



Ministry of  
**JUSTICE**



# **Prison Population Projections 2011 – 2017 England and Wales**

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## Key points

This bulletin presents projections of the prison population in England and Wales from April 2011 to December 2017. The prison population projections are based on assumptions about future custodial convictions and incorporate the anticipated impacts of selected policy and procedural initiatives. In addition, the impact of the public disorder seen in England and Wales in August 2011 on the prison population has been estimated.

The prison population projections are produced using a simple model of flows of offenders into and out of prison which counts the resulting prison population each month. As part of ongoing work to improve modelling and forecasting across the Ministry of Justice, the method used to generate the custodial convictions projections which feed this model has been revised and updated.

Three projected scenarios have been modelled. These “lower”, “medium” and “higher” scenarios, track the impact of three different sentencing trends on custodial convictions and hence on the resulting prison population. They correspond to (though do not use the same assumptions as) the “decreasing sentencing”, “no change” and “increasing sentencing” scenarios used in the 2010 projections. Other impacts included in the projections, such as those of the August 2011 public disorder events, changing legislation, changing procedures and new sentencing guidelines are applied equally to all three scenarios.

The projected prison populations, under each scenario, are given in Table 1. By the end of June 2017, the prison population is projected to be 83,100 on the lower projection, 88,900 on the medium projection and 94,800 on the higher projection.

**Table 1: Projected prison population (end June Figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	84,200	85,200	86,200
Jun-12	84,600	86,900	89,300
Jun-13	83,300	86,900	90,500
Jun-14	82,800	87,500	92,200
Jun-15	82,600	88,000	93,400
Jun-16	82,800	88,500	94,100
Jun-17	83,100	88,900	94,800

These projections take no account of any impacts which might result from the impacts of the Legal Aid, Sentencing and Punishment of Offenders Bill which is currently passing through Parliament<sup>1</sup>. As such these projections provide a

<sup>1</sup> [www.justice.gov.uk/publications/bills-and-acts/bills/legal-aid-and-sentencing-bill.htm](http://www.justice.gov.uk/publications/bills-and-acts/bills/legal-aid-and-sentencing-bill.htm)

set of “baseline” scenarios against which the impacts of future changes can be assessed.

The assumptions informing these projections, and therefore the projections themselves, are subject to uncertainty. This is represented by the three scenarios, with each scenario being only as likely as the assumptions which inform it. Indeed, from 2011 to 2015, this year’s central (medium) projection is lower than the central projection created in 2010 largely because observed growth in all sectors of the prison population was lower than projected on the 2010 “no change” projection.

The assumptions used are based on extensive consultation (see Appendix D for a list of those consulted), and emerging data which describe them are being monitored. A comparison between projected and actual prison population for the last two quarters is given, but this publication does not anticipate which of the modelled scenarios is most likely to occur in the future.

## 1. Introduction

This bulletin presents prison population projections for England and Wales from April 2011 to December 2017. The projections are produced to aid 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 (21<sup>st</sup> October 2011) is 89,217<sup>2</sup>.

Three projections of the prison population have been agreed through a consultative process. These projections track the impact of three different trends in sentencing on custodial convictions and hence on the resulting prison population. These scenarios also take into account drivers which impact equally on each scenario:

- trends in the age and gender of defendants entering the system and in the flow of cases through the courts;
- views of future parole hearing frequency and expected outcomes for indeterminate (Life and Indeterminate for the Public Protection) sentences;
- the impact of changes to arrangements for release on licence for current prisoners sentenced under the Criminal Justice Act 1991, which were brought in through the Criminal Justice and Immigration Act 2008<sup>3</sup>;
- the opening of a new Immigration Removal Centre, Morton Hall, in May 2011;
- new Sentencing Council guidelines on Assault which came into effect on 13<sup>th</sup> June 2011<sup>4</sup>; and
- the impact of the public disorder events in England and Wales in August 2011.

These projections take no account of any impacts which might result from the Legal Aid, Sentencing and Punishment of Offenders Bill. As such these projections provide a set of “baseline” scenarios against which the impacts of future changes can be assessed. The Legal Aid, Sentencing and Punishment of Offenders Bill includes changes which, if passed into law, are likely to have

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<sup>2</sup> [www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/prison-population-figures/index.htm](http://www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/prison-population-figures/index.htm)

<sup>3</sup> Criminal Justice and Immigration Act 2008:  
[www.legislation.gov.uk/ukpga/2008/4/section/26](http://www.legislation.gov.uk/ukpga/2008/4/section/26)

<sup>4</sup> <http://sentencingcouncil.judiciary.gov.uk/guidelines/guidelines-to-download.htm>

an impact on the prison population. A current assessment of these impacts can be found on the Ministry of Justice website<sup>5</sup>.

As part of 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 method used to generate this year's prison population projections has been revised and updated.

A new model has been developed to produce projections of custodial convictions. The new custodial convictions model uses simple projections of numbers of defendants entering the criminal courts and takes into account:

- the age and gender of defendants entering the system;
- the flow of cases through the courts; and
- the sentences which concluded cases attract,

in order to project volumes of defendants being given a custodial sentence.

The prison population projections model (which is fundamentally unchanged from 2010) takes projections of custodial convictions, converts them to projections of prison receptions and then models the average amount of time that offenders spend in prison to calculate the resulting prison population.

The amendment to the projection method replaces the Grove-MacLeod theory of re-offending which has been used to project overall convictions as a feed into the prison population projections from 1998<sup>6</sup> to 2010. After adjusting for differences between data sources, total conviction projections generated using the new methodology are within 10% of projections generated using the Grove-MacLeod theory.

The benefits of the new 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, be they 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.

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<sup>5</sup> [www.justice.gov.uk/publications/bills-and-acts/bills/legal-aid-and-sentencing-bill.htm](http://www.justice.gov.uk/publications/bills-and-acts/bills/legal-aid-and-sentencing-bill.htm)

<sup>6</sup> Home Office Statistical Bulletin 2/98, 29 Jan 1998, Revised Projections of Long Term Trends in the Prison Population to 2005, Philip White and Iqbal Powar

This year extra detail on the sub-populations which make up the prison population have been provided on an experimental basis. We will monitor these sub-population projections closely to evaluate whether they provide added value.

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



## 2. Prison population June 2010 to June 2011

The use of immediate custody (as opposed to other disposal options) and the average custodial sentence length are the two major factors that influence the future prison population. The “Story of the Prison Population 1995 – 2009” - a Ministry of Justice publication - addresses the changes in the prison population since 1995<sup>7</sup> and explains how these two factors, combined with key legislative and policy changes, influenced the prison population over this period. Tougher sentencing and enforcement outcomes and a more serious mix of offence groups coming before the court were the two factors that caused the 66% increase in the prison population over this period.

From June 2009 to June 2010, the prison population continued to rise, at a similar rate to the period from June 2008 to June 2009, allowing for the extra 1,200 growth attributed to the impact of the withdrawal of End of Custody Licence (ECL)<sup>8</sup>.

The projections published in 2010 estimated a population at 30 June 2011 of 86,100 for the “reduced sentencing” scenario, 87,100 for the “no change” scenario and 88,000 for the “increased sentencing” scenario. The actual populations seen on 30 June 2011 was 85,374, so growth from June 2010 to June 2011 has been lower than implied by the “decreasing sentencing” scenario.

This slower than anticipated growth was due to a combination of factors including:

- a decline in the remand population due to decreases in convicted but unsentenced prisoners, which were caused mainly by the increased use of fast-delivery pre-sentence reports;
- low growth in the recall population compared with growth seen in the middle of the decade; and
- increased use of Home Detention Curfew, which is at least partly as a consequence of the Noone<sup>9</sup> judgement.

Table 2 summarises these changes.

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<sup>7</sup> Story of the Prison Population: [www.justice.gov.uk/publications/prison-population-story.htm](http://www.justice.gov.uk/publications/prison-population-story.htm)

<sup>8</sup> [www.justice.gov.uk/downloads/guidance/prison-probation-and-rehabilitation/psipso/psi\\_2010\\_15\\_ending\\_of\\_end\\_of\\_custody\\_licence\\_scheme.doc](http://www.justice.gov.uk/downloads/guidance/prison-probation-and-rehabilitation/psipso/psi_2010_15_ending_of_end_of_custody_licence_scheme.doc). Note that if ECL had continued, growth from June 2009 to June 2010 would have been at a similar rate to that seen from June 2008 to June 2009 (0.4%).

<sup>9</sup> [www.supremecourt.gov.uk/decided-cases/docs/UKSC\\_2009\\_0090\\_PressSummary.pdf](http://www.supremecourt.gov.uk/decided-cases/docs/UKSC_2009_0090_PressSummary.pdf)

**Table 2: Population in custody changes from 2004 to 2011**

	Offender Management Statistics		Year on year % difference
	Start of Year	End of Year	
June 2004 to June 2005	74,488	76,190	2.3%
June 2005 to June 2006	76,190	77,982	2.4%
June 2006 to June 2007	77,982	79,734	2.2%
June 2007 to June 2008	79,734	83,194	4.3%
June 2008 to June 2009	83,194	83,454	0.3%
June 2009 to June 2010	83,454	85,002	1.9%
June 2010 to June 2011	85,002	85,374	0.4%

In August 2011 the public disorder in England and Wales contributed to a reversal of this trend, which resulted in a prison population of 87,501 at the end of September 2011.

Immediate growth in the prison population as a direct consequence of the public disorder was approximately 900, with most of this number made up of defendants on remand. Latest figures for this public disorder sub-population were 846 on 30<sup>th</sup> September 2011<sup>10</sup>, with a growing proportion in the sentenced population. We have estimated the impact these “public disorder prisoners” will have on the prison population and included them in the 2011 prison population projections.

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<sup>10</sup> [www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm](http://www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm)

### 3. Modelling methodology and projection scenarios

The method used for generating projections of the prison population in England and Wales has been revised and updated in order to produce projections for 2011-2017.

At the core of the method is a simple model of flows of offenders into and out of prison which counts the resulting prison population each month for sentenced, recall and remand prisoners. This model is largely unchanged from the model used in 2010.

Inputs to the prison projections model are projections of future custodial convictions. These inputs are generated from simple projections of numbers of defendants entering the criminal courts and take into account the age and gender of defendants entering the system, the flow of cases through the courts and the sentences which concluded cases attract.

The prison projections model monitors the sizes of the sentenced, recall and remand prison populations. These populations depend on the inflows defined above and the outflows, which are defined by average custodial sentence lengths for subsets of these populations. The model also simulates the aging of the prison population over time.

For this publication, the results of the prison projections model are supplemented with an estimate of the future non-criminal population, which is based on the average of published data from July to December 2010<sup>11</sup>.

The models are based on data up to December 2010 (and up to March 2011 for projections of numbers of defendants entering the criminal courts) from various sources including court proceedings and performance data, sentencing data and prison receptions and population data.

Three projected scenarios have been modelled as shown in Tables 3a and 3b. These lower, medium and higher scenarios track the impact of three different incremental changes in sentencing behaviour up to 2015, where the custodial convictions projections are flat-lined:

- The lower projection assumes that custodial convictions by offence type will continue to follow the decreasing trends observed from 2003 to 2010.
- The medium projection assumes that rates of custodial conviction by offence type remain at the same level as the average for 2010.

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<sup>11</sup> Changes in the way that non-criminal population data are recorded mean that it is not possible to use a longer time range to estimate the future level of this population

- The higher projection assumes that the decreasing trends observed from 2003 to 2010 will be reversed going forward.

The three projected scenarios also incorporate the impact of:

- trends in the age and gender of defendants entering the system and in the flow of cases through the courts;
- views of future parole hearing frequency and expected outcomes for indeterminate sentences;
- the impact of changes to arrangements for release on licence for current prisoners sentenced under the Criminal Justice Act 1991, which were brought in through the Criminal Justice and Immigration Act 2008;
- the opening of a new Immigration Removal Centre, Morton Hall, in May 2011;
- new Sentencing Council guidelines on Assault which came into effect on 13<sup>th</sup> June 2011; and
- the impact of the public disorder events in England and Wales in August 2011.

The scenarios modelled are not predictions of what will happen to the prison population, but rather indications of what the prison population would look like if scenario conditions were to be fulfilled. The higher and lower scenarios do not represent bounds on our projections of the prison population.

**Table 3a: Prison projection scenarios – average change in custodial convictions, by demographic group, due to demographic and court route trends, for the medium projection**

Sentencing Trends	Average year on year percentage change in Custodial Convictions 2010 - 2015					
	21 years and over		18-20 years		Less than 18	
	Male	Female	Male	Female	Male	Female
Medium	0%	1%	-1%	-1%	-3%	-5%

**Table 3b: Additional changes in custodial convictions due to sentencing trends for the lower and higher projections**

Sentencing Trends	% point change in Custodial Convictions from medium scenario					
	21 years and over		18-20 years		Less than 18	
	Male	Female	Male	Female	Male	Female
Lower	-2%	-1%	-2%	-1%	-1%	1%
Medium	0%	0%	0%	0%	0%	0%
Higher	2%	1%	2%	1%	1%	-1%

The modelling methodology, projection scenarios and assumptions used are described in detail in Appendix C.

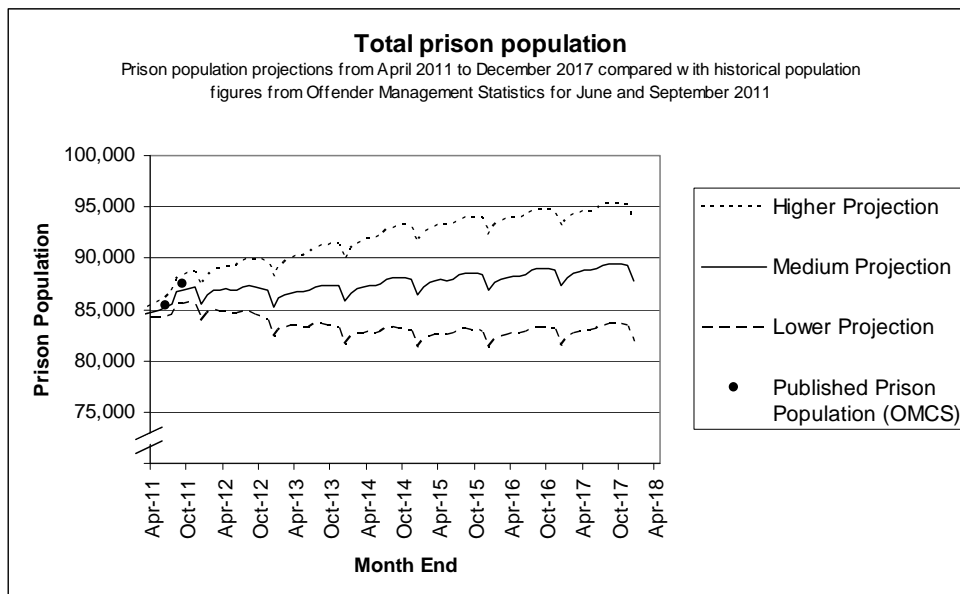
## 4. Results

The lower projection estimates that the prison population will fall to 84,600 by the end of June 2012 and to 83,100 by the end of June 2017. The medium projection estimates that that the prison population will fall to 86,900 by the end of June 2012 and subsequently rise to 88,900 by the end of June 2017. The higher projection estimates that the prison population will rise to 89,300 by the end of June 2012 and to 94,800 by the end of June 2017.

Chart 1 presents the projected scenarios with historical figures to show changes in the prison population from April 2011.

Appendix A contains tables for annual projected end of June populations, average financial year populations and total monthly populations for each scenario. Sub-population figures are given for: determinate sentences; indeterminate sentences; remand; recalls; non-criminals; 15-17 year olds; females 18 and over; males 18-20 and males 21 and over (determinates, indeterminates, recalls and remand). Greater detail is provided on an experimental basis and sub-population projections will be monitored closely to evaluate whether they provide added value.

**Chart 1: Projected monthly prison population (all scenarios)**



The projected trends reflect the cumulative impacts of the various circumstantial, 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. Impacts are included in all three projections to reflect increases in the prison population specifically as a result of the recent public disorder.

On the medium projection, the prison population generally rises gradually (between 0.0 and 0.7 % year on year) to 2017. This gradual rise is principally due to a steady rise in the indeterminate sentence population but is also influenced by a rise in the non-criminal population over the first year of the projection (due to the opening of Morton Hall) and a later rise in the determinate sentence population. The exception to this is a projected 2.0% rise from June 2011 to June 2012 which is partly a consequence of the August 2011 public disorder events. This brings the projected prison population to 86,900 by June 2012. There is 0% growth in the projected prison population in the following year as the majority of public disorder prisoners complete their sentence and the total projected prison population remains at 86,900.

On the lower projection, the prison population generally falls (between 0.2 and 0.6% year on year) to 2015 due to a projected decrease in the level of immediate custodial conviction. After 2015 it rises slightly as the indeterminate sentence population continues to rise against a background of levelling determinate sentence, remand and recall populations. The exception to this is a rise of the population from June 2011 to June 2012 and a subsequent fall in the population to June 2013 as a result of the August 2011 public disorder events.

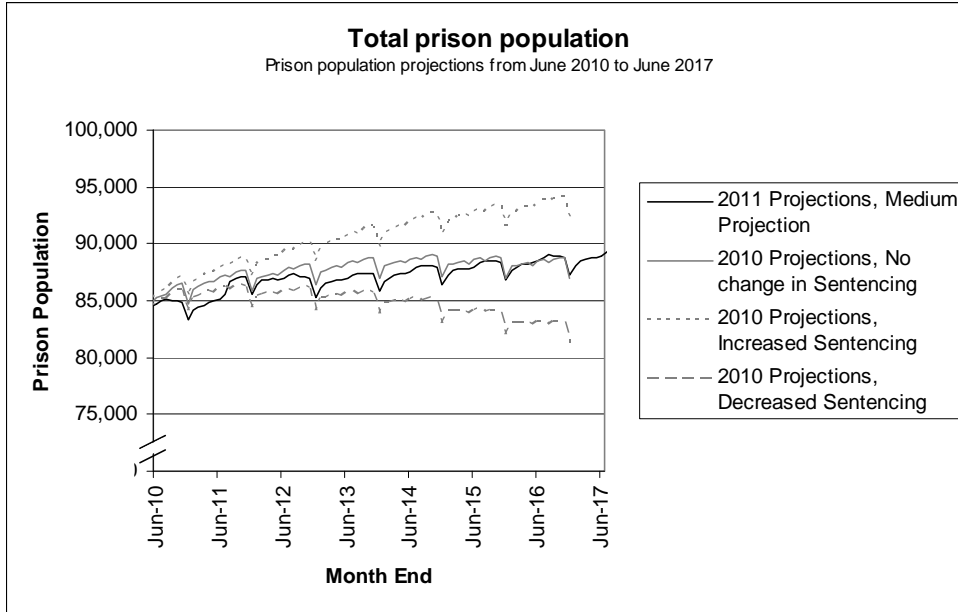
On the higher projection, the prison population generally rises (initially at around 2% year on year, reducing to less than 1% year on year by 2015) throughout the modelled period. The exception to this is a stronger rise of the population from June 2011 to June 2012 and a subsequent lower rise in the population to June 2013 again as a result of the August 2011 public disorder events.

At the end of June 2011 the published prison population was within 0.2% (200 in 85,400) of the medium projection, and within -0.9% of the high projection. At the end of September 2011 the published prison population was within 0.7% (600 in 87,500) of the medium projection, and within -0.9% of the high projection. This does not necessarily mean the prison population will track against either the medium or the high projection going forward.

Differences could be explained by changes, different to those projected, in overall demand, offence mix, age and gender of defendants, court routes, custody rates or sentence lengths. We will need to collate further evidence before we can fully understand the reasons for the higher than anticipated prison population in September and to determine whether these differences are likely to persist. A discussion of the extent to which the actual prison sub-populations have tracked the medium projection can be found in Appendix B.

Chart 2 plots the medium projection against the three 2010-based prison population projections. The 2011-2017 medium projection rises from below the 2010 “decreasing sentencing” projection in 2010/11 to align with the 2010 “no change” projection by 2016. A comparison of end of June figures from the 2010 and 2011 projections can be found in Appendix A. The lower level of the new projections can be attributed to slower growth in the prison population than anticipated by the 2010-based “no change” scenario projection (as discussed in section 2)

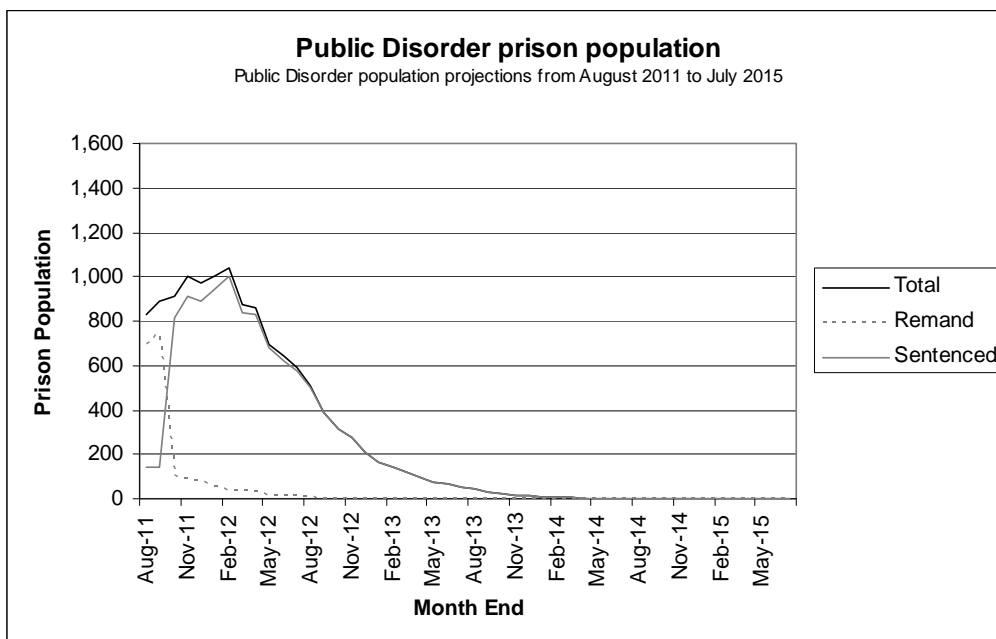
**Chart 2: Comparing 2010 and 2011 projections (June 2010 – June 2017)**



## 5. Impacts of the August 2011 Public Disorder

On 6<sup>th</sup> August 2011, a wave of public disorder events began in London before spreading to other cities throughout England and Wales and lasted for four days. In the aftermath of these events, the police conducted a series of arrests which resulted in just under 2,000 defendants being brought before the courts by the 12<sup>th</sup> October 2011. This resulted in the prison population swelling by just under 900 in the week following the public disorder events, the vast majority of whom were being held on remand. Since then the public disorder sub-population in prison remained relatively flat, though the numbers of sentenced prisoners have grown and the number of public disorder prisoners on remand has fallen. On 30<sup>th</sup> September 2011, 846 individuals were being held in prison for offences relating to the public disorder<sup>12</sup>.

**Chart 3: Estimated public disorder prison population**



The continued impact of the public disorder on the prison population has been estimated by making assumptions around:

- the total number and timing of public disorder related arrests;
- the flow of public disorder cases through the courts; and

<sup>12</sup> [www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm](http://www.justice.gov.uk/publications/statistics-and-data/criminal-justice/public-disorder-august-11.htm)



- remand rates, custody rates and average custodial sentence lengths for convicted offenders.

Actual data from the public disorder events is only just starting to emerge so, through necessity, these estimates are heavily assumptions based.

Chart 3 shows the estimated size of the public disorder prison population with projected month-end numbers for the remand and sentenced parts of this sub-population given in Appendix A (Table A13).

On this estimate, the public disorder prison population rises to just over 1,000 above the baseline by February 2012 and falls back to the baseline level by August 2014. The remand population peaks at just over 700 in September 2011 with the sentenced prisoners completely replacing those on remand by September 2012.

## 6. Caveats on prison population projections

The projections presented here are a set of scenarios which reflect the impact of three possible trends in sentencing, combined with trends in the age and gender of defendants entering the system and in the flow of defendants through the courts. The impacts of changes to legislation and guidance which took place before June 2011 and views of future parole hearing frequency and outcomes for indeterminate sentence prisoners have also been taken into account.

Additionally, the direct prison population impacts of the public disorder events in England and Wales in August 2011 have been estimated. These estimates are provisional and the true impact of the public disorder events on the prison population will be better understood as more information comes to light on arrests, remand rates, progress through the courts for public disorder and other cases, sentencing, appeals, recalls and any offset in offences which might have been committed by those already in prison as a result of the public disorder.

The projections presented here 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 set of “baseline” scenarios against which the impacts of future changes can be assessed.

For example, no attempts have been made to incorporate the effects of the Legal Aid, Sentencing and Punishment of Offenders Bill, as, in line with standard practice, Royal Assent to the Bill needs to be granted before it can be included as a confirmed change. Similarly, no impacts have been included for the introduction of new sentencing guidelines on burglary, as these are not anticipated to affect the size of the prison population<sup>13</sup>.

Even without these changes, the actual future prison population may not be the same as any of the projected scenarios suggest. 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.

Other impacts included in the projections, such as those of August 2011 public disorder events, changing legislation, changing procedures and new sentencing guidelines are applied equally to all three scenarios.

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<sup>13</sup> <http://sentencingcouncil.judiciary.gov.uk/guidelines/forthcoming-guidelines.htm>

Assumptions for modelling and scenario development were captured through a consultative process that included all major stakeholders (see Appendix D). 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. For the total prison population, the medium projection for June and September 2011 are within 0.7% of published data<sup>14</sup>. The ways in which expert judgement, data estimation and underlying statistical modelling variation each contribute to these have not been separately estimated.

Data used in the model have been derived from various sources, including court proceedings and performance data, sentencing data and prison receptions and population data. Due to technical problems relating to the supply of data for statistical purposes, some of these data were unavailable from July 2009 to February 2010 and some were unavailable from July 2009 onwards. This means certain data has been estimated by extrapolating between past and current data and other data has been estimated from headline totals which were unaffected by these problems.

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<sup>14</sup> [www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm](http://www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm)

## Appendix A: Additional tables<sup>15</sup>

Annual tables of overall projected prison population

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

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	84,200	85,200	86,200
Jun-12	84,600	86,900	89,300
Jun-13	83,300	86,900	90,500
Jun-14	82,800	87,500	92,200
Jun-15	82,600	88,000	93,400
Jun-16	82,800	88,500	94,100
Jun-17	83,100	88,900	94,800

**Table A2: Average Projected prison population (financial year figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
2011/12	84,800	86,200	87,600
2012/13	84,000	86,700	89,500
2013/14	83,100	87,000	90,900
2014/15	82,700	87,600	92,600
2015/16	82,600	88,000	93,500
2016/17	82,800	88,500	94,200

**Table A3: Comparison of 2010 based and 2011 based “no change” projections<sup>16</sup> (end of June figures)**

	Central Projections		
	2010	2011	Difference
Jun-11	87,100	85,200	-2.2%
Jun-12	87,700	86,900	-0.9%
Jun-13	88,400	86,900	-1.6%
Jun-14	88,700	87,500	-1.3%
Jun-15	88,600	88,000	-0.7%
Jun-16	88,500	88,500	0.0%
Jun-17	--	88,900	0.0%

<sup>15</sup> All figures are rounded to the nearest hundred. Sub-populations do not sum to total populations due to rounding and due to overlaps in some sub-population categories.

<sup>16</sup> The 2010 “decreased sentencing” scenario is not directly comparable with the 2011 lower projection and the 2010 “increased sentencing” projection is not directly comparable with the 2011 higher projection. These are not shown.

Annual tables of subgroups within the overall projected prison population

**Table A4: Projected determinate sentence prison population (end of June figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	51,300	51,900	52,400
Jun-12	51,000	52,500	54,100
Jun-13	49,700	52,100	54,500
Jun-14	49,000	52,200	55,400
Jun-15	48,600	52,300	56,000
Jun-16	48,400	52,300	56,200
Jun-17	48,300	52,300	56,300

**Table A5: Projected indeterminate sentence prison population (end of June figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	13,600	13,600	13,600
Jun-12	14,100	14,100	14,200
Jun-13	14,500	14,600	14,700
Jun-14	15,000	15,100	15,300
Jun-15	15,400	15,600	15,800
Jun-16	15,700	16,000	16,300
Jun-17	16,100	16,500	16,900

**Table A6: Projected remand prison population (end of June figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	12,700	12,900	13,200
Jun-12	12,500	13,100	13,700
Jun-13	12,300	13,000	13,800
Jun-14	12,100	13,000	14,000
Jun-15	12,000	13,000	14,000
Jun-16	12,000	13,000	14,000
Jun-17	12,000	13,000	14,000

**Table A7: Projected recall prison population (end of June figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	5,600	5,700	5,800
Jun-12	5,500	5,800	6,000
Jun-13	5,400	5,800	6,100
Jun-14	5,300	5,800	6,200
Jun-15	5,300	5,800	6,200
Jun-16	5,300	5,800	6,200
Jun-17	5,300	5,800	6,200

**Table A8: Projected non-criminal prison population (end of June figures)<sup>17</sup>**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	1,100	1,100	1,100
Jun-12	1,400	1,400	1,400
Jun-13	1,400	1,400	1,400
Jun-14	1,400	1,400	1,400
Jun-15	1,400	1,400	1,400
Jun-16	1,400	1,400	1,400
Jun-17	1,400	1,400	1,400

**Table A9: Projected male 21 years and over prison population (end of June figures)**

Scenario	Males 21 years and over					
	Total excluding non-criminal			Determinates		
	Lower	Medium	Higher	Lower	Medium	Higher
Jun-11	69,900	70,600	71,400	42,400	42,900	43,300
Jun-12	69,600	71,500	73,400	41,900	43,000	44,200
Jun-13	68,900	71,700	74,600	40,900	42,800	44,700
Jun-14	68,600	72,400	76,200	40,400	43,000	45,500
Jun-15	68,500	72,900	77,300	40,100	43,000	46,000
Jun-16	68,700	73,300	78,000	39,900	43,100	46,200
Jun-17	69,000	73,800	78,600	39,800	43,100	46,400
Scenario	Indeterminates			Remand		
	Lower	Medium	Higher	Lower	Medium	Higher
	Jun-11	12,900	12,900	12,900	9,700	9,900
Jun-12	13,400	13,400	13,500	9,500	10,000	10,400
Jun-13	13,800	13,900	14,000	9,400	10,000	10,600
Jun-14	14,300	14,400	14,600	9,200	10,000	10,700
Jun-15	14,700	14,900	15,100	9,200	9,900	10,700
Jun-16	15,000	15,300	15,600	9,200	9,900	10,700
Jun-17	15,400	15,700	16,100	9,200	9,900	10,700
Scenario	Recall			Non Criminal		
	Lower	Medium	Higher	Lower	Medium	Higher
	Jun-11	4,900	5,000	5,100	1,000	1,000
Jun-12	4,900	5,100	5,300	1,300	1,300	1,300
Jun-13	4,800	5,100	5,300	1,300	1,300	1,300
Jun-14	4,700	5,100	5,400	1,300	1,300	1,300
Jun-15	4,700	5,000	5,400	1,300	1,300	1,300
Jun-16	4,600	5,000	5,400	1,300	1,300	1,300
Jun-17	4,600	5,000	5,400	1,300	1,300	1,300

<sup>17</sup> Note that these projections are the same under all three projected scenarios

**Table A10: Projected male 18-20 years old prison population (end of June figures, excluding non-criminals)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	7,600	7,700	7,800
Jun-12	7,600	8,000	8,400
Jun-13	7,400	7,900	8,400
Jun-14	7,200	7,900	8,500
Jun-15	7,100	7,800	8,600
Jun-16	7,100	7,800	8,600
Jun-17	7,000	7,800	8,600

**Table A11: Projected female 18 years and over prison population (end of June figures)**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	4,100	4,100	4,200
Jun-12	4,200	4,300	4,400
Jun-13	4,100	4,300	4,400
Jun-14	4,200	4,300	4,500
Jun-15	4,200	4,400	4,500
Jun-16	4,200	4,400	4,600
Jun-17	4,200	4,400	4,600

**Table A12: Projected 15-17 years old prison population (end of June figures)<sup>18</sup>**

	Sentencing Scenarios		
	Lower	Medium	Higher
Jun-11	1,600	1,600	1,700
Jun-12	1,700	1,800	1,800
Jun-13	1,600	1,600	1,700
Jun-14	1,500	1,600	1,700
Jun-15	1,500	1,600	1,600
Jun-16	1,500	1,500	1,600
Jun-17	1,500	1,500	1,600

<sup>18</sup> This population only includes those aged 15-17 in Youth Offending Institutions. 15-18 year olds housed in Secure Children's Homes or Secure Training Centres are not included.

**Table A13: Estimated monthly values of the prison population arising from the August 2011 public disorder (end of month figures)**

	Public Disorder Prison Population		
	Remand	Sentenced	Total
Aug-11	700	100	800
Sep-11	700	100	900
Oct-11	100	800	900
Nov-11	100	900	1,000
Dec-11	100	900	1,000
Jan-12	100	900	1,000
Feb-12	0	1,000	1,000
Mar-12	0	800	900
Apr-12	0	800	900
May-12	0	700	700
Jun-12	0	600	600
Jul-12	0	600	600
Aug-12	0	500	500
Sep-12	0	400	400
Oct-12	0	300	300
Nov-12	0	300	300
Dec-12	0	200	200
Jan-13	0	200	200
Feb-13	0	100	100
Mar-13	0	100	100
Apr-13	0	100	100
May-13	0	100	100
Jun-13	0	100	100
Jul-13	0	100	100
Aug-13	0	0	0
Sep-13	0	0	0



Monthly tables of overall projected prison population

**Table A14: Monthly values of the overall projected prison population (end of month figures)**

	Sentencing Scenarios				Sentencing Scenarios		
	Lower	Medium	Higher		Lower	Medium	Higher
Apr-11	84,100	84,800	85,500	Sep-14	83,100	88,100	93,000
May-11	84,100	85,000	85,800	Oct-14	83,100	88,100	93,100
Jun-11	84,200	85,200	86,200	Nov-14	82,900	88,000	93,100
Jul-11	84,500	85,600	86,700	Dec-14	81,300	86,400	91,600
Aug-11	85,500	86,700	88,000	Jan-15	82,100	87,300	92,400
Sep-11	85,600	86,900	88,300	Feb-15	82,400	87,600	92,800
Oct-11	85,600	87,100	88,600	Mar-15	82,500	87,800	93,000
Nov-11	85,500	87,100	88,700	Apr-15	82,600	87,900	93,200
Dec-11	83,900	85,600	87,300	May-15	82,500	87,900	93,200
Jan-12	84,600	86,400	88,300	Jun-15	82,600	88,000	93,400
Feb-12	85,000	86,900	88,800	Jul-15	82,900	88,300	93,700
Mar-12	84,800	86,900	88,900	Aug-15	83,100	88,500	93,900
Apr-12	84,800	87,000	89,100	Sep-15	83,000	88,500	93,900
May-12	84,600	86,800	89,100	Oct-15	83,000	88,500	94,000
Jun-12	84,600	86,900	89,300	Nov-15	82,900	88,400	93,900
Jul-12	84,800	87,200	89,700	Dec-15	81,300	86,800	92,400
Aug-12	84,800	87,300	89,900	Jan-16	82,100	87,600	93,200
Sep-12	84,500	87,200	89,800	Feb-16	82,400	88,000	93,600
Oct-12	84,300	87,100	89,900	Mar-16	82,600	88,200	93,800
Nov-12	84,000	86,900	89,800	Apr-16	82,700	88,300	93,900
Dec-12	82,300	85,300	88,300	May-16	82,700	88,300	94,000
Jan-13	83,000	86,100	89,200	Jun-16	82,800	88,500	94,100
Feb-13	83,300	86,500	89,700	Jul-16	83,100	88,800	94,500
Mar-13	83,400	86,700	89,900	Aug-16	83,300	89,000	94,700
Apr-13	83,400	86,800	90,200	Sep-16	83,200	89,000	94,700
May-13	83,300	86,800	90,300	Oct-16	83,200	89,000	94,700
Jun-13	83,300	86,900	90,500	Nov-16	83,100	88,900	94,600
Jul-13	83,600	87,200	90,900	Dec-16	81,500	87,300	93,100
Aug-13	83,600	87,400	91,200	Jan-17	82,300	88,100	93,900
Sep-13	83,500	87,400	91,300	Feb-17	82,700	88,500	94,300
Oct-13	83,400	87,400	91,400	Mar-17	82,900	88,700	94,500
Nov-13	83,200	87,300	91,400	Apr-17	83,000	88,800	94,600
Dec-13	81,600	85,800	90,000	May-17	83,000	88,800	94,600
Jan-14	82,400	86,600	90,900	Jun-17	83,100	88,900	94,800
Feb-14	82,600	87,000	91,400	Jul-17	83,400	89,300	95,100
Mar-14	82,700	87,200	91,700	Aug-17	83,600	89,500	95,300
Apr-14	82,800	87,300	91,900	Sep-17	83,500	89,400	95,300
May-14	82,700	87,300	92,000	Oct-17	83,600	89,400	95,300
Jun-14	82,800	87,500	92,200	Nov-17	83,400	89,300	95,200
Jul-14	83,100	87,900	92,700	Dec-17	81,800	87,800	93,700
Aug-14	83,200	88,100	93,000				

## Appendix B: Testing the validity of 2011-2017 prison population projections

The figures in this bulletin are not predictions of the prison population – they are scenarios showing what the future prison population would look like under various circumstances. However, comparing the projections with the actual figures allows us to assess whether the actual prison population is aligned to any of the projections and whether the corresponding scenario assumptions hold true.

As the model used data up to December 2010 (and up to March 2011 for projections of numbers of defendants entering the criminal courts), we can compare our projections with the actual prison population in subsequent months. Table B1 shows the percentage difference between the projected medium projection and published population figures<sup>19</sup> for June and September 2011.

**Table B1: Deviation of published prison population figures from medium projection**

	% Deviation of Published Prison Population Figures from Projection	
	Jun-11	Sep-11
Total Prison Population	0%	1%
<b>Sub Population</b>		
Determinates	1%	1%
Indeterminates	0%	0%
Remand	-4%	-2%
Recall	0%	0%
Non Criminal	-16%	-11%
Males 21 and over (Total ex. Non Criminal)	1%	1%
Males 21 and over (Determinates)	1%	2%
Males 21 and over (Indeterminates)	0%	0%
Males 21 and over (Remand)	-2%	1%
Males 21 and over (Recall)	-1%	1%
Males 21 and over (Non Criminal)	-17%	-14%
Males 18-20 (ex. Non Criminal)	-2%	-2%
Females 18 and over	0%	0%
15-17 year olds	-4%	-12%

The medium projection is in line with published figures for June and September which deviate no more than 0.7% (less than 600 in ~87,500) from the projection. Most of the projected sub-population projections are also in line with current published figures which deviate no more than  $\pm 2\%$  from the projection. Exceptions are the 15-17 year old, remand and non-criminal populations which, along with the other sub-population projections, are provided here on an experimental basis. We anticipate that variation around the central projections for these sub-populations could be significant.

<sup>19</sup> [www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm](http://www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm)

The 15-17 year old population is a small, volatile population which is difficult to model accurately. Currently, the medium projection for 15-17 year olds deviates at most -200 places from 1,600 to give a -12% difference. Past projections have not provided separate projections of the 15-17 year old population.

Assumptions used to model the remand population may be developed further in future. Currently, the medium projection for remand deviates at most -500 places from 12,500 to give a -4% difference. Past projections of remand have not provided any greater accuracy for this population. For example, projections published in 2010 predicted a central value for end June 2011 which was higher than published figures by 6%.

The non-criminal population can be volatile and difficult to model because it is subject to change depending on where immigration detainees are held; detainees held in prisons or in NOMS-run Immigration and Removal Centres are counted in the prison population, whereas detainees held elsewhere in the detention estate are only shown in UKBA detention figures. The non-criminal prison population numbers are currently affected by the ongoing population build-up at Morton Hall, leading to a medium projection which deviates at most -200 places from 1000 to give a -16% difference. Past projections for non-criminals have not provided any greater accuracy for this population. For example, projections published in 2010 predicted a central value for June 2010 which was higher than published figures by 23%, though this difference can largely be explained by changes in the way non-criminal population data are recorded.

## **Appendix C: Detail of models, scenarios and assumptions**

### **The updated modelling approach**

As part of 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 method used to generate this year's prison population projections has been revised and updated.

This amendment to the projection method replaces the Grove-MacLeod theory of re-offending by generating a new projection of offenders with a custodial conviction that allow us to:

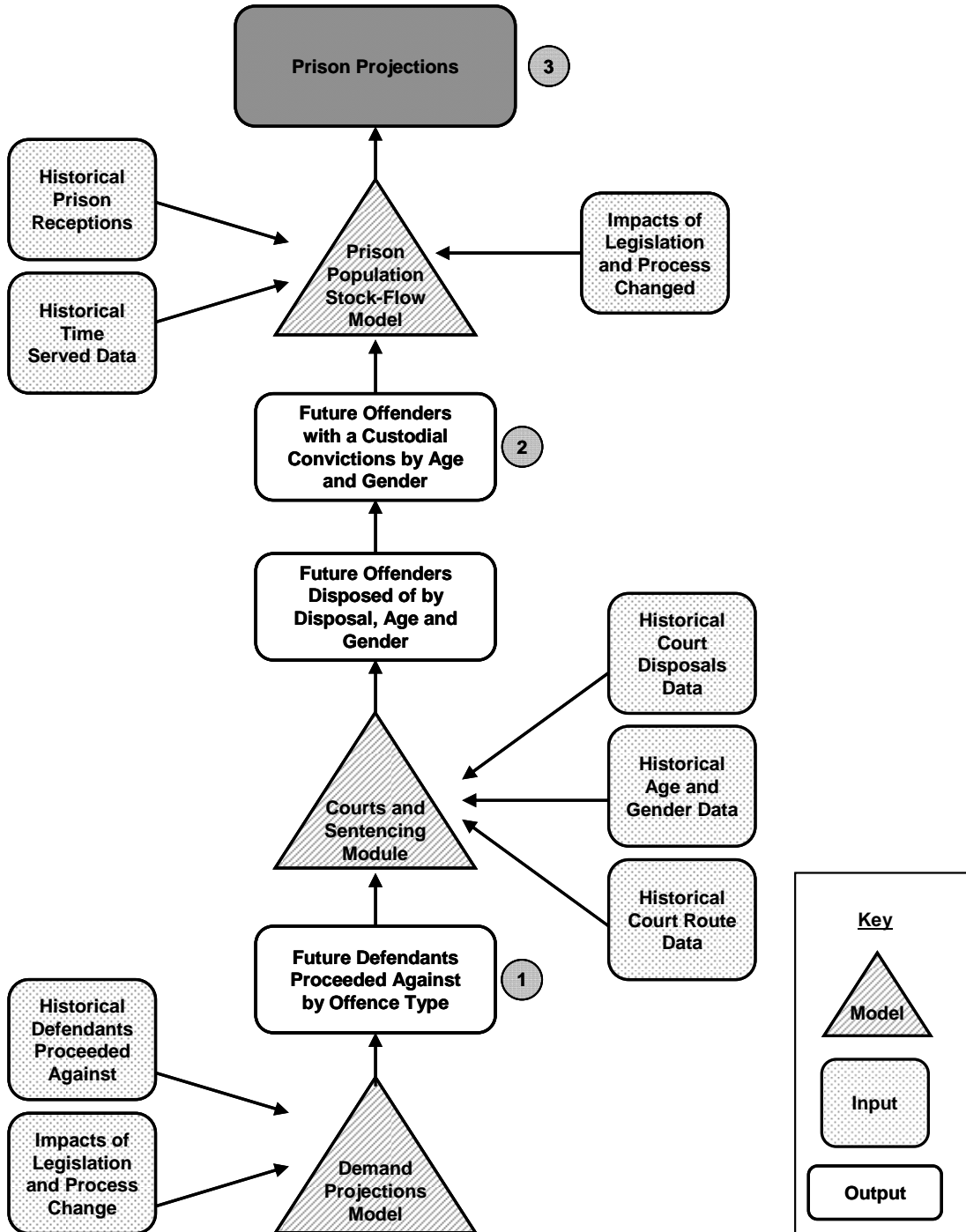
- explicitly project custodial convictions (rather than just convictions);
- understand the Criminal Justice System factors which contribute to change in the prison population, be they time served, sentences given, trial court and sentencing court changes or shifts in the demographic make-up of defendants; and
- more easily model the impact on the prison population of specific Ministry of Justice and other Criminal Justice Agency policy changes.

Simple projections of defendants proceeded against in court are produced for 14 high-level offence categories. These projections are converted into a set of time series projections of disposals by disposal type (including custodial convictions), sex and age-band, at a monthly resolution, taking into account lags imposed by court processes. The resulting projected time series of custodial convictions by sex and age form an input into the same prison projections model (the Prison Population Stock-Flow Model) that was used to generate the 2010 projections.

### **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 from this model 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.

Figure C1: Key Components of the prisons projections modelling system



## **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. Consultation has taken place with the Home Office and CPS to understand these upstream impacts of the Criminal Justice system.

The Demand Projections Model produces baseline projections of all defendants proceeded against at court for 14 high-level offence categories based on historical time series data (January 2001 to March 2011) at a monthly resolution out to 2017. They are not broken down by any further categories (such as age and gender) at this stage.

The high level offence categories used are: Burglary, Criminal Damage, Drug Offences, Fraud & Forgery, Indictable Motoring Offences, Other Indictable Offences, Robbery, Serious Sexual Offences, Other Sexual Offences, Serious Violent Offences, Other Violent Offences, Summary Motoring Offences, Summary Offences (excluding Motoring) and Theft & Handling Stolen Goods.

The demand projections are based on either a simple trend or a flat-line forecast and have seasonal patterns superimposed where appropriate. Each of the offence-category time series are separately evaluated for trend and seasonality.

Basic statistical information on the historical time series data, for each offence type, are evaluated to understand the significance of any historical trend, the percentage change observed in the last period and whether the recent trend is different from historical trend. Analysts use this statistical information and expert judgement to decide whether a trend or flat-line projection is the most suitable for each offence type. Where a trend is implemented it continues the trend in the last 12 months of smoothed data (October 2009 to September 2010). Where there is no significant recent trend the projection takes the average value from the most recent 12 months of data (April 2010 to March 2011) going forward.

Autocorrelation plots are used, at an offence level, to identify clear seasonal patterns. Where autocorrelation plots showed these clear seasonal patterns, three-year (October 2007 to September 2010) average seasonal differences from the annual moving average line are used to superimpose a seasonal pattern on the trend or flat line projections.

Based on our analysis of historical data for the number of defendants proceeded against at court from January 2001 to March 2011, flat-line projections with seasonal patterns were selected for all offence categories, as shown in Table C1.

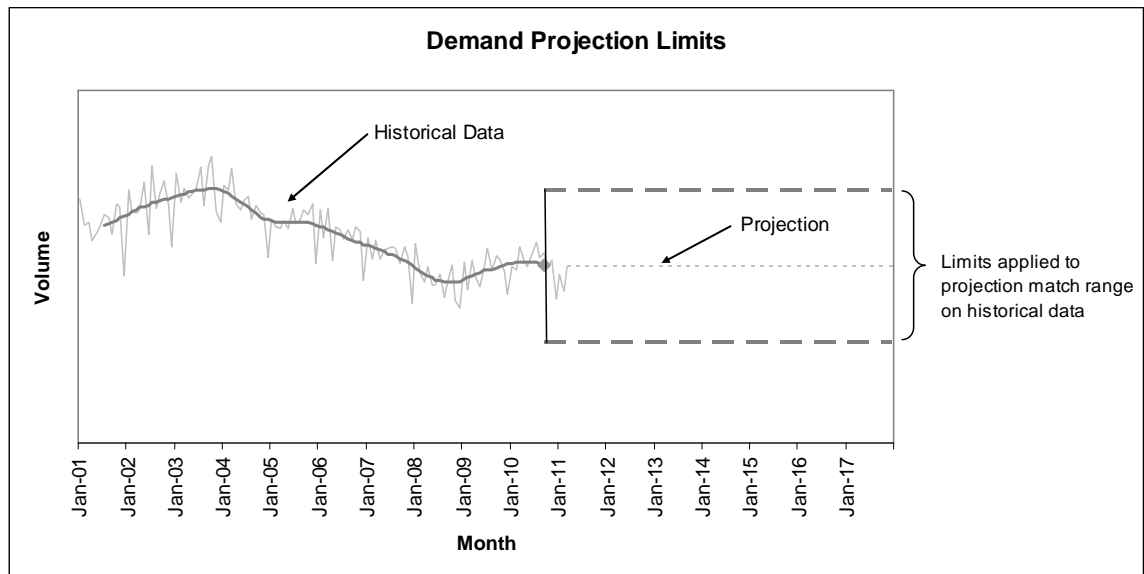
**Table C1: Methodology Applied to the Demand Projections**

	Seasonality	Type of Projection to Use
Burglary	Yes	Flat-Line
Criminal Damage	Yes	Flat-Line
Drug Offences	Yes	Flat-Line
Fraud and forgery	Yes	Flat-Line
Indictable motoring offences	Yes	Flat-Line
Less Serious Sexual Offences	Yes	Flat-Line
Less Serious Violent Offences	Yes	Flat-Line
Other indictable offences	Yes	Flat-Line
Robbery	Yes	Flat-Line
Serious Sexual offences (inc Rape)	Yes	Flat-Line
Serious Violent Offences (inc Homicide)	Yes	Flat-Line
Summary motoring offences	Yes	Flat-Line
Summary offences excluding motoring	Yes	Flat-Line
Theft and handling stolen goods	Yes	Flat-Line

The offence level projections are limited so that they do not fall below zero or vary more than has been seen in the past ten years. Figure C2 shows how these limits are applied.

It should be noted that these projections will not 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 range seen historically.

**Figure C2: Limits applied to the Demand Projections**



## 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), sex and age-band at monthly resolution. These projections of custodial convictions by sex, age and sentence length band are used as a key input for the Prison Population Stock-Flow model.

The intermediate forecasts generated within the Courts and Sentencing Module are consistent with separately modelled Magistrates' Court and Crown Court workload and Crown Court disposal rates.

The Courts and Sentencing Module performs two tasks. First a large number of splits are used to partition the front-end projections into a series of bins, each bin relating to a specific offence-type, gender, age group, court route and disposal. The dimensions of each split are provided in table C2.

These splits have been developed by evaluating court proceedings data from 2004 to 2010 at a quarterly resolution.

**Table C2: Courts and Sentencing Module Splits Dimensions**

Offence Type	Sex	Age	Court-Route	Discharge
Burglary	Male	Age 10-17	MC	Abcond Disch
Criminal Damage	Female	Age 18-20	MCCC	Fine
Drug Offences		Age 21+	CC	Comm Sent
Fraud and Forgery				Suspended Sent
Indictable Motoring				<6 months
Other				6 months - 1 year
Robbery				1 year – 4 years
Sexual Offences				4 years +
<i>(serious sexual and other sexual offences)</i>				Indeterminate
Summary Motoring				ODW
Summary Non-Motoring				
Theft and Handling				
Violence Against the Person				
<i>(serious violent and other violent offences)</i>				

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.

Second, the Courts and Sentencing Module applies disposal rates derived from a workload model of the Crown Court<sup>20</sup> to calculate the percentage of incoming cases that are concluded in a given year.

<sup>20</sup> The Crown Court workload model takes forecasts of caseload and assigns various attributes (e.g. early guilty plea, remand status) to estimate likely hearing times and to prioritise the flow of cases through the system. Its purpose is to provide short-term forecasts of future Crown Court workload given a projected caseload and (user-defined) assumptions about future performance and resources. Use of the CCW requires conversion of projections from a defendant to case



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

- that there is no prioritisation of any age-sex group within the Crown Court;
- the number of working days in each month is the primary driver of seasonality within the 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 horizon.

A set of sentencing splits is applied to those guilty offenders disposed of by the Magistrates Court and the Crown Court. The result is a forecast time series of convictions for each offence type, sex, age and disposal type.

If required, the Courts and Sentencing Module allows trends in the demographic splits and courts and sentencing processes to be implemented when projecting custodial convictions. For each split time series the result of a set of statistical tests (consistent with the tests applied to the projections of defendants proceeded against) determines whether a trend-based forecast is to be applied. For splits where a trend-based forecast is not appropriate then a flat average of the last year of historical data is projected for the duration of the forecast horizon. Where a trend-based forecast is suitable a seven year trend is projected forward. A separate normalisation step is then applied to ensure that the sum of forecast proportions within a category is 100%. As a final test, visual checks are completed within normalisation categories in order to assess the consistency of the forecast trend scenario relative to historical trends.

This procedure enables creation of a number of custodial convictions projections. Tables C3a and C3b outline the three scenarios used to produce the prison population projections. All three projections are driven by the same trends in demographics and court route. Their differences result from the use of different sentencing trends:

- No change in current sentencing trends (custody rate decreases year on year until 2015 and then is flat-lined) leads to the "lower" projection.

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basis, possible because the defendant per case ratio has remained relatively stable at the headline level since 2006. [www.justice.gov.uk/downloads/publications/statistics-and-data/courts-and-sentencing/judicial-court-stats.pdf](http://www.justice.gov.uk/downloads/publications/statistics-and-data/courts-and-sentencing/judicial-court-stats.pdf) Table 4.5

- No change in current sentencing levels (custody rate remains at current level) leads to the “medium” projection.
- Reverse of current sentencing trends (custody rate increases year on year out to 2015 and then is flat-lined) leads to the “higher” projection.

**Table C3a: Prison projection scenarios – average change in custodial convictions, by demographic group, due to demographic and court route trends, for the medium projection**

Sentencing Trends	Average year on year percentage change in Custodial Convictions 2010 - 2015					
	21 years and over		18-20 years		Less than 18	
	Male	Female	Male	Female	Male	Female
Medium	0%	1%	-1%	-1%	-3%	-5%

**Table C3b: Additional changes in custodial convictions due to sentencing trends for the lower and higher projections**

Sentencing Trends	% point change in Custodial Convictions from medium scenario					
	21 years and over		18-20 years		Less than 18	
	Male	Female	Male	Female	Male	Female
Lower	-2%	-1%	-2%	-1%	-1%	1%
Medium	0%	0%	0%	0%	0%	0%
Higher	2%	1%	2%	1%	1%	-1%

Each of these scenarios maintains current trends in demographic splits and court route taken.<sup>21</sup>

These scenarios correspond to (though do not use the same assumptions as) the “no change”, “decreased sentencing” and “increased sentencing” scenarios used in the 2010 projections.

These scenarios are not predictions of what will happen to custodial convictions, but rather indications of what they would look like if scenario conditions were to be fulfilled. The higher and lower scenarios do not represent bounds on our projections of the prison population. Further, though statistical trends in sentencing, demographics, court route and convictions rate have been identified and used to create these scenarios no attempt has been made to unpick the reasons for these trends.

### 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), remand and recall - are modelled using stock-flow structures based on the generic structure shown in

<sup>21</sup> Note that for females aged 15-17, the current custodial convictions trend is in opposite direction to other demographic groups

Figure C3. The stock-flow structures model the flow of offenders into and out of prison and count the resulting prison population each month.

**Figure C3: Generic stock-flow structure in the Prison Population Stock-Flow Model**



To enable detailed calibration of the model, the stock-flow channels are further broken down by gender, reception age group and sentence length sub-band. All input data are smoothed using a 12 month moving average before use so that seasonality adjustments applied post model do not double count seasonal effects.

For the determinate population, the monthly inflows to prison for these sub-populations are based on the custodial convictions projections described above. To convert from custodial convictions to prison receptions, the historical proportions of receptions for each sub-population to total convictions are calculated and averaged over the last twelve months of historical data (January 2010 to December 2010 inclusive). Projected receptions are set equal to projected custodial convictions multiplied by the relevant fraction for each sub-population.

Monthly outflows (including outflows due to prisoner mortality) for determinate population are based on average custodial sentence length. Data on average custodial sentence length are calibrated in the model so that the modelled stock of prisoners is close (within 0.7% at the total level from January 2010 to December 2010) to the actual historical numbers<sup>22</sup>. Projected outflows are based on average of this calibrated sentence length for the last twelve months of historical data.

This approach is used for the other sub-populations with some minor adjustments, as follows.

For recall prisoners, the model assumes there will be a certain fraction of recall receptions per conviction and sets recall receptions in the same month as their related conviction receptions. We assume that this effectively models the real world situation in which individual prisoners can be recalled a number of times and recall receptions are always some time after their related conviction receptions.

<sup>22</sup> Historical numbers are taken from a more detailed breakdown of published Offender Management Statistics: [www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm](http://www.justice.gov.uk/publications/statistics-and-data/prisons-and-probation/oms-quarterly.htm)

For remand prisoners, average custodial sentence lengths are calculated from remand receptions and remand populations and are not calibrated. Instead, reception projections are adjusted so that the modelled stock of prisoners is close to the actual historical numbers.

IPP and life sentence prisoners have an extra section in the stock-flow structure which models their pre-tariff detention. Outflows from this section into the generic stock-flow structure depend on tariff length which is left largely unchanged from management information source data (though life sentence tariffs were tuned for data before 2005, when more detailed data started to be collected on life sentences as a consequence of changes in the 2003 Criminal Justice Act<sup>23</sup>).

Subsequent outflow for IPP and life sentence prisoners depends on the frequency and outcome of Parole Board hearings. The values of these parameters are tuned so that over history the entire modelled stock of pre- and post-tariff prisoners is close to the actual historical numbers. Projected outflows are based on the calibrated frequency and outcome of Parole Board hearings averaged over the last twelve months of historical data.

The non-criminal population is modelled differently. In this case, the projected size of the non-criminal population is set equal to the average size of the non-criminal population over the last 6 months of available data. This ensures that the non-criminal projections reflect the latest and most accurate count of the non-criminal population as changes in the way that non-criminal population data are recorded mean that it is not possible to use a longer time range to estimate the future level of this population.

The main stock-flow structure shown in Figure C3 calculates the flow of prisoners into and out of prison based on their age group on reception (17 and under, 18-20 and 21 and over). Dynamic aging matrices are used to convert projections by reception age group into projections by current age group. Separate matrices are provided for males and females and for remand and sentenced prisoners.

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 and legislation and for seasonal effects**

The raw, unadjusted prison population projections are subject to model adjustments to show the impact of new guidelines for the sentencing of assault, the opening of a new immigration removal centre (Morton Hall), the

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<sup>23</sup> [www.legislation.gov.uk/ukpga/2008/4/contents](http://www.legislation.gov.uk/ukpga/2008/4/contents)

continued impact of the retrospective changes to release arrangements and the impact of the public disorder events in England and Wales in August 2011. Model adjustments are also used to account for seasonal variation in the population. Model adjustments have been applied equally to all the scenarios modelled.

The impact of the public disorder on the prison population has been estimated by making assumptions around:

- the total number and timing of public disorder related arrests;
- the flow of public disorder cases through the courts; and
- remand rates, custody rates and average custodial sentence lengths for convicted offenders.

The maximum increase estimated for the prison population as a direct consequence of the August 2011 public disorder events is 1,000. Actual data from the public disorder events is only just starting to emerge so through necessity these estimates are heavily assumptions based. The true impact of the public disorder on the prison population will be better understood as more information comes to light on arrests, remand rates, progress through the courts for public disorder and other cases, sentencing, appeals, recalls and any offset in offences which might have been committed by those already in prison as a result of the public disorder.

It is anticipated that there will be very few IPPs or Lifers in the public disorder prison population so none have been included in these estimates. Also, estimates of the impact of the public disorder on future recalls have not been made because public disorder prisoners will need to complete their prison sentences before an indication of the likelihood of recall for these individuals can be determined.

The Sentencing Council have developed new guidelines for the sentencing of crimes of violence with the principal aim of promoting consistency in sentencing<sup>24</sup>. These guidelines came into effect on 13<sup>th</sup> June 2011. The guideline applies to offenders aged 18 and over. To model the impacts of these guidelines, changes have been made to the Prison Population Stock-Flow Model receptions and time served figures by age and gender, based on data provided by the Sentencing Council. The maximum reduction made to the prison population due to this guideline change was less than 500.

The Sentencing Council have also developed new guidelines for the sentencing of Burglary<sup>25</sup>. However, these are not anticipated to have any impact on numbers given custodial convictions or on custodial sentence lengths.

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<sup>24</sup> <http://sentencingcouncil.judiciary.gov.uk/guidelines/guidelines-to-download.htm>

<sup>25</sup> <http://sentencingcouncil.judiciary.gov.uk/guidelines/forthcoming-guidelines.htm>

Morton Hall is a new immigration removal centre (IRC) with 392 places that was opened in May 2011. An adjustment has been made to the non-criminal projection for these additional places which would not previously have been counted as part of the prison population<sup>26</sup>. Where actual occupancy rates are available these have been used to adjust the projections. Going forward, the initial trend in occupancy has been assumed to continue until capacity is reached, though the precise build up of the non-criminal population is difficult to model because it depends on where immigration detainees are held. It is expected that once occupancy meets capacity, Morton Hall will see more consistency in its occupancy levels in line with rest of the IRC estate.

Release arrangements for determinate sentence prisoners were changed in 2005 (as a result of changes made in the 2003 Criminal Justice Act) so that determinate sentence prisoners who committed offences from 2005 were released at the half way point of their sentence, instead of at the two-thirds point. No model adjustments are required to model this change because there is sufficient historical data to ensure any impacts are captured in the model calibration. However, in 2008 the Criminal Justice and Immigration Act applied this change retrospectively to most determinate prisoners who had committed offences before 2005. The calibration of the model assumes these prisoners would serve their sentence as they would have done before the retrospective rule change, so the “bounty” gained in each category as a result of the change needs to be subtracted from the determinate sentence projections. Total “bounty” gained was found to be less than 100 prison places at peak levels. It was also found to reduce over time as the number of prisoners to which the retrospective change applies goes down.

The other ongoing changes within the system e.g. End of Custody Licence<sup>27</sup> are assumed to be captured in the past data and the trends detected therein.

Projections for each sub-population were smoothed using a centred 13 month average and seasonality was added back in to the projections. Seasonality was added to the smoothed projections where seasonality was identified using autocorrelation plots. It was added over the historical period using the simple difference between smoothed and non-smoothed historical data. It was added in to the smoothed projections over the future period (and the last six months of the historical period) using average seasonal adjustments from mid 2006 to mid 2009.

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<sup>26</sup> Detainees held in prisons or in NOMS-run Immigration and Removal Centres are counted in the prison population, whereas detainees held elsewhere in the detention estate are only shown in UKBA detention figures

<sup>27</sup> Statement made by the Secretary of State for Justice:  
[www.publications.parliament.uk/pa/cm200910/cmhansrd/cm100222/debtext/100222-0004.htm#22](http://www.publications.parliament.uk/pa/cm200910/cmhansrd/cm100222/debtext/100222-0004.htm#22) Feb 2010 : Column 27

## **Appendix D: Stakeholders consulted about scenarios**

Internal stakeholders from across the Ministry of Justice.

External representatives from:

National Offender Management Service (NOMS)—Estates;

NOMS—Population Strategy;

NOMS—Public Protection Unit;

NOMS—Scenario Analysis Team;

The Magistrates' Association;

The Prison Service;

The Probation Service;

The National Bench Chairmen's Forum;

The Parole Board;

The Sentencing Council;

The Youth Justice Board;

The Judiciary.

## Contact Points for further information

Current and previous editions of this publication are available for download from [www.justice.gov.uk/publications/statistics-and-data/index.htm](http://www.justice.gov.uk/publications/statistics-and-data/index.htm)

Press enquiries should be directed to the Ministry of Justice press office, telephone: 020 3334 3536

Other enquiries about these statistics should be directed to:

Justice Statistics Analytical Services  
Ministry of Justice  
7th Floor  
102 Petty France  
London  
SW1H 9AJ

General enquiries about the statistical work of the Ministry of Justice can be e-mailed to: [statistics.enquiries@justice.gsi.gov.uk](mailto:statistics.enquiries@justice.gsi.gov.uk)

General information about the official statistics system of the UK is available from [www.statistics.gov.uk/](http://www.statistics.gov.uk/)



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