

Scottish prison population projections

June 2023

Scottish prison population projections

This report presents short-term Scottish prison population projections for the six month period from April to September 2023. These are the first projections to be published since the Covid-19 pandemic began. They have been produced using ‘microsimulation’ scenario modelling which simulates prison arrivals and departures, and estimates the number of individuals in prison on a particular date in the future.

The projections are produced to help inform decision making, planning, and policy development.

1 Key Points

The latest prison population projections to September 2023 show that:

- The overall prison population in Scotland is highly likely to either remain stable or rise slightly between April and September 2023, with a projected range of between 7,300 and 8,050 for the average daily prison population in September 2023. As at 1st April 2023, the prison population was around 7,500.
- It is highly likely that the remand population will either remain stable or decrease between April and September 2023. If it decreases as a result of enhanced monthly case conclusions, this may contribute to an increased sentenced population as more individuals transition from remand.
- It is highly likely that the sentenced population will either remain stable or rise slightly; it may rise if the overall rate of transition from remand to the sentenced population increases or if there is a greater inflow of individuals directly from the community to the sentenced population.

There is likely to be a degree of uncertainty in the prison population projections over the next six months due to a number of factors, including variability in both court demand and throughput.

2 Background

Up to March 2020, the Scottish Government produced short-term prison population projections using time-series based forecasting methods applied to prison population trends. These projections were based on ARIMA (Autoregressive Integrated Moving Average) models, which are commonly used in other European jurisdictions. ARIMA projections are based on historical trends in the average monthly prison population and indicate the likely trajectory of the population size should trends in crime and justice remain stable. As ARIMA forecasting extrapolates from historical data, it cannot model changes to the prison population that are not already reflected in past trends. Hence, following the rapid large-scale changes which occurred in the criminal justice system during the Covid-

19 pandemic, ARIMA modelling was no longer considered appropriate for short term prison population projections.

The pandemic has had profound impacts on justice system activity (e.g., court capacity and throughput) and the flows (e.g., remand arrivals and departures, sentence arrivals and departures) impacting on the prison population. Therefore, the Scottish Government has recognised the need to develop alternative projection models that take into account how the system activity and flows that drive the prison population are likely to change, and use these to estimate short-term changes in the population. To that end, in consultation with justice partners, the development of microsimulation scenario modelling of the prison population has been undertaken since 2021. This approach is more appropriate for modelling the prison population post-pandemic and through the initial recovery period.

The 'microsimulation' scenario modelling adopted simulates arrivals and departures of individuals to and from the prison population and then estimates the number of individuals in prison on a particular date in the future. The microsimulation model uses individual-level data to construct a representation of a target population. The model can simulate, using known probabilities, changes in individuals' status over time.

To produce outputs, the model draws on particular court activity data, for example, levels of court hearings at different stages (pre-trial / trial) in summary and solemn courts. This data is also used to estimate levels of remand arrivals in the coming months. The model includes assumptions on future court capacity, as these are currently the most important factor that is likely to impact on prison population changes in the short/medium term. The model does not currently simulate flows for different crime-types, so crime-based trends are not explicitly modelled. As the model can be validated against historical data and can reflect a wide variety of dynamics, it is suitable for forecasting both in the short and medium term. However, there is uncertainty underlying the justice system's recovery (e.g., the rate at which court backlogs can be tackled) which impacts the model's assumptions and longer-term predictive power. Also, since the model works with individual data, as the projections extend further into the future there is greater uncertainty in the level of registrations of cases for prosecution in court. Due to these effects, currently only a 6-month projection is provided.

The rest of this report is organised as follows. Section 3 provides a brief overview of prison population trends from 2010 to 2023. Section 4 includes a contextual narrative of the main drivers of changes in the prison population in the short-term. It provides a brief summary of how the key drivers of trial courtroom capacity have changed recently, and the expected changes in the short/medium term. Section 5 includes an overview of why and how Scottish Government prison population projections have been revised to account for post Covid-19 pandemic justice system recovery. It provides an overview of the assumptions used to project the prison population and explains how the model's previous projections are validated for robustness against actual prison population figures in recent months. Section 6 summarises the population projection results for the period from April 2023 to September 2023. Section 7 concludes the report and briefly discusses other factors which may influence the size of the prison population in the longer term.

This report is the first of its kind and it is envisaged that it will be updated bi-annually (in Spring and Autumn). Each update will include an assessment of how the model has performed by comparing the previous population projections and the actual population level over recent months. Continuous development of the model and user engagement will

be carried out to ensure appropriate and timely adjustments are applied to the model's assumptions and capabilities, in order to maximise its value in informing decision making and capacity planning of justice partners.

3 Overview of Scottish Prison Population Trends

Figure 1 shows the average annual daily prison population between 2009-10 and 2021-22, sourced from the latest official prison population statistics¹. As shown below, the population decreased every year from 2011-12 until 2017-18 when the average daily population reached around 7,500. The prison population then rose sharply to an annual daily average of around 8,200 in 2019-20, just before the Covid-19 pandemic.

Figure 1. Average Total Daily Prison Population by Financial Year.

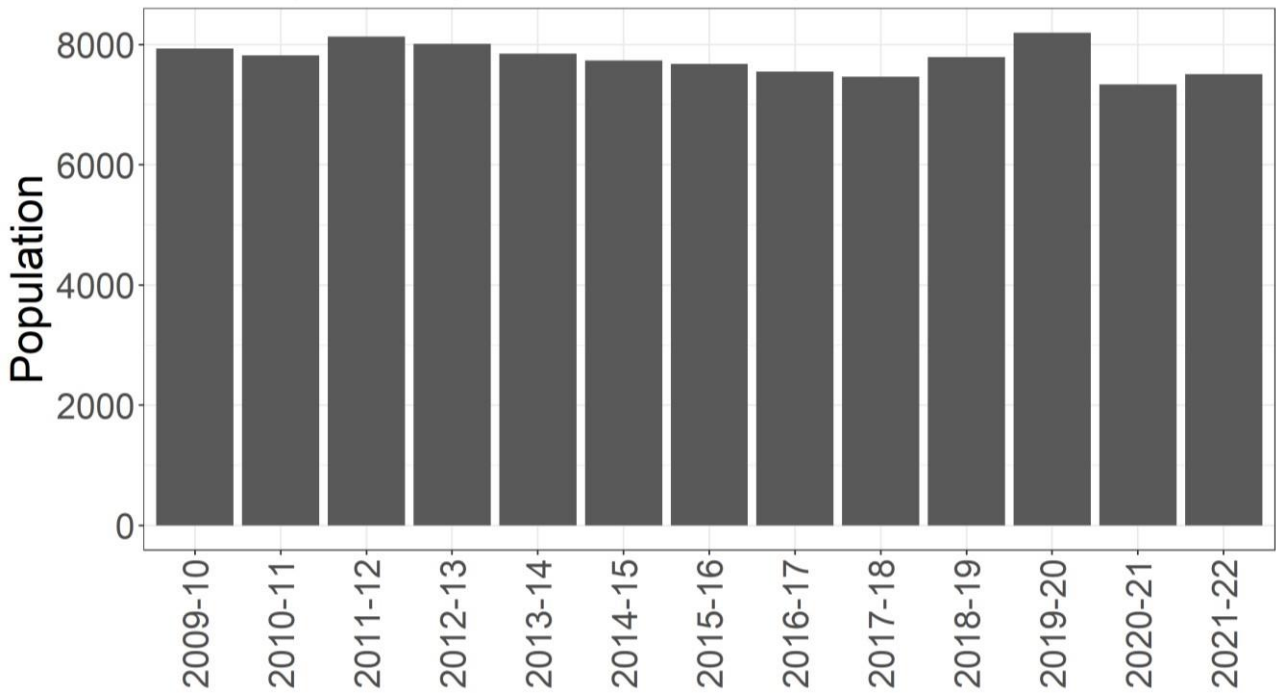
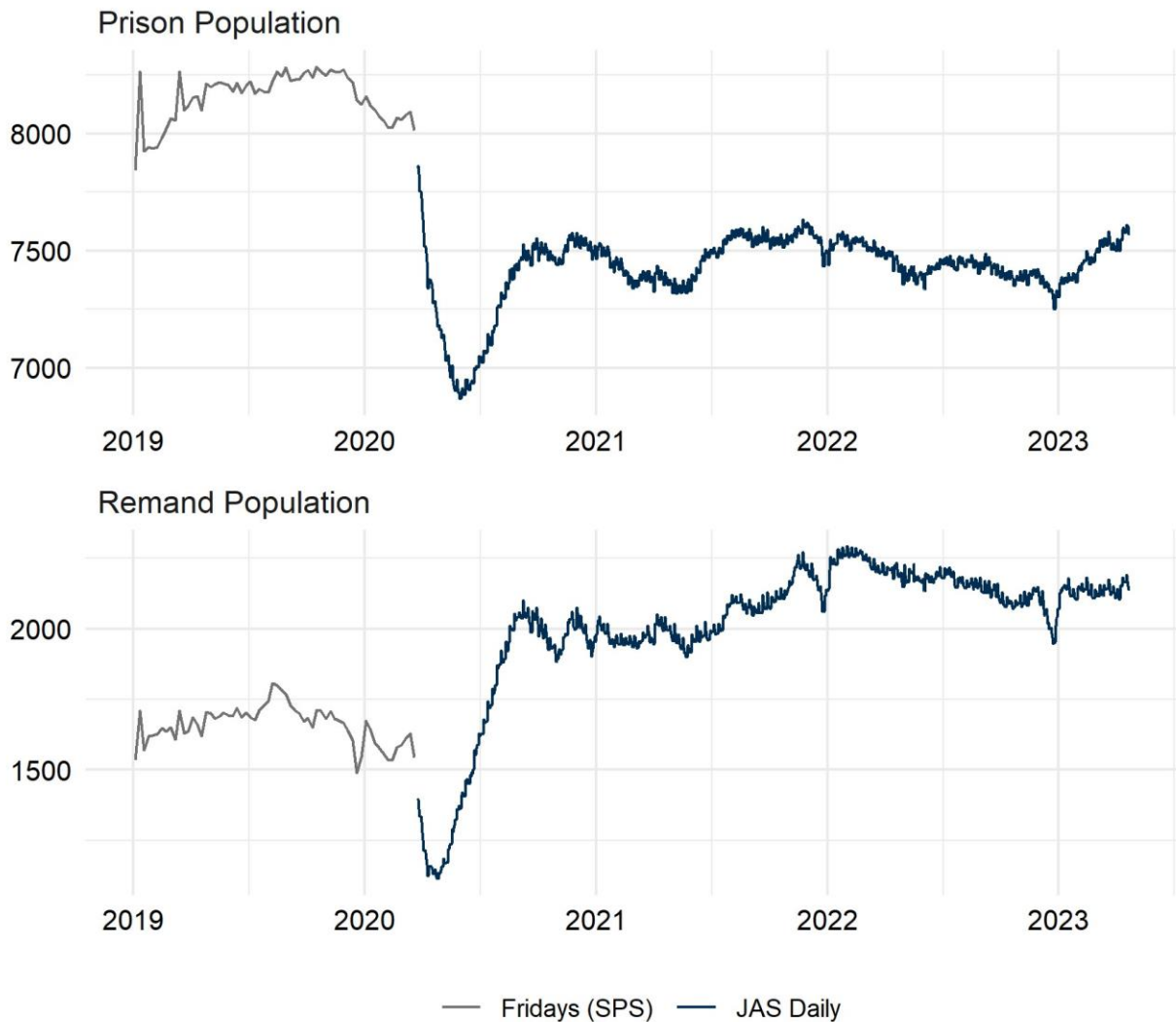


Figure 2 shows that since 2019-20 there have been substantial changes to the total, remand, and sentenced populations during and after the pandemic:

- The average daily prison population fell sharply from around 8,000 to just under 7,000 between March 2020 and June 2020, rising quickly thereafter to around 7,400 in September 2020 then remaining relatively stable until early 2023 (it was around 7,500 on 1st April 2023).
- The average daily remand population dropped from above 1,500 to just over 1,100 between March and April 2020, then increased rapidly to around 2,000 in September 2020. During 2021 the remand population continued to rise, albeit much more slowly. After initially continuing to increase in early 2022 (reaching a peak of nearly 2,300 on 1st February 2022) the remand population then decreased gradually (other than around December 2022/January 2023) over the next year, reaching just over 2,100 on 1st April 2023.

¹ [Scottish Prison Population Statistics - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/prison-population-statistics-2021-22/pages/1-introduction.aspx)

Figure 2. The Prison Population (total and remand), between January 2019 and April 2023².



Adherence to Covid-related public health measures effected normal activity in the court and prison systems. These measures, and the adaptations implemented in response, had a substantial effect on the remand and sentenced populations, especially around March to July 2020, including as a result of an agreement in the initial stages of the pandemic response to early release of eligible short term sentenced prisoners.

² [Justice Analytical Services: safer communities and justice statistics monthly report - gov.scot \(www.gov.scot\)](https://www.gov.scot/Justice-Analytical-Services-safer-communities-and-justice-statistics-monthly-report)

4 The Criminal Justice System in Scotland and Covid-19

The Structure of the Criminal Courts

There are three types of courts which can hear criminal cases in Scotland: the High Court, Sheriff Court, and the Justice of the Peace Court. The High Court hears the most serious cases, including all cases of rape and murder. The Sheriff Court can hear all other criminal cases. The Justice of the Peace court hears minor summary cases.

Criminal cases proceed in court in either a Summary prosecution (starting with a new case calling in the Sheriff Summary or Justice of the Peace court) or a Solemn prosecution (which begins with a new “Solemn Petition” case calling in the Sheriff court). Solemn prosecutions are for more serious criminal charges and would involve a jury when heard at a trial held in either the Sheriff Solemn court or High Court³.

Custodial Sentencing Powers

The following overview of the different custodial sentencing powers of Scottish courts illustrates one of the factors differentiating the court types:

- the maximum prison sentence a Justice of the Peace court can impose is up to 60 days.
- the Sheriff in a Summary case can sentence an accused person up to 12 months in prison, whereas the Sheriff in a Solemn case can sentence an accused person up to 5 years in prison.
- there is no limit on the length of prison sentence the High Court can impose³.

Since the end of June 2019 there has been a statutory presumption in terms of the Criminal Procedure (Scotland) Act 1995 against the imposition of a custodial sentence of less than 12 months. This is likely to mean that fewer custodial sentences will be issued by the Justice of the Peace court.

Impact of the Covid-19 Pandemic on the Justice System

As with many other areas, the Covid-19 pandemic caused significant disruption and presented significant challenges for the operation of the justice system. Compliance with public health measures during the pandemic influenced operations across the criminal justice system. The Lord Advocate issued revised guidelines on the use of police custody, and the courts had to close for extended periods or operate at reduced capacity. The necessity for non-essential court business to be temporarily suspended and the need for

³ Overview of how crimes are dealt with by the police and Crown Office and Prosecution Service (COPFS) and what happens at court and after a criminal verdict ([Scotland's criminal justice system](#)).

social distancing rules to be considered as courts re-opened affected normal activity in the court and prison systems. These measures, and the adaptations implemented in response (see Figure 3 for key events), contributed to major changes in the remand and sentenced populations, particularly between March and July 2020:

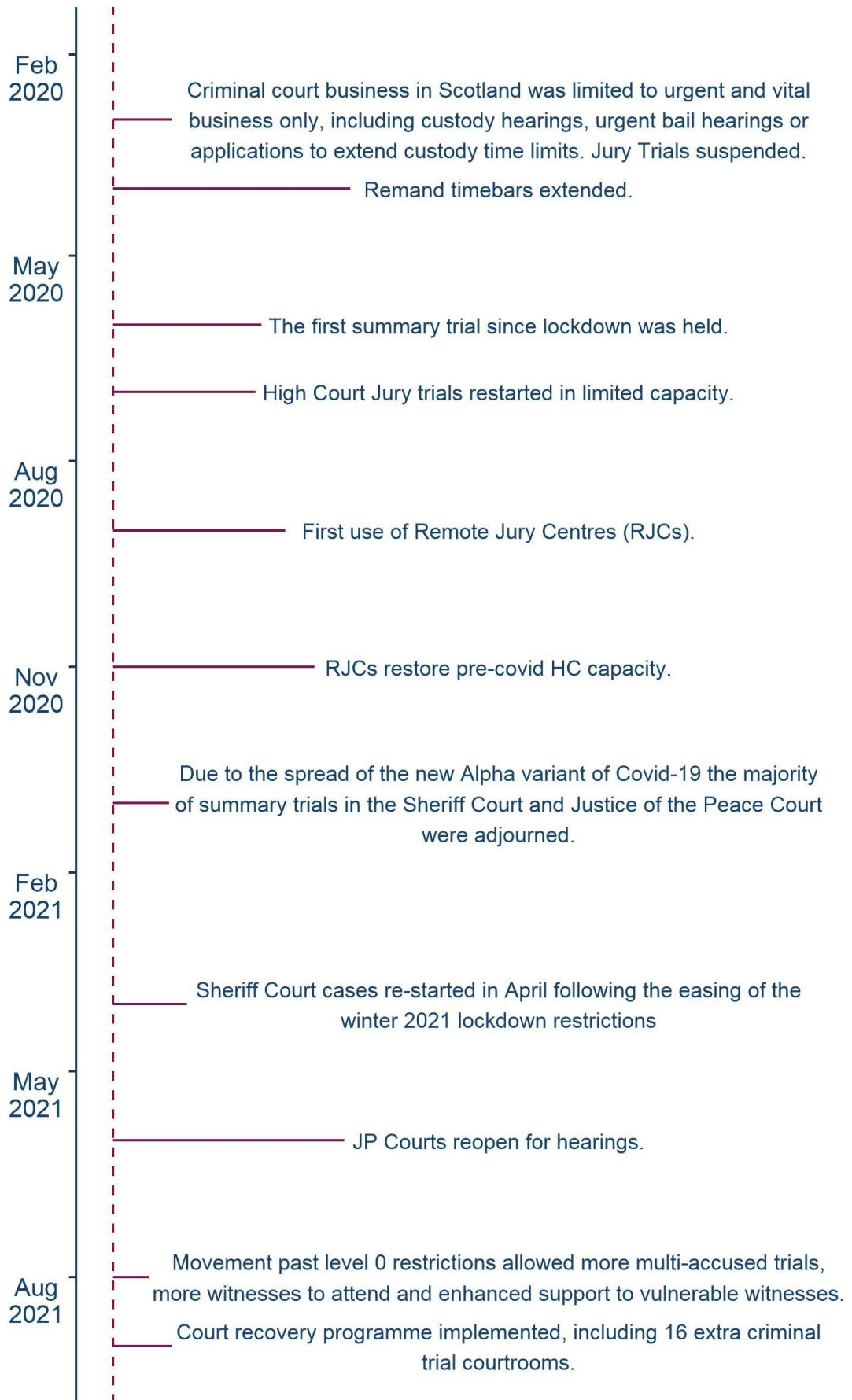
- a decreased volume of custody cases and an increased volume of undertakings reported to the Crown Office and Procurator Fiscal Service⁴.
- a reduced likelihood of an accused being remanded⁵.
- a reduced volume of concluded cases in courts, with subsequent reduction in custodial sentences issued and growth in the trial backlog⁶.

⁴ [Coronavirus \(COVID-19\): Justice Analytical Services data report.](#)

⁵ [Sheriff Courts - remand and bail outcomes: occasional paper.](#)

⁶ [Coronavirus \(COVID-19\): Justice Analytical Services data report - gov.scot \(www.gov.scot\)](#) and [Sheriff Courts - remand and bail outcomes: occasional paper.](#)

Figure 3. Timeline of key pandemic related events in the criminal courts from February 2020 to September 2021.



The Courts Recovery Programme

The SCTS (Scottish Courts and Tribunals Service) Courts Recovery Programme⁷ implemented additional courtrooms from September 2021 to address some of the challenges faced by the justice system. The number of Sheriff Summary trial courtrooms was increased from 33 to 43, Sheriff Solemn trial courtrooms increased from 18 to 20 and High Court trial courtrooms went from 16 to 20.

SCTS monthly management information⁸ shows that the national total trials scheduled across all criminal courts increased steeply, due to the effects of the Covid-19 pandemic, by around 140% from 18,100 in April 2020 to over 43,600 at its peak in January 2022. It then fell substantially to 28,000 at the end of February 2023. However, whilst the number of Sheriff Summary procedure courts scheduled trials reduced between January 2022 and February 2023, they increased in Sheriff Solemn⁹ and High Court¹⁰ by 9% and 28% respectively. Furthermore, since the pandemic, the number of scheduled trials in Sheriff Solemn grew by over 380% from around 500 in April 2020 to 2,400 in February 2023¹¹. The scheduled trials in High Court grew by nearly 75% from 390 in April 2020 to 680 in February 2023. For more information on assumptions related to estimating the size of the scheduled trials backlog refer to SCTS monthly management information¹¹.

The level of new business in Scottish criminal courts is determined by factors outside the control of SCTS which is prepared to adapt capacity using the best available estimates of future court demand. Primarily to address the backlog in solemn trials, the Court Recovery Programme put plans in place to introduce a further 2 High Court and 6 additional Sheriff Solemn trial courtrooms from April 2023. At the same time, linked to the reduction in the summary trials backlog, the number of Sheriff Summary courtrooms was reduced from 43 to 33¹².

Long term trends in crime levels and the prison population

This section seeks to provide context for factors which have influenced the prison population over recent decades. These factors include levels of crime recorded, clear up rates and sentencing.

Over the past 30 years, the overall level of crimes recorded by the police in Scotland has fallen by over 50%. To illustrate this, in 1991 recorded crime reached its highest level since 1974 when it was 613,943 but by 2021-22 the total number of crimes recorded by the police in Scotland had declined to 286,464¹³. As shown in Figure 4, whilst the majority of the decline can be accounted for by a reduction in crimes of dishonesty, in the past 20 years there have been reductions for almost all crime groups, apart from sexual crimes.

⁷ [Recovery programme courts come into operation \(scotcourts.gov.uk\)](https://scotcourts.gov.uk).

⁸ The Management Information and Analysis Team of the Scottish Courts and Tribunals Service produces official statistics and provides management information [SCTS Official Published Statistics \(scotcourts.gov.uk\)](https://scotcourts.gov.uk).

⁹ Increased from 2,212 to 2,402 between January 2022 and February 2023.

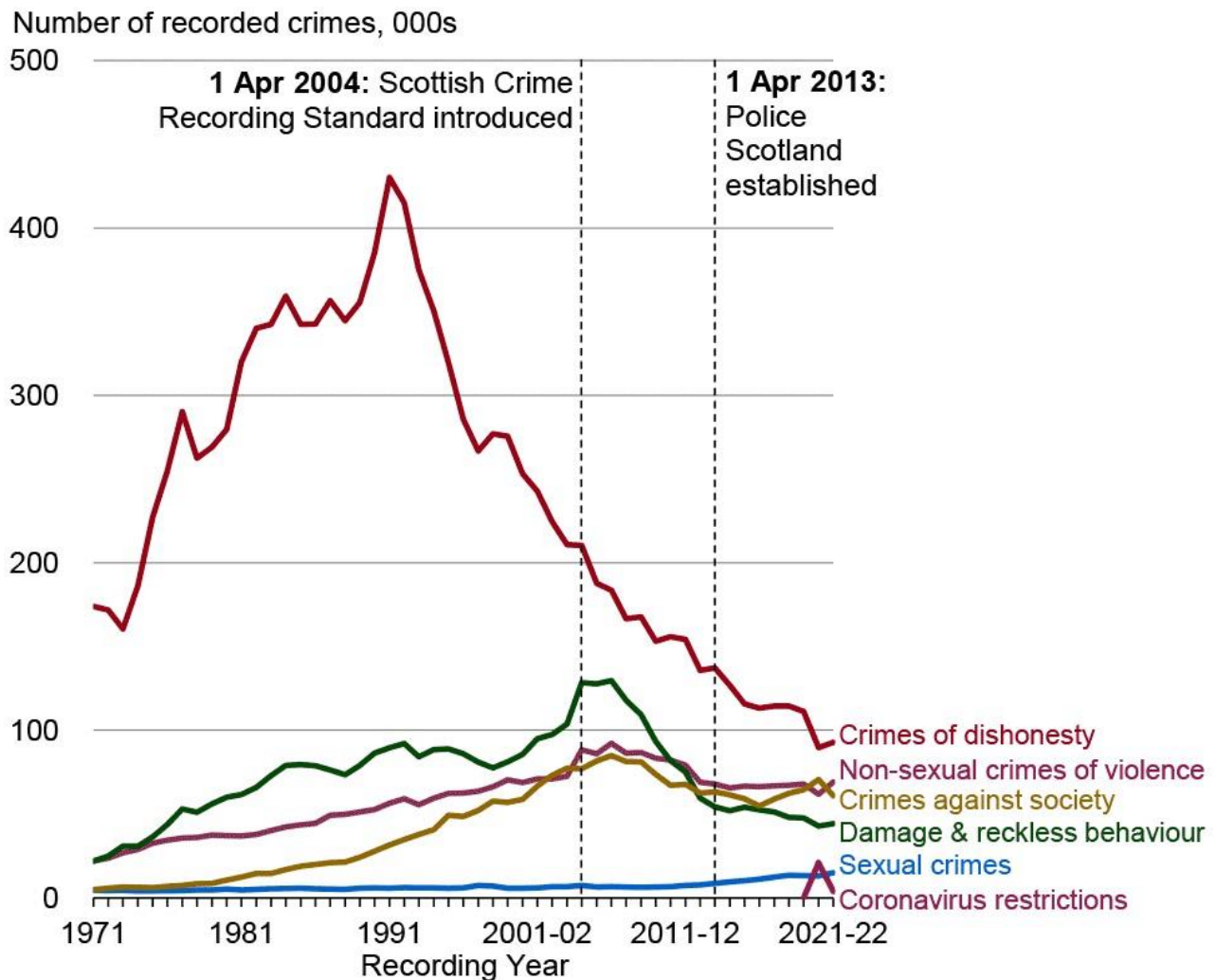
¹⁰ Increased from 534 to 681 between January 2022 and February 2023.

¹¹ [SCTS Official Published Statistics \(scotcourts.gov.uk\)](https://scotcourts.gov.uk).

¹² [Plans for additional trial courts by April 2023 \(scotcourts.gov.uk\)](https://scotcourts.gov.uk).

¹³ [Introduction - Recorded Crime in Scotland, 2021-2022 - gov.scot \(www.gov.scot\)](https://www.gov.scot)

Figure 4. Crimes Recorded by the Police by Crime Group, 1971 to 1994, 1995 - 96 to 2021 - 22¹⁵.



The spread of technology such as CCTV and other means of capturing evidence (e.g., widespread use of forensics) have contributed in part to the improvements in prosecution outcomes¹⁴. Figure 5 shows that the clear up rate (the proportion of all recorded crimes with a sufficiency of evidence under Scots law to justify consideration of criminal proceedings) in Scotland has increased from around 30% in 1991 to over 50% in 2021-22.

¹⁴ [Crime and imprisonment, DG Education Communities and Justice, 2019.](#)

Figure 5. Clear up rate for total recorded crime, 1976¹⁵ to 1994, 1995-96 to 2021-22¹⁵.

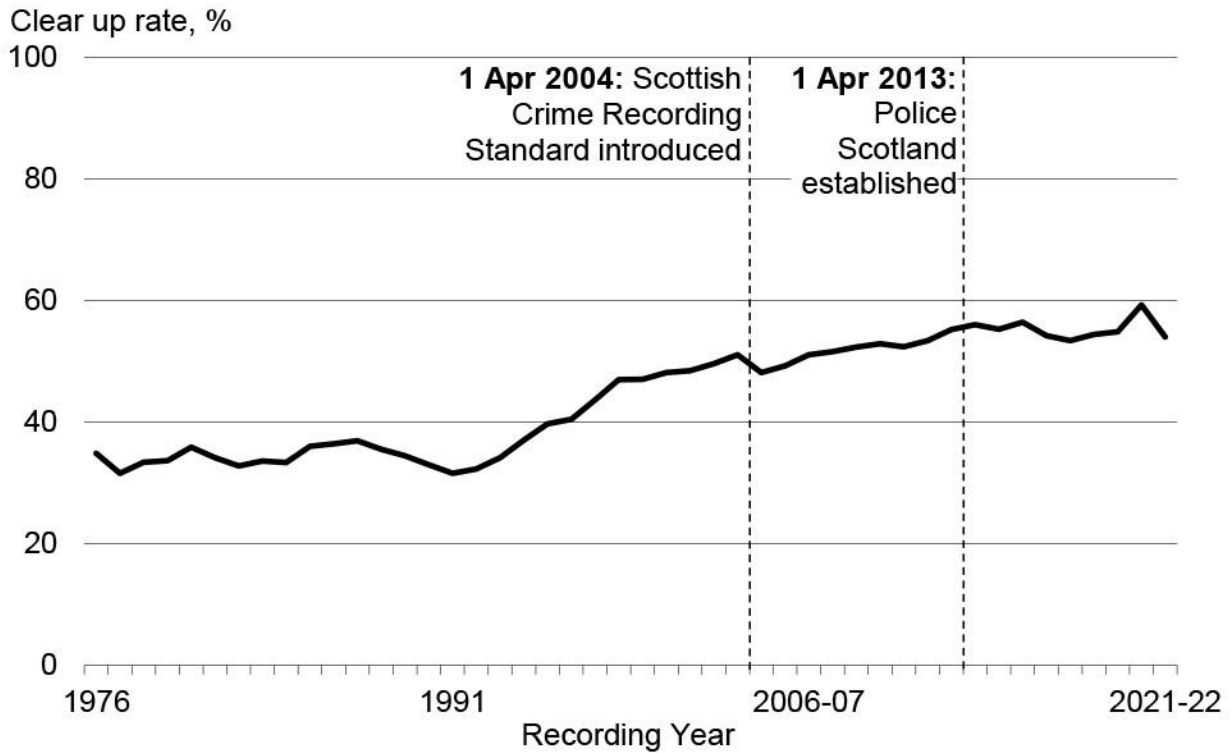
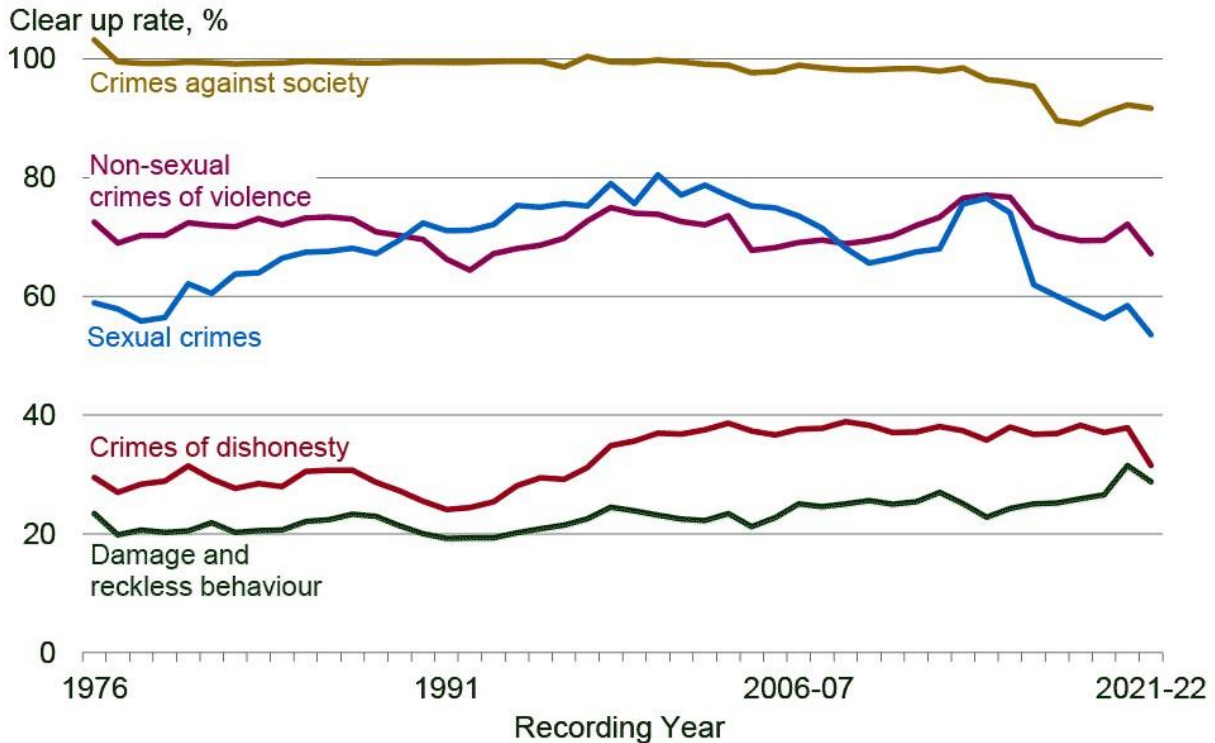


Figure 6. Clear up rates for crimes recorded by the police by crime group, 1976¹⁷ to 1994, 1995-96 to 2021-22¹⁵.



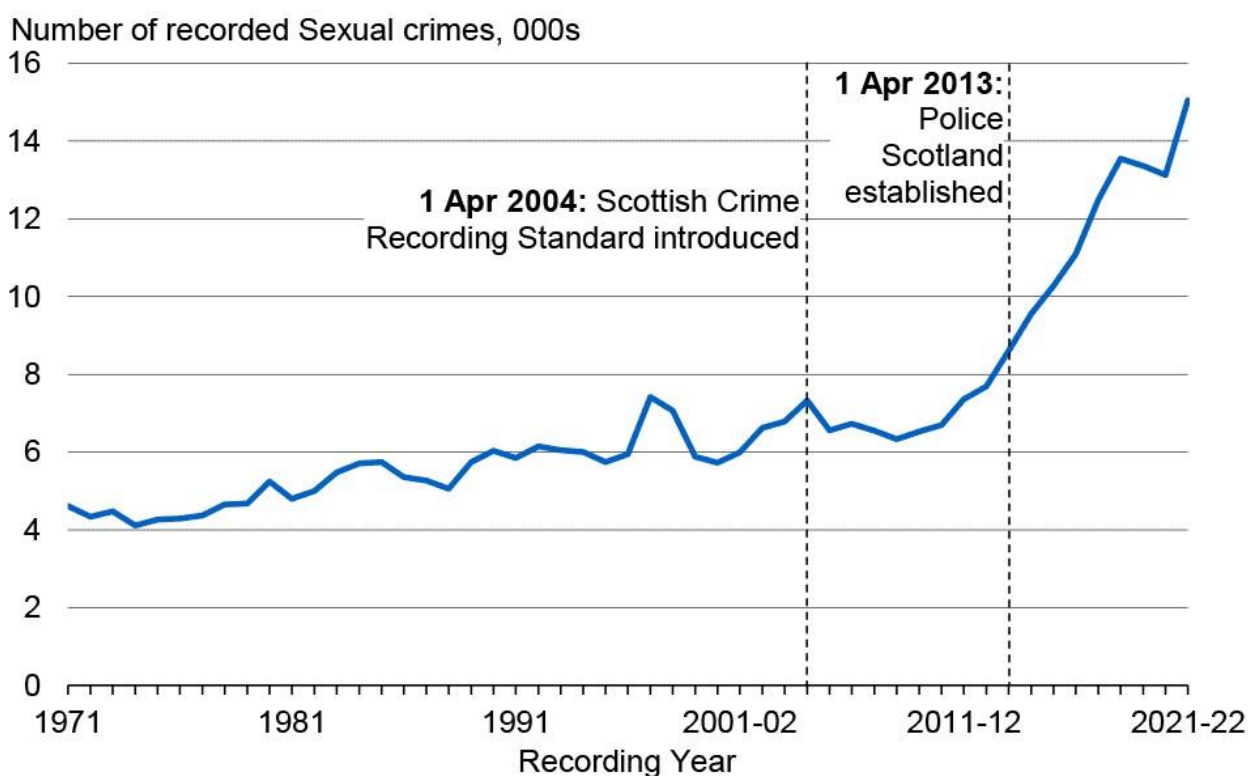
The improvement in clear up rates is in part a “substitution effect”, because (as shown in Figure 4) the number of crimes associated with lower rates (such as crimes of dishonesty)

¹⁵ Comparable clear up rates for the present crime groups are not available prior to 1976.

has reduced by a greater proportion than the number of crimes associated with higher rates (see Figure 6). Furthermore, conviction rates have remained broadly stable, suggesting there has been no reduction in the quality of cases prepared by police and prosecution organisations despite the increase in clear up rates. This helps explain why there has been an increased demand for trials and associated sentencing, despite reduced crime rates.

In contrast to most other types of reported crimes in Scotland, which have fallen consistently over the past ten years, sexual crimes recorded by the police have increased every year to 2021-22, other than small decreases in 2019-20 and 2020-21 (see Figure 7). Although conviction rates for sexual crimes remain relatively low, the overall level of convictions for sexual crimes has increased substantially. The “downstream” impacts on both criminal justice social work and on the prison estate have been significant. Those convicted of sexual crimes now account for a far greater proportion of the prison population.

Figure 7. Sexual crimes recorded by the police, 1971 to 1994, 1995-96 to 2021-22¹⁵.



Due to a combination of factors, the custodial sentences issued have not reduced in the way that recorded crime has in the last 30 years and the average time spent in custody has been increasing. Between 2010-11 and 2019-20, the proportion of individuals who departed prison having served up to 3 months fell from 70% to 58% whereas the proportion who served a year or more increased from 7% to 10%¹⁶.

The prison population is changing in line with recent sentencing legislative and policy changes, alongside crime trends. Repeated below are comments from the 2019-20 prison

¹⁶ [Key Findings - Scottish prison population: statistics 2019 to 2020 - gov.scot \(www.gov.scot\)](https://www.gov.scot/resources/documents/2021/02/Key-Findings-Scottish-prison-population-statistics-2019-to-2020.pdf).

population statistics¹⁷ which provide the context in which recent prison population changes should be viewed:

“The data presented here cannot attest to the impact of these [legislative and policy changes] on their own, but the context is important to consider in interpreting the patterns above. For example, in terms of sentencing, the presumption against short term prison sentences was introduced in 2011, and extended to include custodial sentences of 12 months or less in 2019, with the aim of reducing ineffective use of custody and encouraging community based sentences addressing offending and rehabilitation. Changes in sentencing practices over time are observed in the Criminal Proceedings in Scotland 2018-19 report¹⁸, with a steady increase in custodial sentences of more than one year.

Changes to release arrangements can impact the prison population. Automatic early release for longer term prisoners ended in 2015 and use of home detention curfew¹⁹ for short term prisoners was substantially reduced in 2018²⁰.”

In summary, overall levels of reported crime have been declining over the long term which has allowed increasing prioritisation of resources toward the prosecution of the most serious crimes. Alongside the use of new technology, the focus of resources on a smaller pool of crimes (especially more serious crimes) has contributed to improved detection, clear up and conviction rates. However, this “upstream” progress has meant that pressures have not diminished “downstream”, with the prison population rising substantially over the past 30 years²¹.

Court Activity and the Prison Population

Over the near term, especially while the Covid-19 pandemic related scheduled trials backlog remains high, the two main factors likely to influence changes in the size of the prison population are:

- crime type breakdown of cases in the backlog, and
- court throughput.

Increasing the number of Sheriff Solemn and High Court trial courtrooms, as part of the SCTS Courts Recovery Programme, will permit more Solemn procedure Evidence Led Trials which will directly reduce the size of the backlog. However, the majority of trials called under Solemn proceedings do not result in an Evidence Led Trial, often because the individual pleads guilty before the case goes to trial. In 2019-20 the ratio of indictments to Evidence Led Trials in Sheriff Solemn court was around 5 to 1 (in the High Court it was around 2 to 1). Therefore, greater trial court capacity also *indirectly* causes the court backlog to reduce at a faster rate than it might otherwise. In part, this is because many individuals will choose to plead guilty in the lead up to their scheduled trial date, since they can receive a sentence discount by pleading before proceeding to a trial. Clearly, there needs to be sufficient capacity available in case the accused doesn't plead before the scheduled trial, or the sentence discounting incentive would lose some of its effect and this aspect of the justice system would lose some credibility.

¹⁷ [Scottish prison population: statistics 2019 to 2020 - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/statistics/2019-2020/prison-population-statistics-2019-to-2020/pages/1-introduction.aspx).

¹⁸ [Criminal proceedings in Scotland: 2018-2019 - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/criminal-proceedings-in-scotland-2018-2019/pages/1-introduction.aspx).

¹⁹ [Home Detention Curfew \(sps.gov.uk\)](https://sps.gov.uk/home-detention-curfew/).

²⁰ [The 2018/19 audit of the Scottish Prison Service.](https://www.gov.scot/publications/2018-19-audit-of-the-scottish-prison-service/pages/1-introduction.aspx)

²¹ [Crime and imprisonment, DG Education Communities and Justice, 2019.](https://www.gov.scot/publications/crime-and-imprisonment-2019/pages/1-introduction.aspx)

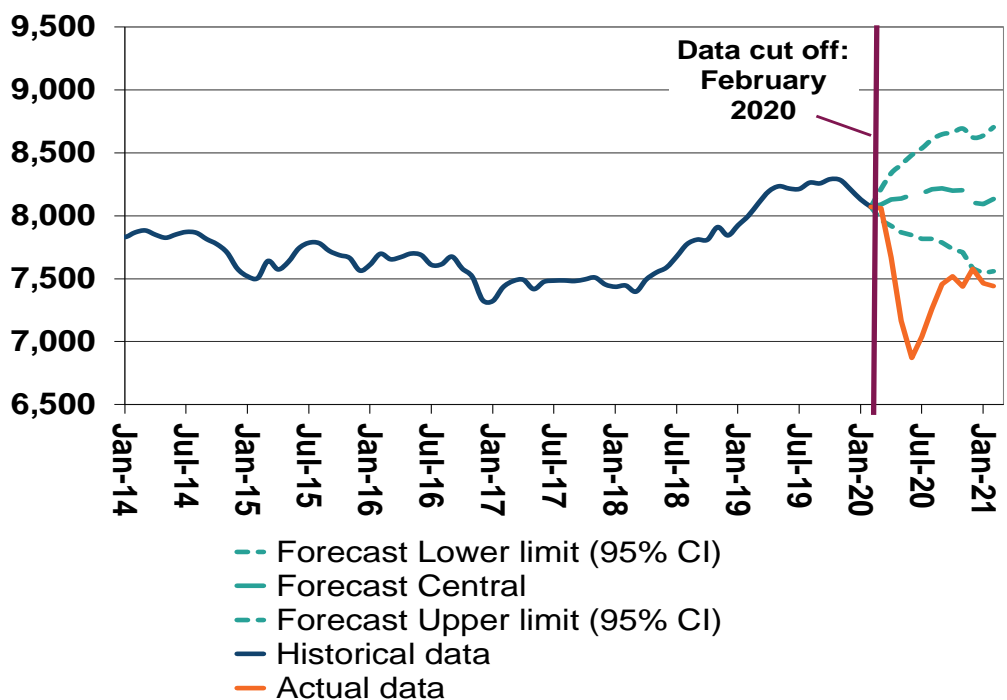
5 Introduction to Prison Population Projections

Pre-pandemic ARIMA Prison Population Projections

Prior to March 2020, Scottish Government prison population projections were produced by applying time-series based forecasting methods (ARIMA) to population trends, a technique used commonly in other European jurisdictions. ARIMA projections are based on historical trends in the average monthly prison population and indicate the likely trajectory of the population size should trends in crime and justice remain stable. As ARIMA forecasting extrapolates from past trends, it cannot model changes to the prison population that are not already reflected in past trends. Hence, following the rapid, large-scale changes occurring in the criminal justice system from March 2020 as: i) a direct result and ii) response to the COVID pandemic, ARIMA modelling was shown to be no longer suitable for providing meaningful or accurate prison population projections.

Figure 8 shows results of ARIMA based prison population projections for the period March 2020 to February 2021, alongside actual prison population figures for the same period. It is clear from the figure below that the actual prison population was substantially below the lowest point of the range of the ARIMA based projections. As such, when there are large scale shocks to the system, as occurred during the pandemic, the ARIMA method has been shown to provide unreliable projections, as it assumes historical trends largely continue to hold true.

Figure 8. ARIMA forecast conducted in March 2020.



Post-pandemic Microsimulation Modelling for Prison Projections

There was a need to develop an alternative to the ARIMA model, which would account for how system activity and flows might change during recovery, to estimate potential short-term changes in the prison population. Therefore “microsimulation scenario” modelling was developed which simulates the expected number of arrivals and departures to help estimate the number of individuals in prison (remand, sentenced and overall populations) on a particular date in the future.

In the short/medium term, whilst the scheduled trials backlog²² remains high, the factor expected to have the greatest influence on changes to the size of the prison population is national court capacity. Therefore, to estimate flows in the coming months, such as case conclusions, the “microsimulation scenario” model uses the planned levels of court capacity at different stages (pre-trial / trial) in both summary and solemn courts. This approach can be adapted to sudden changes in the system, such as uplifts in court capacity, because it is not reliant on forecasting based solely on past trends.

Overview of the microsimulation model’s structure

The microsimulation prison projection model uses mathematical simulations to approximate the processes whereby individuals move into and out of prison. Information on the current prison population and the number of individuals attending court hearings who may receive custodial sentences is used to support the modelling. The individuals accused of crimes who go on to receive custodial sentences are subject to court diets beforehand, hence data on recent court activity helps inform estimates of the future prison population. Modelling is used to make short/medium term forecasts of what may happen to the prison population, whilst accounting for some uncertainty.

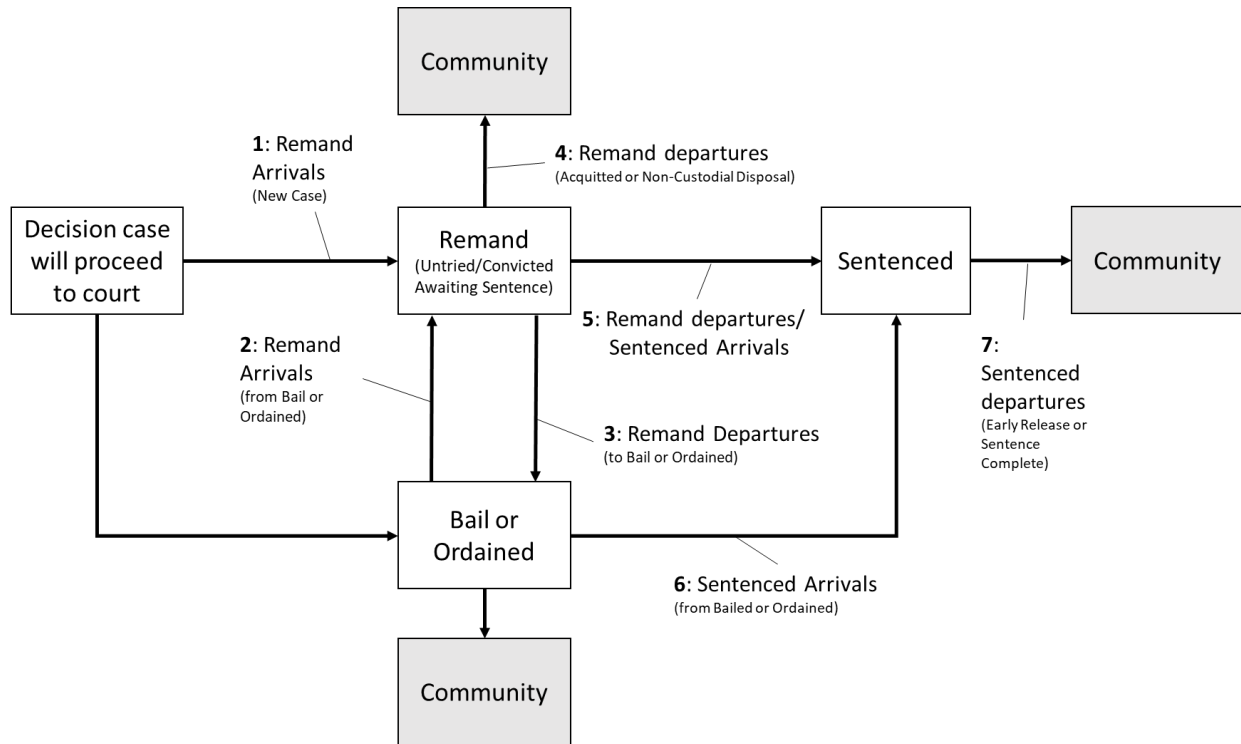
It should be noted that the model does not currently simulate flows for different Sheriffdoms or crime-types, so sub-national and crime-based trends are not explicitly modelled.

In the microsimulation model, prison population data is used to set the initial size of the different prison sub-populations, such as sentenced and remand. Data from prisons also informs the arrival dates and sentence lengths for individuals used in the model. The microsimulation model then draws on estimates/forecasts of each change of status (e.g., remand, sentenced) often derived from court capacity assumptions; these assumptions tend to be the most important determinants of the flows between different prison subpopulations in the short/medium term. Simulation assumptions regarding the proportion of individuals in the model who receive prison sentences and the duration of their sentences are informed by historical disposals and hearings data. The model conducts a large number of simulations to enable calculation of population mean and range limits for each scenario.

²² SCTS publishes monthly management information that shows how many criminal cases have progressed through different stages of court procedure, from registration to conclusion. This includes data on the number of trials that have been scheduled but not yet called, which is often used as a proxy for the ‘backlog’ of cases in the system.

Figure 9 summarises the transitions between legal status amongst the remand/bail/ordained/sentenced sub populations, as well as the various points in court proceedings and prison sentences at which those subject to court hearings may transfer outside the court and prison system into the community. In the microsimulation model some of the sub groups shown in Figure 9 are aggregated; for example, all remand arrivals are considered as a single group, regardless of whether they were previously bailed or ordained.

Figure 9. Overview of transitions between remand, sentenced and community.



Microsimulation Model Limitations

The model relies on the availability of a large amount of frequently refreshed high-quality data about court activity and prison populations, some of which can be resource intensive to obtain and process.

The model does not currently simulate flows for different crime-types, so crime-based trends are not explicitly modelled. However, there are plans to develop the model further and include case-mix in future modelling.

Model Assumptions and Scenarios

The scenarios on which the projections are based can feature different suppositions about how trends in the court system might change, including: assuming continuation of current court capacity, increased court capacity, normal remand/bail mix and prioritisation of remand case progression through courts.

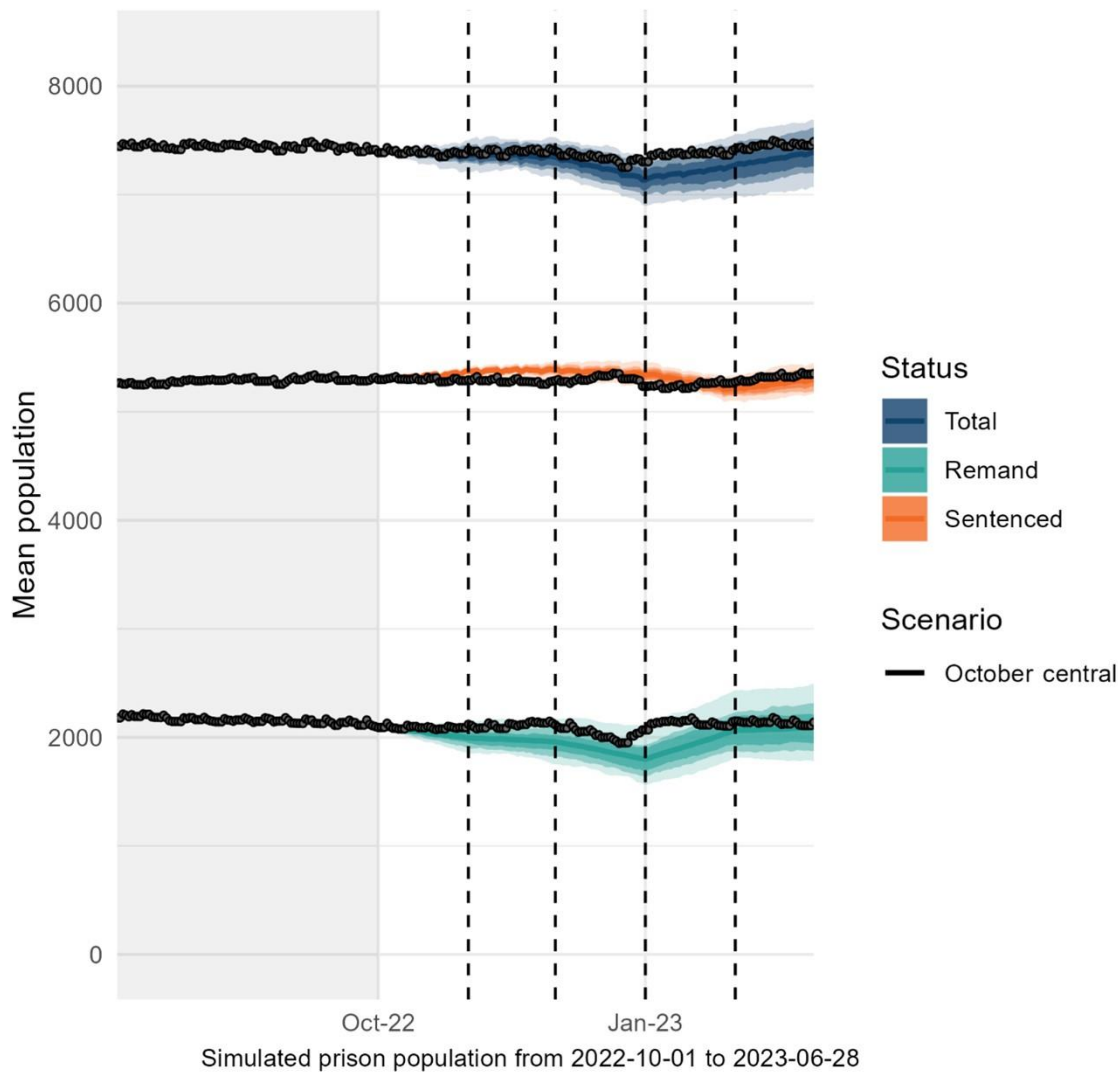
The most recent scenarios for prison population estimation include the planned changes to court capacity from April 2023. Furthermore, to understand how sensitive the prison population may be to variations in court throughput compared to historical rates, three variations have been included in the modelling process, central, high, and low. The central court throughput scenario variant assumes that the conclusions per courtroom will be similar over the next few months to the average level between April 2022 and March 2023. The “high” scenario assumes the average case throughput per court will be slightly greater than it has been over the same period, and the “low” scenario assumes that the average case throughput per court will be slightly smaller.

Since the rate of progress of the justice system’s recovery (e.g., rate of reduction of scheduled trials) impacts the model’s assumptions and longer-term predictive power, the projections cover a limited period, only up to September 2023.

Model Quality Assurance

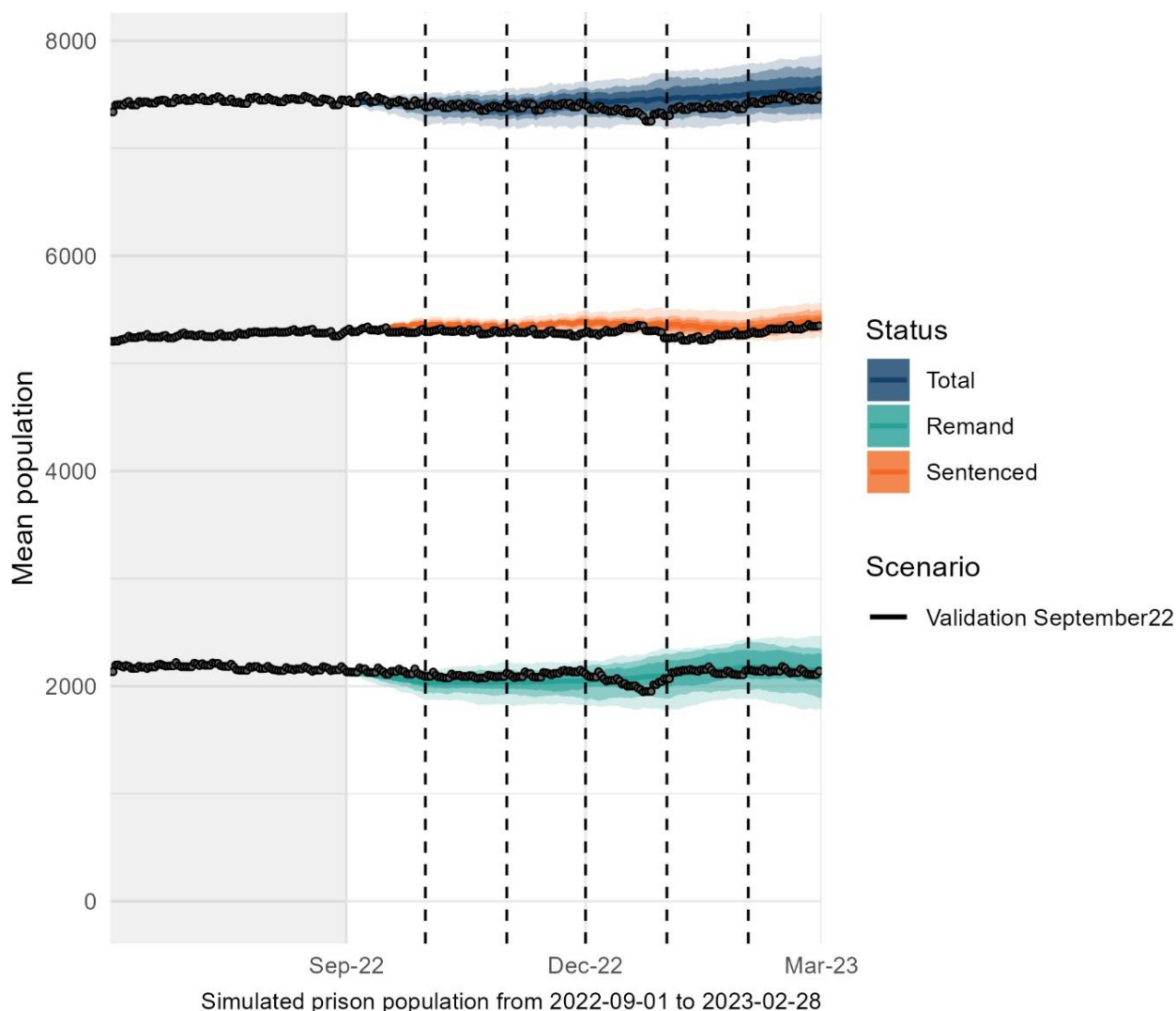
The modelling scenarios from previous months can be validated against the actual population data to check the accuracy of the projections and confirm the model continues to be suited to forecasting over the medium term. Figure 10 shows the October 2022 central projection from the microsimulation, based on prison population and courts data up to the end of September 2022. Even after accounting for a wide variety of uncertain dynamics in the system, it may be seen in Figure 10 that the projected levels of remand, sentenced and total populations reasonably accurately aligned with the actual numbers, in light of the December 2022/January 2023 seasonal reduction in court days.

Figure 10. Central projection and actual prison population beginning on 1st October 2022, based on courts and prison population data up to end of September 2022 (showing 50%, 75% and 95% confidence intervals). The actual population is shown as a series of black points.



To check the model further, back-casting is used to retrospectively compare the actual prison population for the past few months against a projection generated by the model based on actual monthly court throughput. The back-cast eliminates uncertainty about the majority of the assumptions, so if there was a difference between the back-cast and the actuals it may indicate technical deficiencies in the model. The recent back-cast projections presented in Figure 11, show that the back-cast from October 2022 to February 2023 has remained largely accurate over the time period covered.

Figure 11. The back-cast based on courts throughput data up to February 2023 (showing 50%, 75% and 95% confidence intervals). The actual population is shown as a series of black points.



6 Microsimulation Model Results: April 2023 to September 2023

The latest prison population projections are shown in Figure 12 and Table 1 below. These indicate that it is highly likely²³ that the overall prison population in Scotland will either remain stable or rise slightly from April to September 2023.

The results also show that it is highly likely that the remand population will either remain stable or decrease. If it decreases, primarily because of enhanced monthly case conclusions, this could contribute to an increased sentenced population as people

²³ Professional Head of Intelligence Assessment (PHIA) framework of language for discussing probabilities, Page 5, [Epidemiology Modelling Review Group: consensus statement on COVID-19 \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/108444/epidemiology-modelling-review-group-consensus-statement-on-covid-19.pdf).

transition from remand to the sentenced population. It is projected that the sentenced population will either remain stable or rise slightly; it may rise if the overall rate of transition from remand to the sentenced population increases or if there is a greater inflow of individuals directly from the community to the sentenced population.

Figure 12. Prison population projections for April 2023 to September 2023. Includes 50%, 75% and 95% confidence intervals for assumed high, central and low court throughput. The actual population is shown as a series of black points.

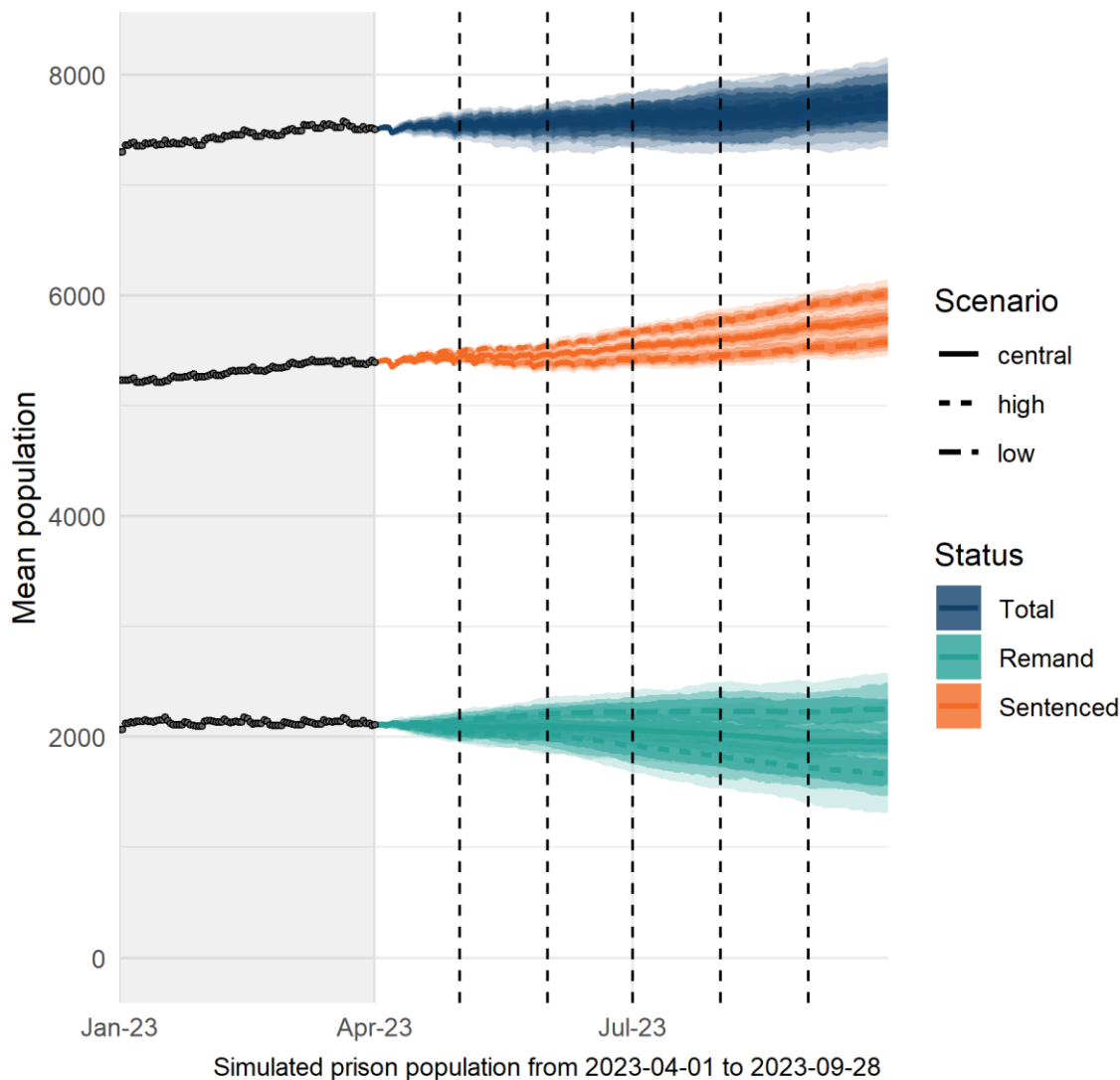


Table 1. Prison population projections upper/lower estimates: April 2023 to September 2023²⁴.

Month	Remand		Sentenced		Total	
	Average Daily Population by Month - Lower estimate	Average Daily Population by Month - Upper estimate	Average Daily Population by Month - Lower estimate	Average Daily Population by Month - Upper estimate	Average Daily Population by Month - Lower estimate	Average Daily Population by Month - Upper estimate
Apr 2023	2,000	2,200	5,400	5,500	7,450	7,600
May 2023	1,900	2,300	5,350	5,550	7,350	7,700
Jun 2023	1,800	2,400	5,300	5,650	7,300	7,800
Jul 2023	1,600	2,450	5,350	5,800	7,300	7,900
Aug 2023	1,500	2,500	5,400	5,950	7,300	8,000
Sep 2023	1,350	2,550	5,450	6,100	7,300	8,050

Over the course of the next few months remand arrivals, sentenced arrivals and case conclusion levels will be monitored to ascertain if, following changes to court capacity, actual prison population numbers are more closely aligned to the lower, central, or higher court throughput scenarios. It should be noted that whilst the projections are based on past trends and confirmed changes to court capacity, they do not explicitly model the impact of potential future policy or operational changes and their potential impact on the prison population.

7 Conclusion

Prior to the pandemic, the Scottish Government used time-series based forecasting methods applied to prison population trends to provide 12-month prison projections. This method extrapolated projected future prison populations from past trends, so it could not model changes to the prison population that were not already reflected in historical trends, such as the impact of the pandemic. The microsimulation approach overcomes some of these issues by allowing assumptions to be made about court throughput, a key determinant of changes to the prison population in the short term.

For several reasons, modelling the future using the microsimulation gets less accurate the further ahead it is projected (whether due to systematic errors in the model, inaccurate assumptions due to unforeseen circumstances, or due to changed circumstances that the model is not built to account for). Experience to date suggests that to ensure reliable projections, forecasting six months into the future is the limit.

²⁴ The values have been rounded to the nearest 50 and exclude the home detention curfew population. The upper and lower estimates of the total prison population may not be equal to the sum of the sentenced and remand populations as they can be from different scenario variants. For example, the upper estimates for remand, sentenced and total populations are from the low, high, and central scenarios respectively.

As previously highlighted, the main determining factor for changes in the prison population in the short term will be the court recovery programme changes, which may contribute to reducing the backlog of scheduled solemn trials. However, if the number of complaints and/or indictments to court for accused individuals were to increase compared to recent historical levels this could balance against increased case throughput and result in the number of scheduled trials remaining high.

The Crown Office and Prosecution Service (COPFS) have reported²⁵ that there is uncertainty whether their overall volume of casework will continue to grow but violence against women and children, sexual crime and domestic abuse will likely persistently account for a large proportion of its casework for some years to come. Furthermore, COPFS indicate that the continued increase in complex cases requires longer investigations and court hearings.

In the longer term, changing prison population inflows will be impacted by changes in the crimes recorded and prosecuted.

²⁵ Criminal Justice Committee, Wednesday 2 November 2022, written submissions from witnesses and from other organisations and individuals ([parliament.scot](https://www.parliament.scot/)).



© Crown copyright 2023



This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is available at www.gov.scot

Any enquiries regarding this publication should be sent to us at

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-80525-867-4 (web only)

Published by The Scottish Government, June 2023

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS1295082 (06/23)

W W W . g o v . s c o t