many did! It also meant that those with teaching or caring commitments could easily drop in and out of the team discussions as they developed. A list of the 55 people who registered for the VSG is enclosed.

3.5 Reporting

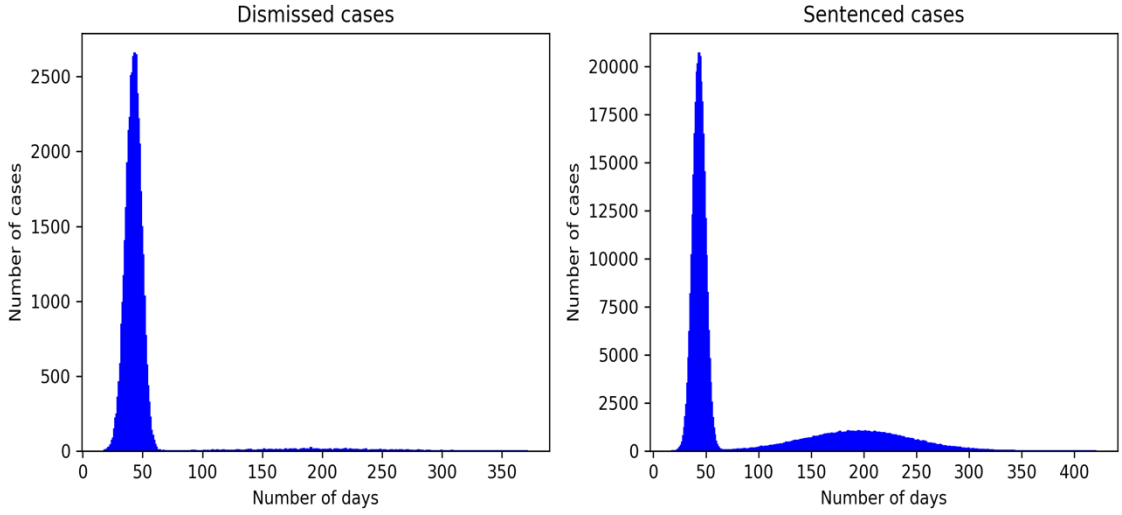
Short reports on the progress in each Theme (based on the final presentations on the third day) were provided by the Facilitators in the month after the VSG and are summarised below. The longer and more considered reports are being written (in Overleaf) and are being coordinated by Lauren Hyndman of the ICMS. They are all in an advanced state of writing and are expected to be completed in February (3 months after the meeting).

4. Summary of the research done at the VSG

The research was done in the three themes of A: Modelling throughput, B: Statistical evidence for bias, C: The role of AI in the Judicial System

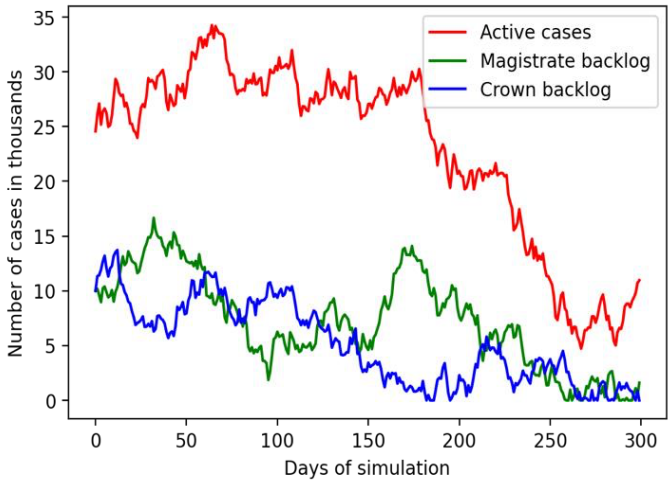
Theme A

The aim of this theme was to predict the case volume and case duration in the judicial system with a focus on the case characteristics and also the identification of the main factors that impact duration of court case. To do this the group examined the data from the national statistics for the Criminal court statistics quarterly: April to June 2023 and in particular considered the crown and magistrate court case characteristics. The group then developed both an agent based and a distribution-based model to determine the proportion of the magistrate and crown court backlog cases from the total active cases.



The agent-based model functioned by sequentially processing cases through the justice system and the group monitored the duration of each case. The model first examined the

dismissal or sentencing cases; then it proceeds to the next case. The distribution-based model was formulated to partition the system into three stacks: active, magistrate, and crown. After each time step, a random number of cases was transferred from one stack to another. There are initial periodic peaks in the number of active cases, and these peaks are sometimes accompanied by increases in magistrate and crown court backlogs.
There seemed from the model to be an inverse relationship between the crown and magistrate backlogs.



Analysing the differences and patterns in these backlogs provided useful insights into the legal processes.

For follow up the group recommended the use of additional information, such as the types of cases being filed, the reasons for case dismissals, and the average time it takes to resolve cases might be useful in identifying model parameters.

The model derived simulated a simple version of a justice system from (Summoned, Magistrates, Crown court, Sentencing). A more robust simulation could be conducted to fully implement the flow chart of the main court processes for criminal cases provided by the Ministry of Justice in the Guide to criminal court statistics report.

Theme B

Confidence in the justice system relies on it being both impartial and being seen to be impartial. It is therefore troubling that that there are well documented disparities between men and women and between ethnic groups at various stages of the criminal justice process. These disparities don't necessarily indicate bias or discrimination, as they might stem from correlations with legitimate factors. A perceived bias towards males in sentencing could, for instance, reflect a correlation where thefts involving force or threats (more often committed by males) result in a higher probability of custodial sentences. In this hypothetical case the true causal link here would be between use of force or threats and the sentencing outcome, rather than gender. Theme B focussed on statistical analysis of existing data to (1) better