Prison Population Projections 2015 – 2021 England and Wales

Ministry of Justice Statistics Bulletin

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Contents

Introduction

This bulletin presents prison population projections for England and Wales from November 2015 to March 2021. It is produced to aid policy development, capacity planning and resource allocation within the Criminal Justice System (CJS) and the National Offender Management Service (NOMS). The latest published useable operational capacity (20 November 2015) is 87,730[1].

The projection is produced using a model of flows of offenders into and out of prison which counts the resulting prison population each month. It is based on assumptions about future custodial convictions and incorporates the anticipated impacts of agreed policy and procedural initiatives. It does not, however, attempt to estimate the impact of any future Government policy that is yet to achieve Royal Assent, and therefore becomes less certain over time.

Following consultation earlier this year, there have been some changes to the content of this publication. The high and low population scenarios have been removed and replaced with a fan chart based on how previous published projections performed against actuals. Projections of the over 50 and over 60 year old prison population have also been provided for the first time. These changes are currently marked as experimental statistics.

For further information on:

- Criminal Court Statistics visit:
  www.gov.uk/government/statistics/criminal-court-statistics-quarterly-april-to-june-2015

- Criminal Justice Statistics visit:
  www.gov.uk/government/statistics/criminal-justice-system-statistics-quarterly-june-2015

- Offender Management Statistics visit:
  www.gov.uk/government/statistics/offender-management-statistics-quarterly-april-to-june-2015

- The Story of the Prison Population 1993-2012 visit:
  www.gov.uk/government/uploads/system/uploads/attachment_data/file/218185/story-prison-population.pdf

The next edition of the Annual Prison Population Projections will be published on **Thursday 25th August 2016 9:30am**.

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[1] Source: Weekly population figures www.gov.uk/government/statistics/prison-population-figures-2015

Key Findings

In the 2015 projection the prison population in England and Wales is estimated to increase from the current position[2] of 85,977 to 86,700 by June 2016. By March 2021 (the end of the projection period) it is projected to be 89,900. The projected prison population under the 2015 projection is shown in Chart 1.

The prison population projections are produced using a model of flows of offenders into and out of prison which counts the resulting prison population each month. Additional policy measures which have achieved Royal Assent and which are expected to have an impact on the future prison population are incorporated into the projection.

The 2015 projection has been modelled assuming custodial convictions are broadly in line with recent trends. Assumptions related to the projection are based on consultation with policy and operational experts at the Ministry of Justice and the National Offender Management Service (NOMS).

Chart 1: Projected total prison population
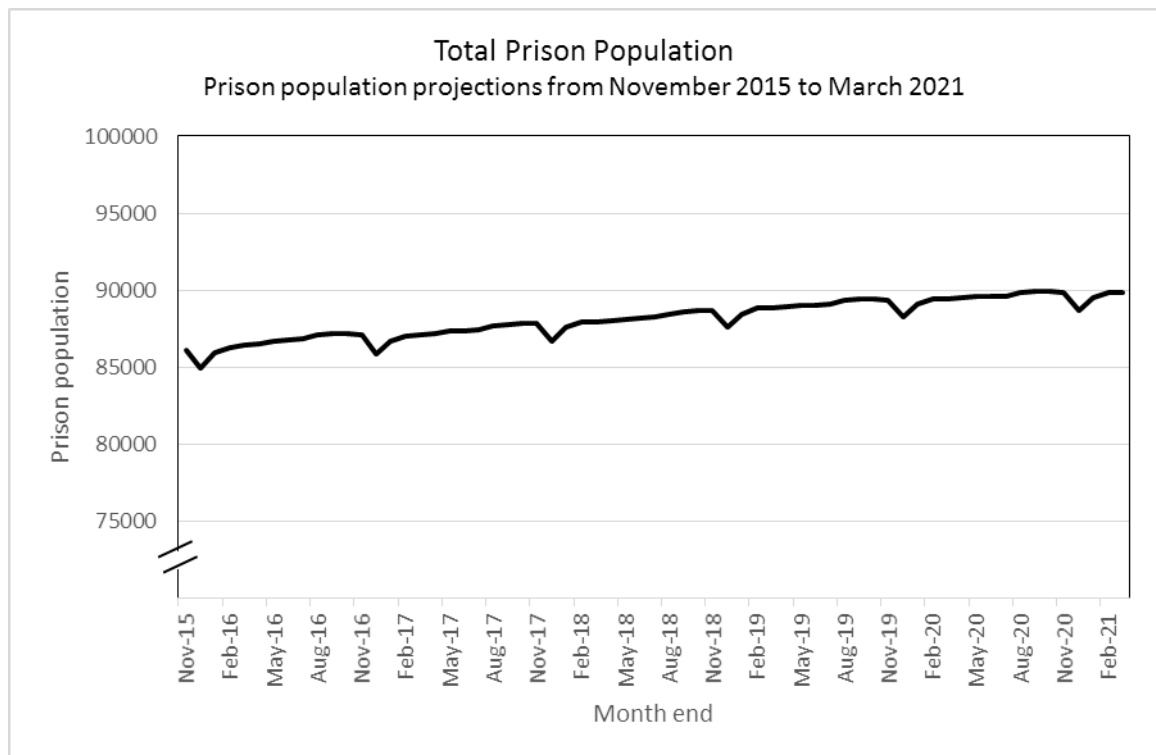
The projected increase to the prison population is largely due to recent trends in offender case mix, where we have seen more serious cases (e.g. sexual offences) come before the courts. This results in offenders receiving longer custodial sentence lengths, which in turn places an upward pressure on the prison population.

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[2] Measured on Friday 20th November 2015

For the first time projections are being published for the over 50 and over 60 year old prison populations. These are presented here as experimental statistics. Both over 50 and over 60 populations are projected to rise in absolute terms and as increasing proportions of the total population. This is because projected shifts to a more serious case mix (e.g. sexual offences) have a larger impact on these age-groups than on the general prison population.

The projections in this publication are subject to significant uncertainty, so the actual future prison population may not match the published projection.

Further statistics and commentary on the changes seen in Court proceedings and sentencing over the last year is presented in the Criminal Justice System Statistics Quarterly publication. This is available online on GOV.UK at: www.gov.uk/government/collections/criminal-justice-statistics-quarterly

Further statistics and commentary on the changes in the prison population can be found in the Offender Management Statistics Quarterly publication. This is available online on GOV.UK at: www.gov.uk/government/collections/offender-management-statistics-quarterly

1. The 2015 Projection

The prison population is estimated to rise from 85,977 (at 20 November 2015) to 86,700 by the end of June 2016 and to 89,900 by the end of the financial year 2020/21. Chart 1 above presents the prison population projection from November 2015 to March 2021.

The projected trends in the population reflect the cumulative impacts of the various sentencing, legislative and procedural assumptions that are used to generate the projections. The seasonal pattern reflects the dip in the prison population which is always seen around the Christmas period.

Appendix A contains tables for projected end of June populations[3], average financial year populations and total monthly populations for the projections along with detailed breakdown of the projections for specific sub-populations.

The projected increase to the prison population is largely due to recent and expected future trends in offender case mix, resulting in more serious cases coming before the courts. This results in offenders receiving longer custodial sentence lengths, which in turn places an upward pressure on the prison population. Further pressure is expected through the impact of agreed future policies, which are outlined in more detail below.

The result of this is concentrated in a projected rise in the determinate sentenced population which is projected to grow from a current level of 54,500[4] to 59,400 by June 2020.

This projected increase in the determinate sentenced population is further concentrated in the population of offenders serving sentences of four years or more. A large part of this increase is attributable to the growing population sentenced to extended determinate sentence (EDS), again driven by an increased number of offenders sentenced for more serious offences (e.g. sexual offences).

Further projected growth in the prison population is a result of the expected impact of a range of policies already in effect, or expected to come into effect, over the projection horizon. The projections take into account the impact of government policies which have achieved Royal Assent. These include:

- The impacts of the Offender Rehabilitation Act 2014 which achieved Royal Assent on 13 March 2014, meaning offenders sentenced to custodial sentences of less than 12 months will be released subject to licence with resulting likelihood of recall to custody. There will also be a new post-sentence supervision period following licence for offenders released from custodial sentences of less than 2 years;

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[3] June is chosen as it is a month relatively free from seasonal effects and therefore provides a robust measure of the prison population for comparison
[4] Measured 30th September 2015

- The impacts of the Release on Temporary Licence (ROTL) review deciding that all offenders who have previously absconded will no longer be allowed to return to the open estate or be released on temporary licence except in exceptional circumstances;

- The impacts of the Criminal Justice and Courts Act 2015 which includes provision for minimum custodial sentences for a second offence of possession of a blade or offensive weapon[5];

- The impacts of the Serious Crime Act 2015 which includes provision for custodial sentences relating to controlling or coercive behaviour in an intimate or family relationship[6];

- The impacts of the Prisoner Transfer Framework Decision which means that the UK can utilise the Prisoner Transfer Framework Decision to transfer to and receive prisoners from other EU member states[7].

Further details and commentary on the latest prison population can be found in the Offender Management Statistics publication:
www.gov.uk/government/collections/offender-management-statistics-quarterly

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[5] www.legislation.gov.uk/ukpga/2015/2/part/1/crossheading/repeat-offences-involving-offensive-weapons-etc
[6] www.legislation.gov.uk/ukpga/2015/9/section/76/enacted
[7]www.gov.uk/government/uploads/system/uploads/attachment_data/file/326699/41670_Cm_8897_Print_Ready.pdf

2. Comparison to previous projection

At the end of September 2015 the prison population was within 3.2 % of the 2014 Central Scenario, and within 1.7% of the (lower) Scenario 1 projection and 4.7% of the (higher) Scenario 2 projection. A comparison of the 2014 projections against actuals to date and the latest projection are presented in Chart 2.

The 2015 projection reflects lower growth in the population than anticipated over the last 12 months. This lower growth was due to a mix of factors, including lower than expected numbers of offenders sentenced to custody, a falling remand population[8] and reduction in the number of offenders being held in Immigration Removal Centres (IRCs) following the decommissioning of the IRCs operated by NOMS at Haslar and Dover.

Chart 2: Comparing 2014 and 2015 projections (November 2014 – March 2021)
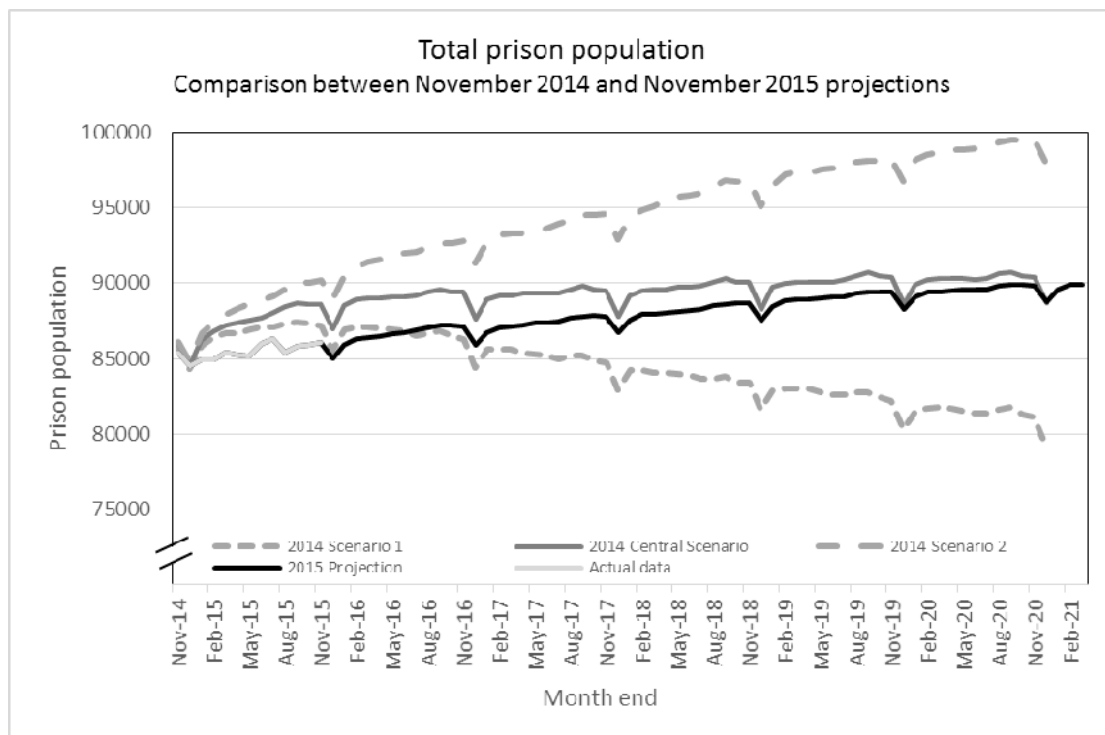
Compared to the 2014 Central Scenario projection the 2015 projection continues to project a rise in the population to the end of December 2020 but from the lower, current position. This higher rate of population growth is due to a more serious offence mix – with associated longer sentences – being projected.

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[8]Commentary on shifts in the remand population is included in the quarterly Offender Management Statistics publication www.gov.uk/government/collections/offender-management-statistics-quarterly

3. Experimental statistics

Uncertainty in the projection

Following user consultation[9] the higher and lower scenarios presented in previous publications have been removed from this bulletin. These have been replaced with an alternative measure of uncertainty in the projection. The fan chart presented in Chart 3 is based on comparing how previous projections performed against actuals over time.

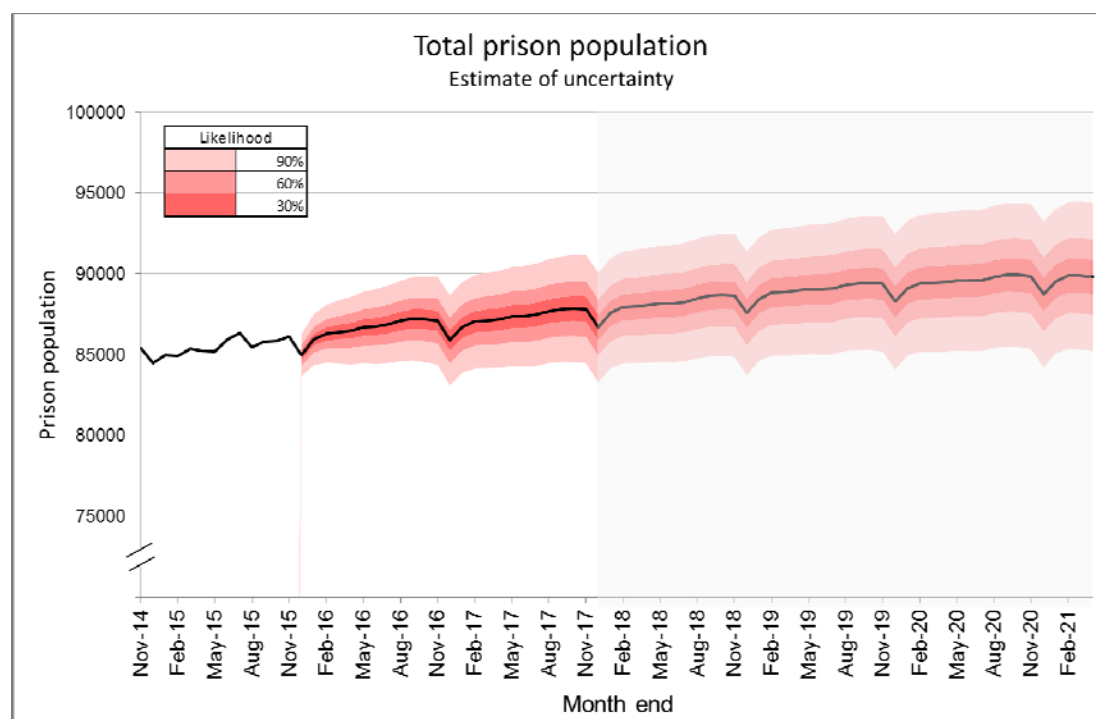## Chart 3: Uncertainty in 2015 projection

Chart 3 shows the 2015 projection as a solid line. This can be interpreted as the single most likely population projection, given the agreed set of assumptions. Around the projection are three bands, indicating the range of expected populations with estimated 30%, 60% and 90% likelihoods. For all bands the width increases over time, as the level of uncertainty increases with time after the date of projection.

This interpretation is conditional on the assumption that there are no significant differences between the methodology and conditions under which the previous projections were made and the methodology and conditions under which the current projection has been generated.

These bands are included as an experimental statistic. The methodology for calculating the fan chart is set out in Annex B of this publication. Users are invited

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[9] www.gov.uk/government/uploads/system/uploads/attachment_data/file/472329/consultation-response.pdf

to comment on the new methodology and presentation of projection uncertainty in Chart 3. Contact details can be found at the end of this publication.

Projection of over 50 and 60 year old population

Following user consultation[10] this bulletin includes for the first time breakdowns of the over 50 and over 60 year old prison population projection.

The over 50 year old population is projected to grow from 11,980 as at 30 June 2015[11], to 15,100 by the end of June 2020. The over 60 year old population is projected to grow from 4,109 to 5,500 over the same time period.

Both over 50 and over 60 populations are projected to rise in absolute terms and as increasing proportions of the total population. This is because projected shifts to a more serious case mix (e.g. sexual offences) have a larger impact on these age-groups than on the general prison population.

These projections of specific age-band populations are included as an experimental statistic. Users are invited to comment on the presentation of these projections. Contact details can be found at the end of this publication.

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[10]

www.gov.uk/government/uploads/system/uploads/attachment_data/file/472329/consultation-response.pdf
[11] Table 1.5 Offender Management Statistics Quarterly :
www.gov.uk/government/statistics/offender-management-statistics-quarterly-april-to-june-2015

4. Modelling Methodology

The prison projections model is part of wider work within the Ministry of Justice to develop a consistent and coherent suite of models of the criminal courts and offender management, driven by common projections of demand for the Ministry of Justice's services. Two key components of this suite are used to develop these projections, a custodial convictions model and a prison population projection model.

The custodial convictions model is driven by projections of numbers of defendants entering the criminal courts. In order to project volumes of defendants being given a custodial sentence, it also takes into account:

- the age, gender and offence of defendants entering the system;

- resources required to process cases through the courts; and

- the sentences which concluded cases attract.

The prison population projections model takes projections of custodial convictions, converts them to projections of prison receptions and then models the amount of time that offenders spend in prison to calculate the resulting prison population. The model also simulates the ageing of the prison population over time.

The benefits of this method are that it allows us to:

- explicitly project custodial convictions (rather than just convictions);

- understand the Criminal Justice System factors which contribute to change in the prison population, such as time served, sentences given, trial and sentencing court changes or shifts in defendant demographics; and

- more easily model the impact on the prison population of specific Ministry of Justice and other Criminal Justice Agency policy changes relating to specific offences or specific sentences.

The assumptions informing these projections, and therefore the projections themselves, are subject to significant uncertainty. The level of uncertainty of the projections is presented in Chart 3 above and outlined in Annex B.

The projection model is based on latest available data from various sources including court proceedings and performance data, sentencing data and prison receptions and population data.

The method used for generating projections of the prison population in England and Wales for the 2015-2021 projections is consistent with the approach used to generate the 2014-2020 projections published on 27 November 2014.

Appendix C provides further details of the methods used to produce the prison population projections and the assumptions behind them.

5. Caveats on Prison Population Projections

The projections presented reflect the impact of trends in sentencing, combined with trends in the age, gender and offence of defendants entering the system and in the flow of defendants through the courts. The impacts of publically announced changes to legislation and guidance which took place before November 2015 and views of future parole hearing frequency and outcomes for indeterminate sentence prisoners have also been taken into account.

The projections do not reflect the impact of legislative, policy, operational or procedural change or guidance for which there is no definite timetable for implementation. The projections therefore provide a "baseline" against which the impacts of future changes can be assessed.

Even without these possible changes, the actual future prison population may not match the projection. Changes to criminal justice processes could influence the numbers of offenders being brought to the point of sentence or the way that offenders are managed. Changes to sentencing behaviour may also be different from those modelled. Finally, both sentencing behaviour and criminal justice processes, as well as policy decisions, can respond to a multitude of environmental factors which cannot be anticipated, such as high profile criminal cases, events like the August 2011 public disorder events, and public debate.

Assumptions for modelling were captured through consultation with policy and operational experts at the Ministry of Justice and the National Offender Management Service. The assumptions are based on analysis (where reliable data are available) and on expert judgement from policy makers, key deliverers and system influencers. The assumptions are therefore likely to be more robust for those measures and processes that have a well-defined boundary than for those that do not.

Appendix A: Additional tables[12]

Table A1: Projected prison population (end of June figures)

	Total	Determinate	Indeterminate	Remand	Recall	Non-Criminal	Fine
Jun-16	86,700	55,400	11,500	11,500	6,700	1,500	100
Jun-17	87,400	56,300	11,000	11,600	6,800	1,500	100
Jun-18	88,200	57,400	10,600	11,700	6,900	1,500	100
Jun-19	89,000	58,600	10,200	11,700	7,000	1,500	100
Jun-20	89,600	59,400	9,800	11,700	7,100	1,500	100

Table A2: Average projected prison population (financial year figures)

	Total
2016/17	86,800
2017/18	87,600
2018/19	88,400
2019/20	89,200
2020/21	89,600

Table A3: Comparison of 2014 Central Scenario projection and 2015 projection (end of June figures)

	2014	2015	Difference
Jun-15	87,700	--	--
Jun-16	89,100	86,700	-2.6%
Jun-17	89,300	87,400	-2.1%
Jun-18	89,700	88,200	-1.8%
Jun-19	90,100	89,000	-1.2%
Jun-20	90,200	89,600	-0.7%

Table A4: Juvenile, young adult and adult populations by gender (end of June figures)

	Male			Female		
	15-17	18-20	21+	15-17[13]	18-20	21+
Jun-16	700	4,800	77,400	0	200	3,700
Jun-17	700	4,700	78,000	0	200	3,700
Jun-18	700	4,800	78,800	0	200	3,700
Jun-19	700	4,800	79,600	0	100	3,800
Jun-20	700	4,800	80,100	0	100	3,800

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[12] All figures are rounded to the nearest hundred. Sub-populations may not sum to total populations due to rounding and due to overlaps in some sub-population categories.
[13] The prison population projections cover offenders held in National Offender Management Service (NOMS) estate. Currently this includes a number of juvenile males in the 15-17 age group, but no females. We do not project any female juveniles to enter the prison population.

Table A5: Projected male 21 years and over prison population (end of June figures)

	Males 21 years and over						
	Total	Determinate	Indeterminate	Remand	Recall	Non- Criminal	Fine
Jun-16	77,400	49,200	11,000	9,600	6,100	1,400	100
Jun-17	78,000	50,100	10,500	9,700	6,200	1,400	100
Jun-18	78,800	51,100	10,100	9,700	6,300	1,400	100
Jun-19	79,600	52,300	9,700	9,700	6,400	1,400	100
Jun-20	80,100	53,000	9,400	9,700	6,500	1,400	100

Table A6: Projected over 50 year old and over 60 year old prison population (end of June figures)

	Over 50 year old	Over 60 year old
Jun-16	12,500	4,400
Jun-17	13,300	4,800
Jun-18	14,000	5,000
Jun-19	14,600	5,300
Jun-20	15,100	5,500

Table A7: Monthly values of the overall projected prison population (end of month figures)

	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
April	-	86,500	87,200	88,100	88,900	89,500
May	-	86,700	87,400	88,100	89,000	89,600
June	-	86,700	87,400	88,200	89,000	89,600
July	-	86,900	87,500	88,200	89,100	89,600
August	-	87,100	87,700	88,500	89,300	89,800
September	-	87,200	87,800	88,600	89,400	89,900
October	-	87,200	87,800	88,700	89,400	89,900
November	86,100	87,100	87,800	88,700	89,400	89,800
December	85,000	85,900	86,700	87,600	88,300	88,700
January	85,900	86,700	87,600	88,400	89,100	89,500
February	86,300	87,000	87,900	88,800	89,400	89,900
March	86,400	87,100	88,000	88,900	89,400	89,900

Appendix B: Method for calculating projection uncertainty

As with any projection, there is uncertainty in the projection of the prison population, arising from several sources, including uncertainty in model parameters as well as future changes in behaviour or policy that are uncertain or unexpected at the time of projection.

In previous publications, this uncertainty has been communicated using illustrative scenarios based on hypothetical trends in custodial convictions and sentence lengths. While the scenarios were useful to illustrate how changes in certain parameters can affect the population, they did not represent insights into the likelihood of any particular outcome.

For this publication, the performance of previous published projections against the actual population has been analysed and used to estimate the uncertainty in the prison population. The results are displayed as a fan chart, a commonly-used method of communicating uncertainty in a time series projection.

Projections of the total prison population have been published annually since 2008. There are therefore 7 projections with one year of actual population to compare against, 6 projections with two years to compare against and so on. While this is a rather small data set, estimates of the uncertainty in the population projection can still be made. The fan chart should be considered an estimate of the expected levels of uncertainty, informed by past performance, rather than a precise set of limits on the population.

Fan chart and interpretation

Chart 3 shows the prison population projection as a solid line. This can be interpreted as the single most likely population, given the agreed set of assumptions. Around the projection are three bands, indicating the range of populations with estimated 30%, 60% and 90% likelihoods. The interpretation is that, assuming no significant differences between the conditions under which the previous projections were made and the conditions under which the current projection has been made, there is a 30% likelihood that the population will stay within the inner band, a 60% likelihood that the population will stay within the second band and a 90% likelihood that the population will stay within the outer band. The shaded portion of the chart indicates the period more than 2 years after the time of projection. This is shaded to indicate that estimates of uncertainty for this time are based on extrapolation, not measurement of performance, as explained below.

Technical details

A normal distribution has been used for this initial calculation for simplicity and ease of reproduction. As more published projections become available in future, it may be possible to further refine the characterisation of uncertainty (for example assessing whether a skewed two-piece normal distribution is more appropriate).

A normal distribution is characterised by a mean and a standard deviation. For this fan chart, the mean is assumed to be the prison population projection. The standard deviation at each time point is calculated in the following way:

1. Calculate the percentage difference between the projected and actual populations for each time interval (i.e. difference one month after forecast, two months after forecast etc.), up to two years after the forecast date

2. Calculate the standard deviation of the percentage differences for each time interval

3. Fit a power law to the standard deviation as a function of time (i.e. a function of the form $y = ax^b$, where y is the standard deviation and x is the time after projection)

4. Use this function to produce estimates of the standard deviation of errors at each time interval up to the end of the projection period

Appendix C: Detail of Models and Assumptions

The modelling approach

The prison projections form part of the Ministry of Justice's wider work to develop a consistent and coherent suite of models of the criminal courts and offender management, driven by common projections of demand for the Ministry of Justice's services.

The prisons model used to generate the 2015 projections has not changed substantially from that used in the 2014 projections. As in the 2014 projections, custodial sentence lengths used in the model are disaggregated by gender, age of the offender and offence type. The total time to be served in prison by projected future prisoners is assigned by matching their gender and age characteristics to relevant distributions of (i) custodial sentence lengths and (ii) the percentage of custodial sentence served. These distributions are derived from latest available data. This allows us to:

- understand the Criminal Justice System factors which contribute to change in the prison population, including sentence lengths issued, the percentage of sentence served in custody, trial court and sentencing court changes, or shifts in the demographic characteristics of defendants;

- model the impact on the prison population of specific Ministry of Justice and other Criminal Justice Agency policy changes; and

- quantify the impact of uncertainty around the time a defendant serves in prison on the prison population.

Overview of the modelling approach

Central to the modelling approach is the Prison Population Stock-Flow model. Projections of future custodial convictions are fed into this model and outputs are adjusted to account for the impact of changes in legislation and process on the prison population, as shown in Figure C1, and described below.

1) Producing projections of defendants proceeded against

Projections of defendants proceeded against at court are chosen as the entry point to the modelling system because this is the entry point of defendants into the MoJ's area of responsibility. Underlying crime levels and the activities of the police and CPS will have an impact on the volume of defendants proceeded against.

Figure C1: Key Components of the prisons projections modelling system
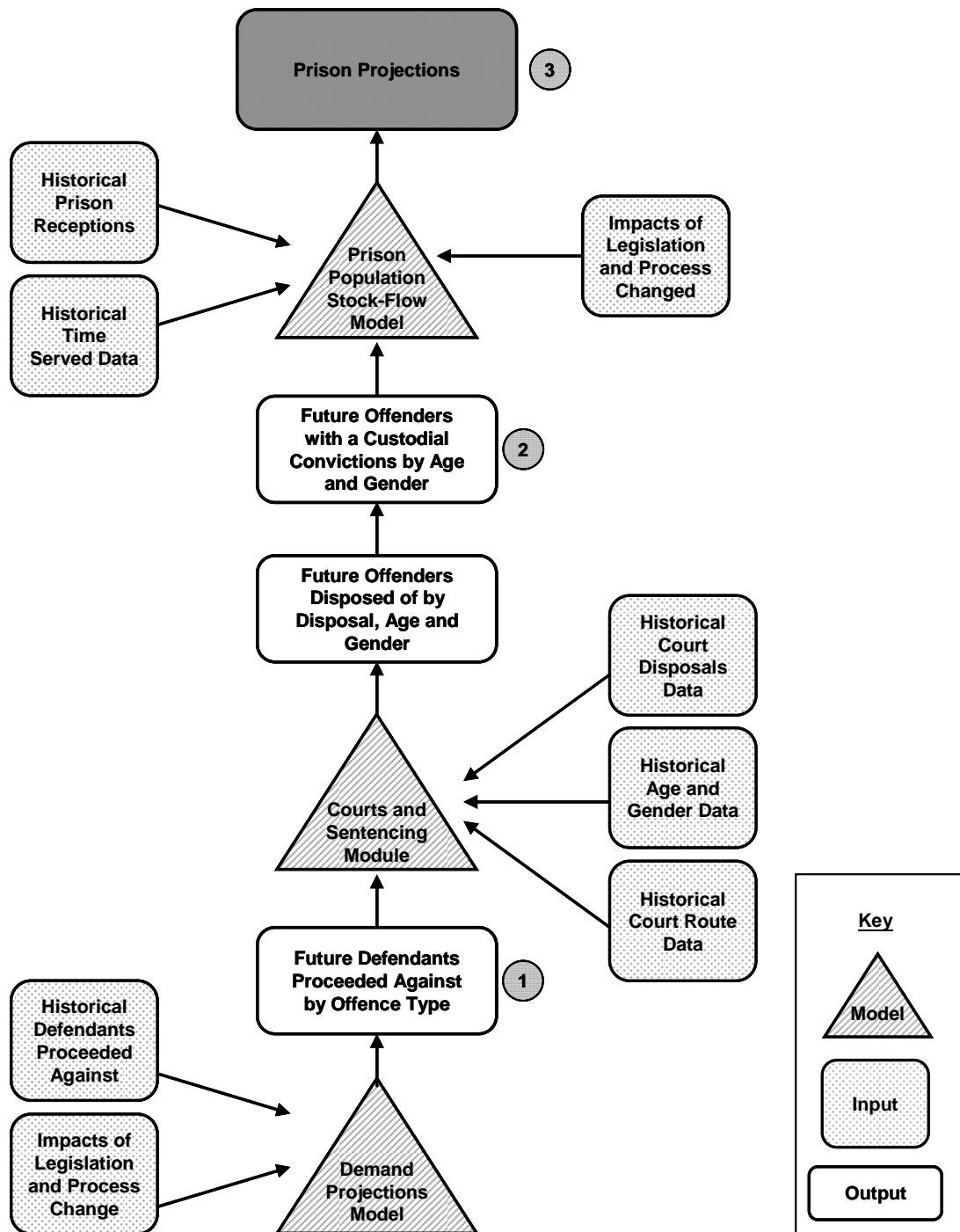
The Demand Projections Model produces baseline projections of all defendants proceeded against at court for 12 high-level offence categories. This is based on historical time series data at a monthly resolution out to March 2021, sub-divided by region and age for the Magistrates' court and region for the Crown Court.

The demand projections are based on time series forecasting methods such as Seasonal Exponential Smoothing (SES).

It should be noted that these projections cannot be expected to track actual volumes of defendants proceeded against if there is any sudden or cumulative change which takes demand volumes or offence mix well outside the trends seen historically.

2) Converting the demand projections into custodial convictions

A Courts and Sentencing Module converts the demand projections into a set of projections of disposals by disposal type (including custodial convictions), offence, sex and age band at a monthly resolution. These projections of custodial convictions by sex, age and offence type are used as a key input for the Prison Population Stock-Flow model.

The Courts and Sentencing Module is a combination of the Magistrates' and Crown Court Workload Models and the Sentencing Module. The demand projections are used as an input into a Magistrates' Workload Model, which uses historical data to split defendants into court routes (Table C1) and tracks their flow through the system.

The Crown Court workload model takes forecasts of caseload and assigns various attributes (e.g. early guilty plea, effective trial mix) to estimate likely hearing times and the resulting flow of cases through the system. The cases disposed of are then converted to the number of defendants disposed of using recent data for the observed ratio between cases and defendants.

The key assumptions that are used in the Courts and Sentencing Module are:

- that there is no prioritisation of any age or sex group within the Magistrates' and Crown Court;

- the number of working days in each month is the primary driver of seasonality within the Magistrates' and Crown Court;

- no change in offence type occurs as cases move through the system;

- defendants that are tried at the Magistrates' Court proceed to sentencing without delay;

- delays within the Magistrates' Court are not significant for the monthly timescales used in the modelling; and

- a Magistrates' Court backlog will not develop during the forecast period.

The Sentencing Module takes the number of defendants disposed of in the Magistrates' Workload Model and the Crown Court Workload Model and applies sentencing splits based on analysis of court proceedings data. This results in a set of projections as broken down in Table C1. These are aggregated providing forecasts for each offence, gender, age and disposal category, which are used as the custodial conviction projections.

Table C1: Courts and Sentencing Module Splits Dimensions

| Offence Type	Gender	Age Band	Court Route	Disposal
Burglary	Male	Age 10-17	MC	Discharge
Criminal Damage	Female	Age 18-20	MCCC	Fine
Fraud and Forgery		Age 21+	CC	Community Sentence
Indictable Motoring				Suspended Sentence
Other				Custodial <6 months
Robbery				Custodial 6 months - <1year
Sexual Offences				Custodial 1year - 4 year
Summary Motoring				Custodial 4 year+
Summary Non-Motoring				Indeterminate
Theft and handling				Otherwise Dealt With
Violence Against the Person				

Key to the court route splits: MC: those tried and sentenced in the Magistrates Court; MCCC: those who are tried in the Magistrates Court and Sentenced in the Crown Court; CC: combines those defendants who are committed for trial in the Crown Court and sent for trial in the Crown Court into a single category.

If required, the Courts and Sentencing Module allows trends in offender demographics and courts and sentencing processes to be incorporated into custodial convictions projections. This procedure was implemented to create the custodial convictions projections used in this projection.

3a) Producing prison population projections

Prison population projections are produced using the Prison Population Stock-Flow Model. The principal sub-populations in prison – determinate sentence, life sentence, imprisonment for public protection (IPP) and remand – are modelled using stock-flow structures based on the generic structure shown in Figure C2. The stock-flow structures model the flow of offenders into and out of prison and count the resulting prison population at the end of each month.

Figure C2: Generic stock-flow structure in the Prison Population Stock-Flow Model
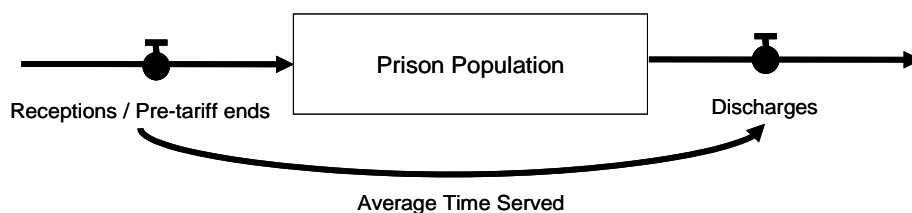
For the determinate population, the monthly inflows to prison are based on the custodial convictions projections described above. These custodial convictions include offenders that may already be serving a sentence for a previous crime or those who would serve their whole custodial sentence on remand, meaning that they would not be a new reception to prison. To convert from custodial convictions to prison receptions we apply a conversion ratio derived from the historical proportions of custodial convictions to prison receptions for each sub-population averaged over the last twelve months of historical data.

Monthly outflows for the determinate population are based on observed custodial sentence lengths and the observed percentage of sentence length served. Each projected offender that enters the model is given a custodial sentence length that is randomly selected from the relevant distribution. These distributions are populated with custodial sentence lengths from actual offender receptions who share the same characteristics of offence, gender and age group in the observed time period. The percent of custodial sentence length served is derived in the same manner, except that the observed distribution is made up of discharged offenders further disaggregated by custodial sentence length band.

For offenders who receive the new EDS sentence an adjustment is made to the percent of custodial length served to reflect that these offenders will spend a greater proportion of their sentence in custody than standard determinate sentenced offenders discharged to date.

Projected prison receptions are sub-divided by age category (Juvenile, Young Adult, Adult) with the exact age of the offender attributed in the same manner as the custodial sentence lengths. This allows the model to explicitly age the offenders whilst in prison (e.g. move from Juvenile to Young Adult categories).

The approach for the other sub-populations is similar and has not been substantially revised since the 2014 publication. The methodology applied to each is briefly outlined below.

The remand and recall populations are projected going forward based on latest available time-series data and take into account population growth relating to related populations (e.g. recalls relating to numbers of offenders released).

IPP and life sentence prisoners have an extra section in the stock-flow structure which models the indeterminate nature of their sentence lengths. Outflows for IPP and life sentence prisoners depend on the tariff lengths they receive and on the frequency and outcome of Parole Board hearings. The values of these parameters are set and calibrated to reflect the most recent data on Parole Board outcomes.

The population in prison at the end of each modelled month is aggregated into the categories defined by gender, current age group and, for determinate sentence prisoners, sentence length band, to produce raw, unadjusted prison population projections.

3b) Accounting for the impacts of circumstance, legislation, and for seasonal effects

The raw, unadjusted prison population projections are subject to model adjustments to show the impact of certain provisions in the Offender Rehabilitation Act 2014, the ROTL review, the Criminal Justice and Courts Act 2015, the Serious Crime Act 2015 and the EU Prisoner Transfer Framework Decision. Model adjustments are also used to account for seasonal variation in the population.

Custodial conviction projections for each sub-population were smoothed using a centred 12 month average. No seasonality in prison receptions and discharges was modelled explicitly. Seasonality was measured in the historical prison population and applied as a series of percentage adjustments to the final population projections. Seasonal factors for a set of sub-population categories (Remand, Determinate by sentence length band and Recall) were identified for each month by measuring statistically significant deviations from a centred 12 month average.

Contact Points for Further Information

Current and previous editions of this publication are available for download from
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