there was not enough evidence to show that there was a true difference in the population (95% CI: (0.49, 1.21), p-value > 0.05).

			95% Confidence Level			
Variable	**Reference Level**	**Effect**	**OR**	**LCL**	**UCL**	**Sig**
Offender Characteristics						
Ethnicity	European	Māori	1.11	1.01	1.21	0.04
		Pasifika	0.95	0.80	1.12	0.51
		Other	0.96	0.78	1.17	0.67
Sex	Female	Male	1.07	0.97	1.18	0.17
Age Group	18-30	31-45	1.67	1.51	1.83	0.00
		46-64	1.57	1.37	1.79	0.00
		65+	0.77	0.49	1.21	0.24
Prior Convictions	No	Yes	1.47	1.32	1.64	0.00
Gang Member or associate	No	Yes	1.93	1.58	2.36	0.00
Reference Offending						
Police Discovered	No	Yes	1.00	0.90	1.11	0.93
Police District	Canterbury	Auckland City	0.78	0.65	0.95	0.01
		Bay of Plenty	1.21	1.01	1.44	0.04
		Central	1.52	1.26	1.83	0.00
		Counties Manukau	1.38	1.14	1.68	0.00
		Eastern	1.40	1.14	1.72	0.00
		Northland	1.86	1.45	2.39	0.00
		Southern	0.97	0.79	1.19	0.78
		Tasman	1.40	1.12	1.76	0.01
		Waikato	0.99	0.82	1.18	0.87
		Waitematā	1.79	1.45	2.21	0.00
		Wellington	1.26	1.05	1.52	0.02

Table 4.2: Model output for the full model.

				95% Confidence Level		
Variable	**Reference Level**	**Effect**	**OR**	**LCL**	**UCL**	**Sig**
History of Offending & Police Contact						
Proceedings within prior 6 Years	0	1-4	1.49	1.35	1.66	0.00
		5-9	2.35	2.06	2.68	0.00
		10+	3.1	2.79	3.4	0.00
Proceedings within prior 12 Months	0	1-4	1.15	1.01	1.33	0.03
		5-9	1.40	1.10	1.80	0.01
		10+	2.45	1.03	7.01	0.06
Seriousness of Recent offending	N/A	log(...)	0.66	0.56	0.78	0.00
Number of prior contact with Police as "subject of"	0	1	1.24	1.05	1.46	0.01
		2	1.58	1.04	2.45	0.04
		3+	0.82	0.40	1.76	0.60
Offence Type						
Offence Type (code)	1512	213	5.47	4.48	6.68	0.00
		412	11.14	8.58	14.58	0.00
		532	5.17	4.13	6.48	0.00
		823	2.02	1.66	2.47	0.00
		829	2.79	2.21	3.53	0.00
		1041	1.02	0.85	1.24	0.81
		1099	2.04	1.50	2.78	0.00
		1122	3.53	2.81	4.44	0.00
		1219	5.71	4.59	7.11	0.00
		1311	0.99	0.80	1.22	0.93
		1319	0.12	0.10	0.15	0.00

Table 4.2: Model output for the full model.

Similar results occurred when applying the model to each offence type. For 'Dangerous Driving', 'Possessing Illegal Drugs', 'Other Illicit Drug Offences', 'Trespass Offences', 'Disorderly Conduct', and 'Resist or Hinder a Police Officer or Justice Official', as age increases, the likelihood of prosecution increases up until a point. For 'Threatening Behaviour', 'Motor Vehicle Theft', and 'Property Damage', there was a significant difference between 18-30 and 31-45. However, there was no significant difference between other age group categories and 18-30s.

4.2.2 Ethnicity

Māori are 11% more likely to be prosecuted than New Zealand European, given all other variables in the model remain constant. The results in Table 4.2 show results with New Zealand European as the reference level, but making Pasifika the reference level, Māori are 17% more likely than Pasifika to be prosecuted. However, this result is not found to be statistically significant (95% CI: (0.99, 1.38), p-value > 0.05).

There is not enough evidence to suggest that New Zealand Europeans were prosecuted at a higher rate than Pasifika or Other ethnicities.

Of the twelve offences measured in the model, the evidence indicates that Māori are more likely to be prosecuted than New Zealand Europeans for two crimes, 'Common Assault' (29%) and 'Theft from Retail Premises' (40%). The likelihood of prosecution is greater for Māori than New Zealand Europeans for 'Threatening Behaviour' (30%), 'Theft (Exc. Motor Vehicles) N.E.C' (40%), and 'Misuse of Regulated Weapons' (41%), though there was not enough evidence to suggest that this was a statistically significant result. For 'Possessing Illicit Drugs', Māori were 37% less likely to be prosecuted than New Zealand Europeans, which was a statistically significant result.

4.2.3 Sex

Overall, the model showed that while males were on average 7% more likely to be prosecuted, this was not a statistically significant result (95% CI: (0.97, 1.08), p-value > 0.05). Therefore, there is not enough evidence to suggest that the likelihood of prosecution is different for males than females.

There is some variability when looking at specific offences. Males are significantly more likely to be prosecuted for 'Dangerous Driving' (90%), are over twice as likely to be prosecuted for 'Threatening Behaviour' (110%), and 'Property Damage' (51%). Females are significantly more likely to be prosecuted for 'Possessing Illicit Drugs' (32%) and 'Trespassing' (29%).

4.2.4 Gang Membership or Association

Being a known gang member or associate greatly increases the likelihood of prosecution. Gang members or associates on average are almost twice as likely to be prosecuted, with an OR = 1.93 (93% more likely), and this estimate could be as low as 58% or as high as 136%, with 95% confidence. For all offences measured, the likelihood of prosecution is higher for gang members or associates, controlling for all other factors in the model and is especially high for 'Common Assault' (OR = 4.09), 'Possessing Illicit Drugs' (OR = 3.04), 'Trespassing' (OR = 2.87), and 'Disorderly Conduct' (OR = 2.57).

Although adding this variable provides the valuable insights outlined above, it is important to acknowledge two things. First, there may be issues with the quality of the data. Of the full data set (141,230 observations), gang membership or association were 'Unknown' for 130,908 proceedings. As previously stated in Section 3.1.2, these were all given the value of 'No', but this will provide an underestimate of the number of gang members or associates in the data set.

Secondly, the distribution of gang members or associates are very unevenly distributed across ethnicity groups and sex with respect to count. From Table 4.3, the full data set shows that 77% of gang members or associates were Māori, 12.4% New Zealand European, 9.9% Pasifika, and 0.7% Other. Prosecution rates were consistent over all categories, with rates between 87.5 – 89.5%. With respect to sex, Table 4.4 shows male gang members make up 99.66% of all proceedings, with a prosecution rate of 89.1%. Female gang members make up 0.34% of proceedings, with a prosecution rate of 78.2%.

Prosecuted	NZ European	Māori	Pasifika	Other	Total
No	100	572	72	6	750
Yes	748	4708	604	42	6102
Total	**848**	**5280**	**676**	**48**	**6852**
Prosecution rate	88.21%	89.17%	89.35%	87.50%	89.05%
Membership %	12.38%	77.06%	9.87%	0.70%	100%

Table 4.3: Gang membership or association prosecution numbers, rates, and percentages across ethnicities. Note that these figures were computed using the full data set of 141,230 observations (not the final sample for the model in Table 4.2).

Prosecuted	Female	Male	Total
No	5	745	750
Yes	18	6084	6084
Total	**23**	**6829**	**6834**
Prosecution rate	78.26%	89.09%	89.03%
Membership %	0.34%	99.66%	99.74%

Table 4.4: Gang membership or association prosecution numbers, rates, and percentages across sex. Note that these figures were computed using the full data set of 141,230 observations (not the final sample for the model in Table 4.2).

Removing the variable "Gang Member" from the model had two significant effects from the full model. First, it increased the OR estimate for Māori vs New Zealand European from 1.11, to 1.16 (95% CI: (1.05, 1,27), p-value < 0.05). Secondly, it increased the OR estimate for sex from 1.07, to 1.12 (95% CI: (1.02, 1.24), p-value < 0.05). This results in sex being statistically significant, meaning that that there is evidence to show that the likelihood of prosecution for males is higher than females if we do not account for gang membership or association in the model.

4.2.5 Prior Convictions and Offending History

Offenders with prior convictions were 47% more likely to be prosecuted than those with no prior convictions. For all offences measured, the likelihood of prosecution generally increased, and was statistically significant for 'Dangerous Driving' (OR = 3.8), 'Theft from Retail Premises' (OR = 1.5), 'Theft (Exc. Motor Vehicles)' (OR = 1.7), 'Other Illicit Drug Offences' (OR = 3.3), 'Misuse of Regulated Weapon' (OR = 1.7), and 'Property Damage' (OR = 2.3).

Prior history, measured by the number of proceedings in the prior 12 months (recent history) or 72 months (long-term history), greatly increase the likelihood of prosecution as the number of proceedings increase. An offender with 10 or more proceedings in the last 72 months were 3.1 times more likely to be prosecuted than an offender with no recent proceedings. For the offence types measured, the likelihood of prosecution increasing as the number of proceedings increased was true.

4.2.6 Offence Reporting

Whether an officer discovered a crime, or if it was reported by a member of the public was a variable that was measured. In this study, it was found to not be a significant variable, with an OR of 1. For 'Common Assault', the OR was found to be 0.45, meaning that the likelihood of prosecution was 55% more likely if the offence was reported by a member of the public, rather than an officer discovering the offence themselves. We found similar results for 'Threatening Behaviour' (40%) and 'Disorderly Conduct' (23%), but for 'Dangerous Driving', if an officer discovered the offence, the offender was 5.4 times more likely to be prosecuted and, for 'Resisting or Hindering an Officer or Justice Official', an offender was 2.3 times more likely to be prosecuted.

4.2.7 Location/Police District

Police district was used mainly used as a variable to control for variation due to location, or where a proceeding occurred. The results showed that the Police district for which the offence occurred had some influence over the likelihood of prosecution.

Assuming all other variables remain constant, the likelihood of prosecution in Canterbury was shown to be significantly different to all other districts, apart from Southern and Waikato. Northland was 86% more likely to prosecute an offender than Canterbury, Waitematā 79% and Central 52%, with Auckland City 22% less likely to prosecute when compared to Canterbury.

Investigating the effect of location for individual offence types, there were similar results of differences across Police districts. For some of the more extreme results, for 'Dangerous Driving', an offender is 17 times more likely to be prosecuted in Waikato than in Canterbury. For 'Threatening Behaviour', an offender was almost 4 times more likely to be prosecuted in Northland than in Canterbury, and for 'Theft (Exc. Motor Vehicles)', an offender is over 6 times more likely to be prosecuted in Waitematā than in Canterbury.

These results indicate that there are significant differences in prosecution practices across Police districts, even after accounting for offender demographics, offending history and offence types.

4.2.8 Comparisons with Previous Studies

Generally, the results found with the new dataset are in line with many of the findings of the two previous studies. Regarding demographic variables, age was shown to be a strong predictor of the likelihood of prosecution. Our findings suggest that while the likelihood of prosecution increases with age, this relationship is true up to a point, whereas when offenders start approaching retirement age, the likelihood of prosecution decreases.

Being Māori increased the likelihood of prosecution by 11% compared to New Zealand Europeans, which was the same value given in the 2020 report but lower than the 2018 study (19%). Gang membership or association, having prior convictions, and having a high number of proceedings in both the short and long-term significantly increased the likelihood of prosecution, and for some crimes, greatly increased likelihood.

Two noticeable differences between our study and the previous studies were the result regarding the influence of sex and the reporting channel. Both the 2018 and 2020 studies found that, on average, being a male increased the likelihood of being prosecuted, and that officers discovering the offence (as opposed to it being reported by the public) increased the likelihood of prosecutions. Our results suggest that there is not enough evidence to back these findings based on the current model.

5. Discussion

The purpose of this study was to use administrative data to investigate factors that may influence the likelihood of prosecution, and to quantify that influence. A statistical modelling approach using multiple logistic regression models were used to perform the analysis. We presented a short review that summarised two previous studies and presented official statistics of prosecutions in New Zealand over the same time period we performed our analysis on. After describing the methodology, data, and modelling details, we presented the model outputs, results, and analyses.

Our findings show that the age of an offender, prior convictions, recent and long-term history of proceedings, and gang membership were significant factors that influence the likelihood of prosecution. Though ethnicity was not a strong predictor, the results found that Māori were still significantly more likely to be prosecuted relative to a New Zealand European offender.

Though this seems to have decreased over time compared with the previous two studies, it is still concerning given that the official statistics show that Māori are over five times more likely to be involved in the prosecutions process than New Zealand Europeans, and 4.2 times more likely than non-Māori. We did not find evidence to suggest that sex was an influential factor, which differed from the previous two studies.

Relating these results back to the aims of the UPD project -- to understand whether bias exists in prosecution decision-making -- we can say we have evidence that certain demographic factors influence the likelihood of an offender being prosecuted (e.g., age, being Māori, having prior convictions, etc.).

However, our findings cannot dictate a causal relationship[7] between factors and prosecution decisions, only evidence of an association. Where associations exist, however, it does warrant further investigations into why these discrepancies exist, and what can be done to correct them. Mixed research methods where quantitative studies, along with more in-depth qualitative methods, are used to investigate these findings may reveal greater insights.

It is worth mentioning that this study investigates one critical aspect of the prosecution process. In that sense, it is precise but narrow, only focusing on the decision whether to prosecute an offender or not. There are a range of processes that take place before the decision to prosecute that may influence the decision, for which we do not have the data, such as interaction with Police at the time of arrest, or the characteristics of the officers that performed the arrest. We are limited to the data that we have and is available but this does not necessarily capture the entire picture of the event.

7. A causal relationship is a cause-and-effect relationship where one variable directly results in the occurrence of a change in another variable.

5.1 Limitations

A limitation of the dataset we have is that it does not contain information surrounding an offenders' socioeconomic status. The two previous studies used meshblock-level index of socioeconomic status provided by the Department of Health, University of Otago (NZDEP2013) [1], known as the Deprivation Index.

However, to link this information, we required the physical address of each offender which we did not have ethical approval for. In both previous studies, deprivation as a measure of socioeconomic conditions was not found to be a significant variable in the model. This does not necessarily mean this had no effect; rather that adding this information to a model that included all the variables did not add any extra value and was therefore excluded. The deprivation index is quite a broad measure of socioeconomic status and there is no guarantee that capturing that information for an offender based on their last known address will necessarily reflect their true socioeconomic status.

As noted, the modelling did not account for all offences and only included a subset of 12 offences that had a large enough sample size, and that had a prosecution range of roughly between 10% to 90%. The decision to prosecute for some offences are a function of the seriousness of the offence (e.g., 'Abduction and Kidnapping', 'Murder'), and some are almost never prosecuted (e.g., 'Consumption of Legal Substances in Prohibited Spaces').

To allow for and to measure Police discretion, we chose the subset that roughly fits the criteria. We included 'Disorderly Conduct' though the prosecution rate was slightly lower than 10%, but that decision was made to keep our study consistent with previous studies, and the fact that it had a large sample size. The choice of prosecution range is rather arbitrary and an argument could be made to change the range so that it includes certain offences.

Another limitation is categorical groupings of factors. For ethnicity, due to sample size issues, we decided to keep New Zealand European, Māori and Pasifika, and to group Asian, MELAA, Other ethnicities, and Unknown into a single category called 'Other'. Pasifika is a broad term for a range of different ethnicities and further analysis, after disaggregating down, may bring more and interesting insights but the sample size limitation means that our estimates may be too variable to perform quality statistical inference. Some factors can be categorised in many ways, such as age. The categorisations that we have chosen, or that have been chosen in previous studies, may come across as arbitrary. We settled on our categorisation as we believe it more accurately portrayed the relationship between age and the likelihood of prosecution than the previous studies.

Lastly, we mention that the decisions surrounding how data is collected, recorded and categorised can be a limitation. Data pertaining to sex is collected but only in relation to the categories 'Male' or 'Female'. Therefore, we cannot measure anything other than the differences between these categories and cannot measure the difference in treatment of those who identify as other genders. The collection of ethnicity data only allows for one ethnicity, though many might consider themselves of mixed ethnicity. Disability data is not collected at all and therefore cannot be a part of the analysis in this study.

5.2. Recommendations for Future Work

Comparing our results to the two previous studies yielded some interesting results. Where men were more likely to be prosecuted, our results showed that this may no longer be the case. Although Māori were more likely to be prosecuted, the scale of the likelihood has decreased from the previous two studies. Canterbury was shown in the 2020 study to be the Police district where an offender had the lowest likelihood of being prosecuted; however, our findings did not support that conclusion. This illustrates that the world of prosecutions is dynamic and constantly changing. Therefore, we recommend that these studies continue periodically to monitor how things are changing in relation to prosecutions, and whether that change is positive or negative.

This study, and any future study, employing a quantitative approach can identify factors influencing prosecution decision-making and quantify the scale of the effect but not why it occurs. As stated before, further investigation is required to understand why these discrepancies occur and what can be done to correct these discrepancies if needed.

Although the sample size of the modelling dataset was more than sufficient, better standards regarding data collection and recording would improve analyses further. Although this is outside of the scope of this project, it is an example that data quality and integrity is important if we wish to obtain excellent insights into New Zealand policing services.

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POLICE

Appendix

Appendix A

Code	ANZSOC Division Offence Description	Proceedings	Prosecutions	Percentage
1	Homicide and Related Offences	1184	1155	97.55%
2	Acts Intended to Cause Injury	121652	92280	75.86%
3	Sexual Assault and Related Offences	10863	9038	83.20%
4	Dangerous or Negligent Acts Endangering Persons	30891	15567	50.39%
5	Abduction, Harassment, and Other Related Offences Against a Person	8132	6939	85.33%
6	Robbery, Extortion, and Related Offences	31069	23459	75.51%
7	Unlawful Entry with Intent/Burglary, Break-and-Enter	94111	60221	63.99%
8	Theft and Related Offences	86755	55411	63.87%
9	Fraud, Deception, and Related Offences	16690	13923	83.42%
10	Illicit Drug Offences	49432	23878	48.30%
11	Prohibited and Regulated Weapons and Explosive Offences	4518	2753	60.93%
12	Property Damage and Environmental Pollution	95138	81329	85.49%
13	Public Order Offences	22647	14958	66.05%
14	Traffic and Vehicle Regulatory Offences	31784	18351	57.74%
15	Offences Against Justice Procedures, Govt. Sec and Govt. Ops	63237	13912	22.00%
16	Miscellaneous Offences	156130	149341	95.65%
Total		**824233**	**582515**	**70.67%**

Table A1: Official Statistics of the ANZSOC Division codes and descriptions, number of proceedingss and prosecutions, and the percentage of prosecutions between Jan 1st 2017, and 31st Dec 2022.

Ethnicity	Proceedings	Prosecutions	Percentage
Asian	11445	7589	66.31%
European	288913	203544	70.45%
Indian	17000	11864	69.79%
Māori	365746	272323	74.46%
Not Stated/Unknown	55258	25015	45.27%
Other Ethnicities	13182	8934	67.77%
Pasifika	72689	53246	73.25%
Total	**824233**	**582515**	**70.67%**

Table A2: Official Statistics for the number of proceedings, prosecutions, and percentage of prosecutions per ethnicity between Jan 1st 2017, and 31st Dec 2022. Ethnicity categories are defined by the policedata.nz website.

Age	Sex	Proceedings	Prosecutions	Percentage
0-9	M	872	1	0.11%
	F	148	0	0.00%
9-14	M	24122	3736	15.49%
	F	8835	961	10.88%
15-19	M	92166	49789	54.02%
	F	26779	11885	44.38%
20-24	M	109255	82521	75.53%
	F	32340	22855	70.67%
25-29	M	107134	86989	81.20%
	F	33963	25485	75.04%
30-34	M	85424	70852	82.94%
	F	29420	22335	75.92%
35-39	M	62030	51014	82.24%
	F	20547	15381	74.86%
40-44	M	45864	36864	80.38%
	F	14295	10101	70.66%
45-49	M	36390	28232	77.58%
	F	10895	7463	68.50%
50-54	M	26648	19764	74.17%
	F	7726	5038	65.21%
55-59	M	17731	12726	71.77%
	F	4646	2842	61.17%
60-64	M	9985	6712	67.22%
	F	2588	1416	54.71%
65-69	M	5422	3445	63.54%
	F	1321	601	45.50%
70-74	M	2906	1724	59.33%
	F	843	321	38.08%
75-79	M	1342	702	52.31%
	F	493	125	25.35%
80+	M	1130	377	33.36%
	F	566	101	17.84%
Unspecified		407	157	38.57%
Total	**M**	**628421**	**455448**	**72.47%**
	F	**195405**	**126910**	**64.95%**

Table A3: Official Statistics of the number of proceedingss, prosecutions, and percentage of prosecutions for different age groups and sex, between Jan 1st 2017, and 31st Dec 2022.

Location	Proceedings	Prosecutions	Percentage
Northland	38628	28538	73.88%
Waitematā	62646	45245	72.22%
Auckland City	69689	49507	71.04%
Counties/Manukau	102872	71001	69.02%
Waikato	77328	53718	69.47%
Bay of Plenty	92030	67051	72.86%
Eastern	62530	47385	75.78%
Central	80263	53214	66.30%
Wellington	70249	51041	72.66%
Tasman	35328	23729	67.17%
Canterbury	79929	60348	75.50%
Southern	52952	31857	60.16%

Table A4: Official Statistics of the number of proceedings, prosecutions, and percentage for each Police district, between Jan 1st 2017, and 31st Dec 2022.

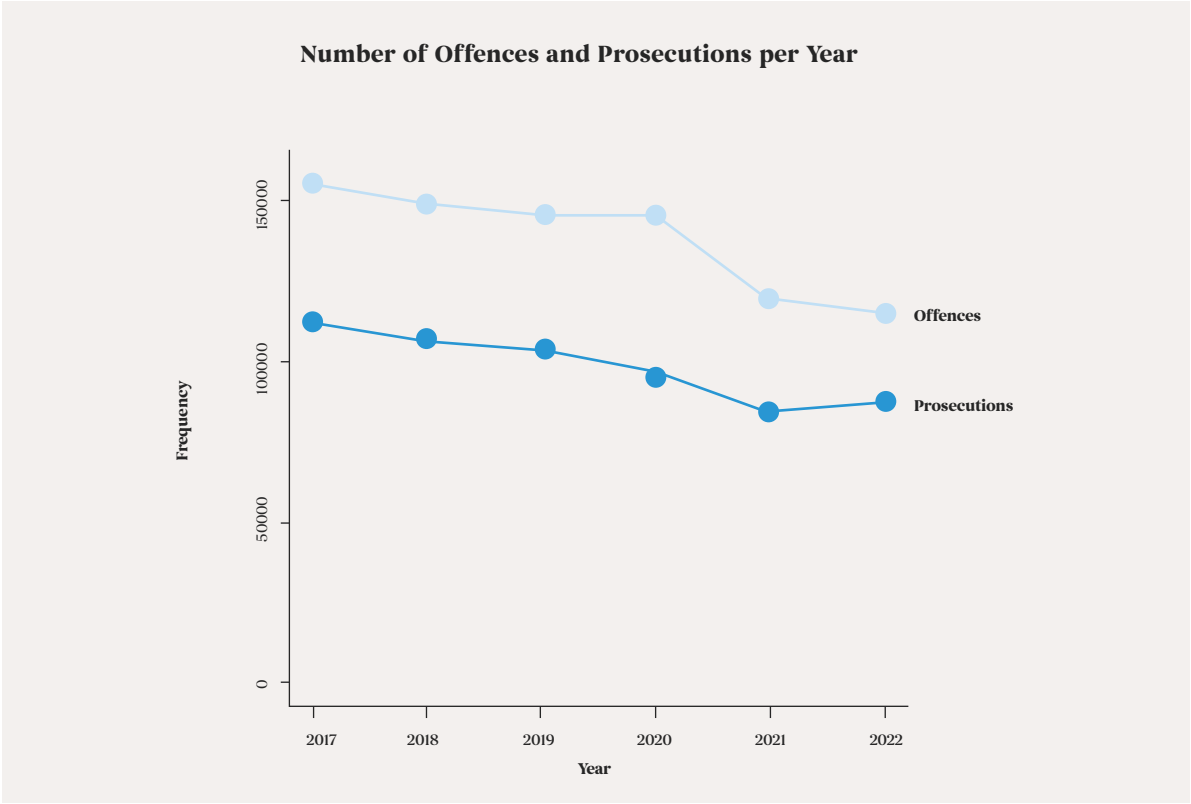

Figure A1: Time series plot showing number of offences that led to a proceeding, and number of prosecutions each year between Jan 1st 2017, and 31st Dec 2022. There was an overall declining trend in offences, and a relatively steady rate of prosecutions.

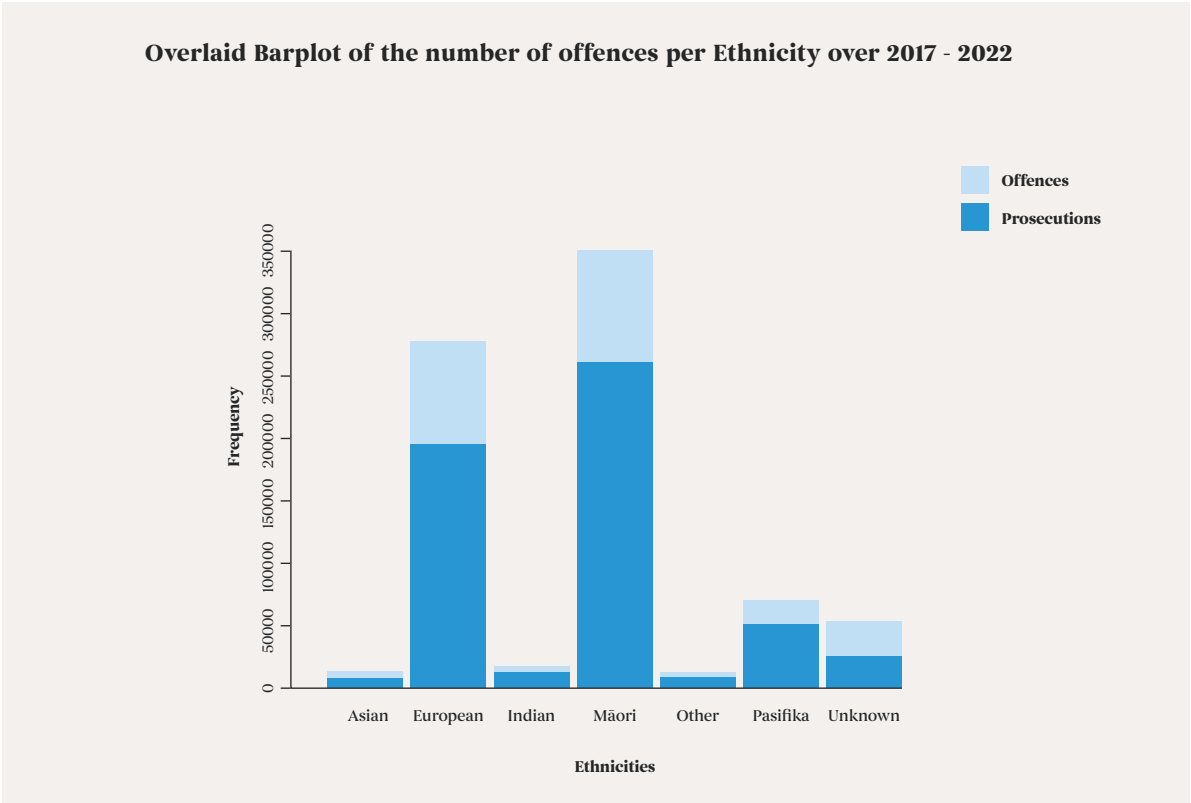

Figure A2: Overlaid barplot of number of offences that led to a proceeding, and prosecutions for each ethnicity group between Jan 1st 2017, and 31st Dec 2022.

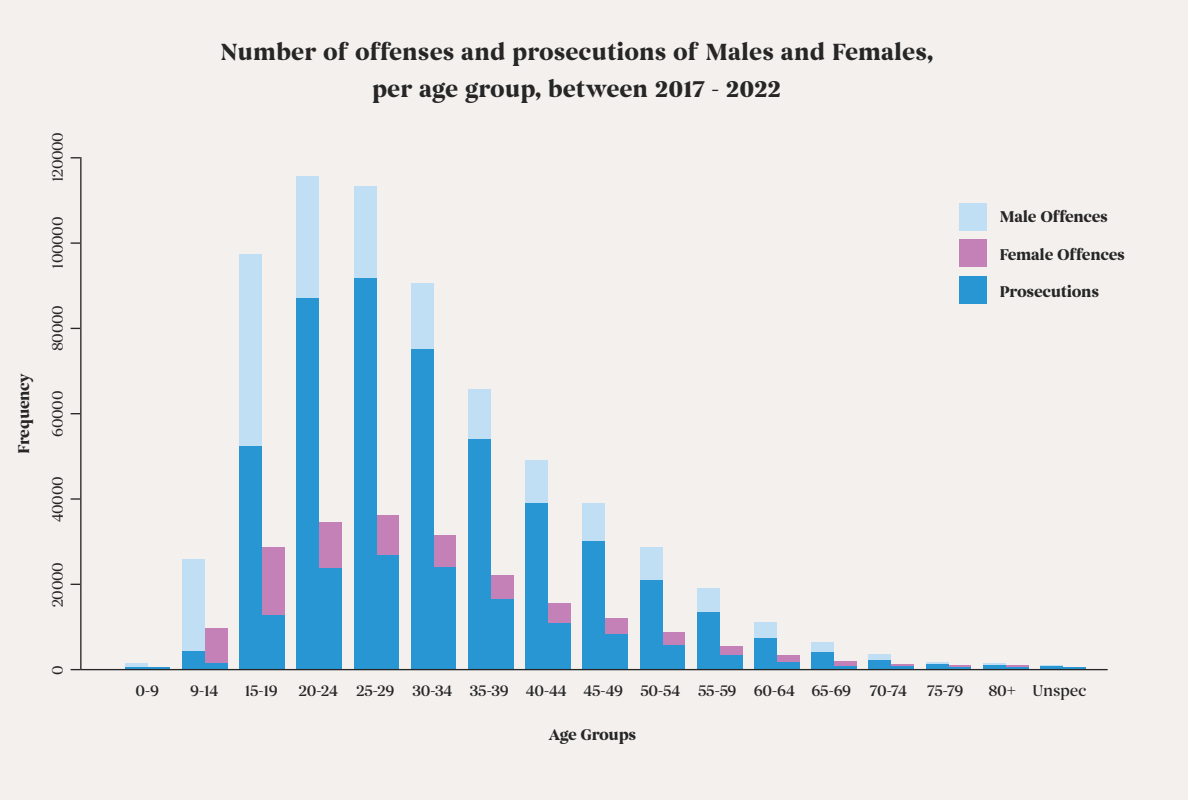

Figure A3: Overlaid barplot of offences that led to a proceeding, and prosecutions for male and females within each age group, between Jan 1st 2017, and 31st Dec 2022.

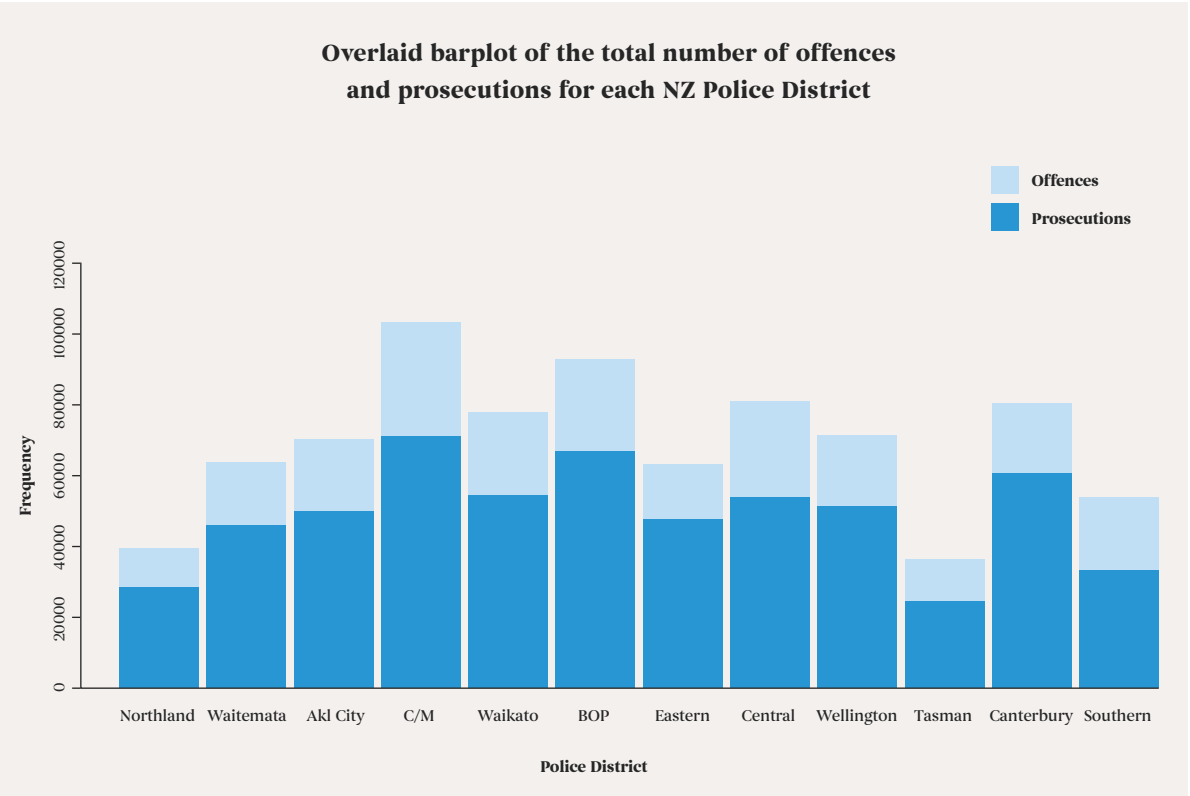

Figure A4: Overlaid barplot of number of offences that led to a proceeding and prosecutions for each Police District between Jan 1st 2017, and 31st Dec 2022.

Appendix B

Variable Name	Description	Type	Model
PERSON_ORG_ID	Person/Organisation Id	Numeric	No
PROCEEDING_DATE	Proceeding date	Date	No
DISTRICT_ID	District ID	Categoric	Yes
AREA_ID	Area ID	Categoric	No
STATION_ID	Station ID	Categoric	No
ANZSOC_DIVISION	ANZSOC Division	Categoric	No
ANZSOC_SUBDIVISION	ANZSOC Subdivision	Categoric	No
ANZSOC_GROUP	ANZSOC Group	Categoric	Yes
NOI_RANKING	NABS National Offence Index (NOI) Ranking	Numeric	Yes
NZCHI	Crime Harm Index	Numeric	No
AGE_AT_OCCURRENCE_DATE	Age at Occurrence Date	Numeric	Yes
YOUTH_FL	Youth Flag	Categoric	No
GENDER_CD	Gender Flag	Categoric	Yes
ETHNICITY_CD	Ethnicity Code	Categoric	Yes
OFFICER_DIS_FL	Officer Discovered Flag	Categoric	Yes
PROSECUTION_FL	Prosecution Flag	Categoric	Yes
WARNING_FL	Warning Flag	Categoric	No
PROCEEDING_CD	Proceeding Type Code	Categoric	No

Variable Name	Description	Type	Model
GANG_MEMBER_FL	Gang Member Flag	Categoric	Yes
DELTA_DAYS	Days between current and previous proceeding	Numeric	No
DELTA_MONTHS	Months between current and previous proceeding	Numeric	No
PREVIOUS_PROCEEDING_RECENT	Previous proceeding in last 12 months	Categoric	Yes
PREVIOUS_PROCEEDING	Previous proceeding in last 72 months	Categoric	Yes
NOI_MOST_SERIOUS_RECENT	Previous proceeding NOI in last 12 months	Numeric	No
NOI_MOST_SERIOUS	Previous proceeding NOI in last 72 months	Numeric	No
PREVIOUS_BOUND_BY_ORDER	Previous Bound by Order role in last 72 months	Numeric	No
PREVIOUS_CONTACT	Previous Contact role in last 72 months	Categoric	Yes
PREVIOUS_INFORMANT	Previous Informant role in last 72 months	Categoric	No
PREVIOUS_PERSON_AT_RISK	Previous Person at Risk role in last 72 months	Categoric	No
PREVIOUS_SUBJECT_OF	Previous Subject Of role in last 72 months	Categoric	No
PREVIOUS_SUBJECT	Previous Subject role in last 72 months	Categoric	No
PREVIOUS_VICTIM	Previous Victim role in last 72 months	Categoric	No
PREVIOUS_WITNESS	Previous Witness role in last 72 months	Categoric	No
PREVIOUS_CONVICTIONS	Previous Conviction role in last 72 months	Categoric	Yes
PREVIOUS_WARNING	Previous Warning role in last 72 months	Categoric	No

Table B1: Model variables that were tested and included in the model with description and data type.

UPD

UNDERSTANDING POLICING DELIVERY