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## Special Edition Reducing Prison Violence

### Understanding Prison Violence Trends and Correlates

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#### Introduction

Violent incidents in prisons have increased. In 2014 there were 16,196 assault incidents in prisons in England and Wales, representing an increase of 10 per cent compared to 2013. Similarly there were 2,145 serious assaults, representing an increase of 35 per cent on 2013.

The headline statistics are stark but they cover up a complex picture of interacting drivers that are impacting on the prison system. These numbers cover both public and private prisons, male and female, adult and juvenile. They also cover a broad range of different types of incident; prisoner-on-prisoner, prisoner-on-staff and fights involving multiple perpetrators. Simple breakdowns of the figures reveal intriguing patterns.

For example, if we breakdown the trend in the number of assaults by the age of youngest prisoner involved in the incident, we see that the level of assaults where the youngest person involved was aged between 18 and 20 years old has remained broadly unchanged at around 3,000 incidents a year over the last 10 years. The number of assaults involving 15 to 17 year olds has fallen by over 50 per cent from its peak in 2009 to 1,479 assault incidents in 2014. This fall in the 15 to 17

year old age group has been driven by the fall in the number of 15 to 17 year olds held in prison custody, and does not present any evidence in itself of this age group becoming less violent.

This exemplifies the challenge of understanding what is driving the increase in assaults in prison — there are multiple drivers, many of which interact with each other. We therefore decided to take a more nuanced approach to our analysis of this problem.

#### **Modelling and Analysis**

The first stage of our analysis involved collecting and collating the ideas and hypotheses of what might be driving the increase in violence in prisons. We spoke to senior managers in headquarters and operational staff from prisons. There was no shortage of ideas and we consolidated these into a map using systems thinking. This kind of approach is used widely in both the public and private sectors to gain a shared view on how a complex system fits together.<sup>1</sup> Its particular strength is its ability to clearly set out the interactions between system drivers and also identify reinforcing loops. The figure below represents a simplified section of our systems thinking work.



1. For example, please see the Munro Review of Child Protection. https://www.gov.uk/government/uploads/system/uploads/attachment\_data/file/175407/TheMunroReview-Part\_one.pdf

The next step for us was to systematically analyse the available data to test the relationships set out. We xdecided to structure our analysis across three tiers:

- □ Incident level When and where are incidents happening? Why do they occur?
- Perpetrator level Who are committing the assaults? Are there common characteristics?
- □ Prison level What factors influence the differing levels of assaults we see across prisons?

#### **Incident** analysis

The most significant source of data on violent incidents is the Incident Reporting Module in Prison NOMIS. Along with numerous fields of categorical data such as the date, time and location of the assault, for each incident prison staff record answers to questions which give more detail to the incidents. For example, 'Where was the assault?' and 'Was there an apparent reason for the assault?'. To investigate this data further, we took an extract from Prison NOMIS of all assaults recorded on the Incident Reporting Module between 1st April 2012 and 30th September 2014.

By crossreferencing the time and location of the violent incidents, we were able to produce a 'heat map' analysis of where and when assaults are most likely to take place. Analysis such as this is not insightful at a national level due to the variation in regimes and prison layouts across the estate. As set out in the section below on the Violence Diagnostic Tool, this kind of analysis is much more useful at an operational level.

Answers to these questions are where the detail lies and are where the real value in the data is, however, unstructured data such as this brings with it major analytical challenges. The data fields are not always mandatory so the guestions may not be completed. For example, the guestion 'Was there an apparent reason for the assault?' was only

answered 28 per cent of the time. The quality of the answers in free text fields is also variable with different prisons using unique styles and terminology.

To start to understand the reasons for the assaults, we applied a textual analysis approach to the data. An extract of all the answers was taken and we manually reviewed the data to identify broad categories of assaults such as prisoner debt or changes to the prisoner's level on the Incentives and Earned Privileges scheme. We then iteratively processed the data and the categorisation was refined as far as possible to end up with exhaustive, homogenous groups. The categorisation used in this analysis is as follows:

- □ Retaliation (Previous assault, theft, outside issues)
- □ Issues with Staff (IEP, resistance to search, dislike for orders/requests)
- **D** Bullying (Sex offenders, racism, informants)
- Recreation (Pool, table tennis, TV, radio, games, sports, gym)
- Debt (Tobacco/nicotine-based products, drugs, money)
- **U**nauthorised Item (Drugs, alcohol, mobile phone)
- **D** Food and Queuing (Canteen issues, certain food not available)
- Gang Related (Reason explicitly states gang or gang-related issues)
- □ Tobacco (Issues relating to tobacco, other than debt, such as access / restrictions)
- Medication (Access / restrictions to medication) such as methadone)

We then designed and implemented an algorithm to categorise the reason of an assault from the free text in the data. The algorithm used sophisticated methods to find key words and phrases in the text and categorised the assault accordingly. The output, shown in Table 1 below, offers novel insights into why assaults happen,

Table 1: An analysis of the apparent reasons given for assaults where recorded.			
Prison Function	Assault Rate per 1000 Prisoners Apr 12-Sep 14 <sup>2</sup>	% of Assaults with a recorded reason on NOMIS	Most Common Reason Category
Juvenile	153	18%	Retaliation
YOI Juvenile	94	14%	Gang Related
YOI	47	17%	Retaliation
YOI Cat C	21	19%	Retaliation
Local Adult Prisons	16	21%	Issues With Staff
Female	12	24%	Issues With Staff
Cat C	10	29%	Debt
Cat B	9	26%	Issues With Staff
IRC	9	49%	Recreation
Cat C Sex Offender	7	22%	Recreation
Cat B Sex Offender	6	34%	Bullying
Open	1	45%	Unauthorised Item

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These figures are taken from NOMS internal management information and may not be consistent with published statistics due to differences in time periods and prison classifications.

although the number of assaults with a reason given is small, so these insights must be taken with caution.

This table shows that retaliation and gangs are the most prevalent reason for assaults in YOI and Juvenile institutions. We also see prisons which have the most assaults have the lowest level of reason recording. IRC and Open prisons have very few assaults whereas YOI juvenile and locals see the most.

As recording of assaults improves this analysis will become stronger and the insights can be used to tackle violence with more confidence. This analysis demonstrates the amount of value that is stored in the free text fields on the Incident Reporting Module, and if we are able to extract that data meaningfully it can assist greatly in forming the violence reduction strategies at both a national and local level.

#### **Perpetrator analysis**

We required a different analytical approach to understand who was committing the violent incidents and their common characteristics. First we matched a dataset consisting of all sentenced prisoners on 30 June 2012, bringing in their criminal histories from the Police National Computer and their most recent assessment from OASys. We then matched in incidents data from the Incident Reporting Module to see which prisoners had been actively involved in violent incidents in the following month.

Using this data set of c. 70,000 prisoners, we were able to build a statistically valid logistic regression model that predicted the outcome that the prisoner was actively involved in a violent incident in the following month. In this case the factors that were predictive of a heightened propensity for prison violence were:

The statistical relationship between an offender's propensity reoffend violently outside of prison with their propensity to commit violence inside prison is exemplified in Chart 1. NOMS has already developed two strong predictors of violent reoffending; the OASys Violence Predictor Version 2 (OVP2) and the violence score of the Offender Group Reconviction Scale (OGRS4V). Where OVP2 could not be scored, OGRS4/V was substituted. The two scores are produced using similar statistical approaches, and the OVP2 is preferred, where available, as it includes a wider range of risk factors and therefore has greater predictive validity. This relationship has the potential to be used operationally — the OVP score (transition from version 1 to 2 is imminent) is available for any offender who receives a full OASys assessment and this could be used to inform the risk management of prisoners in relation to prison violence.

The remaining predictive factors listed above are consistent with the evidence that we were provided by operational colleagues and support the existing guidance. For example, our analysis shows that prisoners are far more likely to be involved in violent incidents if they are either newly received into the establishment or if they have recently been involved in a violent incident, highlighting the need to closely manage these prisoners.

#### **Prison analysis**

Understanding the nature of the problem at an establishment level required a different analytical approach again. We undertook significant work to collate and cleanse a dataset to support this work. We matched data from the Incident Reporting Module with monthly population extracts containing extensive

Factor	Explanatory Notes	
The prisoner's risk of committing a violent offence outside prison	It is logical that the likelihood of violence outside prison indicates the likelihood of a person being violent inside prison	
Number of previous involvements in incidents as a violent party in their current sentence	Prisoners who are repeat offenders of violence are more likely to continue this pattern of behaviour and be involved in further assaults in prison	
The prisoner's current age	Younger offenders have been known to be more violent	
The number of days since the prisoner's previous involvement in an incident or since arrival at the prison	Prisoners can be involved in several incidents in quick succession, this could be due to retaliation for previous assaults.	
Whether the prisoner had ever been involved in an incident as the violent party	The fact that a prisoner has never been a perpetrator of an assault is an indicator that they are less likely to in the future	



details on the characteristics of the population (age, sentence length, ethnicity etc.). This gave us a dataset which detailed the number of assaults, serious assaults and staff assaults which occurred in each prison in each month. It also detailed the population characteristics of that prison in that month. This meant we were able to conduct multiple sets of bivariate analyses to test whether there were statistical correlations.

Through this work we identified numerous statistically valid relationships but we were not clear if it was valid to interpret these relationships as causal. Some variables may be correlated statistically but this does not imply that if the value of one variable increases this causes the value of the second variable to increase. There could be a third variable which is causing both the first and second variables to increase which has not been considered. For example the number of assaults is strongly correlated with the number of serious assaults, however, one does not cause the other to increase but several other variables might impact on the number of assaults and serious assaults.

We therefore decided to test how these variables interact by building a regression model. Our first attempts at this did not work. After some investigation, it became clear that it would not be possible to build a robust predictive model of the levels of violence for all prisons at the same time, as the relationships between some risk factors and assaults appeared to vary between types of establishment. Therefore, cluster analysis was used to identify groups of prisons that are more homogeneous than the usual prison functions described by NOMS. For example, some Category C prisons held substantial numbers of young offenders, while others mostly held prisoners convicted of sexual offences.

The next phase of this analysis is still in progress. It involves several stages within an iterative cycle.

First, we have identified a valid statistical modelling approach. At present, it appears most valid to predict the expected number of assaults in each establishment in each month, based on a number of risk factors/markers, using the Negative Binomial model form. While this type of model predicts the number of events (e.g., assaults) in a given period (e.g., a calendar month), it allows adjustment for the level of exposure to the event, through an offset. The offset in these models was the product of each establishment's population<sup>3</sup> and the number of days in the month: this is, essentially, the number of discrete opportunities for an assault to occur in the establishment during that month. Establishments of different sizes, and months of different lengths, could therefore be compared on an equal basis.

<sup>3.</sup> Population was calculated as an estimate of the average population during the month based on two end-of-month totals. For example, an establishment's May 2013 population estimate was the mean of its populations on 30 April 2013 and 31 May 2013.

The second stage is for us to customize the analytical approach. In developmental work on local prisons looking at the relationship between the level of assaults and the population profile in terms of age and index offence, we recognised that the subtle gradations of offender age, and large number of offence classes, found in established recidivism predictors such as OGRS3<sup>4</sup>, are not appropriate for this topic. The most recent preliminary models achieve more interpretable results using simpler age and offence classifications.

Third, an iterative element requires preliminary results to be considered, and additional predictive factors to be introduced, which may require further data processing and in depth analysis. For example, after an early round of local prison modelling, we introduced a factor to deal with variation in the months' ratios of weekdays to weekends and public holidays, as the latter offer prisoners less time out of cell and therefore are associated with lower overall assault rates. At the time of writing, we are working to code and structure data that will adequately summarise variations in staffing profiles, experience and management structure, to ensure that any association between staffing and assault is properly described.

We are continuing this analytical work and will feed the results into the Violence Reduction project when it is completed and they have been independently quality assured.

#### Violence Diagnostic Tool

Using the understanding gathered from all three strands of our analysis we were able to develop a new management information report in the form of a dashboard which visually presents an analysis of the assaults in each prison. The tool is for use in both prisons and headquarters to help staff understand and manage prison violence. The tool is intended to be visually engaging and easy to interpret.

We brigade the analysis under six categories. Each category encourages the user to ask their own questions of the data and should allow them to focus their energy on the key areas, times or people in their prison where the violence is most prevalent.

- What We present the total number of assaults on prisoners, assaults on staff, serious assaults on prisoners and serious assaults on staff as well as a rate per 1000 prisoners.
- Why We use the analysis from the text mining process to display the reasons for assaults. These include, debt, alcohol, drugs, bullying, retaliation, issues with staff, unauthorised item. We also include the number of unexplained injuries here as this has long been an indicator of levels of violence as unexplained injuries are often assaults

where the prisoner doesn't want to report the perpetrator.

- When We use data on the time of assaults to portray 3 charts
  - By hour Shows the number of assaults that occur in each hour of the day
  - By day Shows the number of assaults that occur each day of the week
  - By month Shows the number of assaults that occur in each month of the year

This shows interesting national trends as well as trends specific to individual prisons

- Where Here we use the text mining work to portray the number of assaults in each area of the prison. We have also combined this analysis with the time of the assaults to produce a heat map which indicates which areas and at what time are the peak times for assaults.
- □ Who Using prison population data we show the percentage of the population on a basic regime and the percentage of the population with a violent or robbery offence. We also use data on the perpetrators of assaults to show the percentage of perpetrators who were in their first 30 days of sentence and the number of repeat offenders.
- Recording We present the number of assaults recorded on IRS within 3 days, the number of assaults which have an apparent reason and the number of assaults where the location is given. We will also show the prisons data quality audit score when it is introduced.

During the process of putting together this product we consulted widely with operational colleagues to ensure that we were presenting the data as coherently and as helpfully as possible. We are still in the process of updating the tool and are incorporating several additional pieces of functionality into the tool after feedback from staff. This includes;

- Extracting wing level data using text analysis to improve the Where section of the tool
- **G** Splitting the data by prison function
- □ Looking at additional population characteristics such as age.

The objective of the tool is to get prison staff asking the right questions rather than giving all the answers. We are clear that central analysis is limited in its capacity to explain the levels of violence in individual prisons. The onus is therefore on prison managers and their staff to bring together centrally produced management information, such as the Violence Diagnostic Tool, with their own local analysis and operational experience to give a full picture of the violence in their prison.

<sup>4.</sup> Howard, P., Francis, B., Soothill, K. and Humphreys, L. (2009) OGRS 3: the revised offender group reconviction scale. Ministry of Justice Research Summary, 7/09.