**PAPER NUMBER #178**

**Using Machine Learning Forecasts to Improve Evaluations**

**Presenting Author**

Dr Geoffrey Barnes

**Affiliation**

Western Australia Police and University of Cambridge

**Country of residence**

Australia

**Objectives/aims**

Randomised trials or other evaluations, especially in criminal justice, are often hindered by their eligibility criteria. New programs are frequently limited to first-time offenders for political or practical consideration. Many of these offenders will not recidivate, regardless of how they are randomly assigned or what responses are applied to them. These null outcomes end up removing variance from the result measures in both the treatment and comparison groups, and limit our ability to discover what works for those who otherwise would reoffend. Advanced forecasting techniques, however, can identify better samples for evaluation.

**Methods**

Random forest forecasting has been used to identify the eligible sample for a randomised trial within the Durham (UK) Constabulary. The session will discuss the nature and accuracy of the prediction model, describe the types of offenders targeted for the Durham Checkpoint evaluation, and examine what might have happened if more traditional eligibility criteria had been employed.

**Main findings**

Those offenders identified by the model as being eligible candidates for the Durham experiment were more likely to re-offend than those who would have been enrolled in the study if other, more basic eligibility rules had been employed. The increased likelihood of reoffending improved the power of the trial, and therefore improve the amount of confidence that we can have in in the overall findings of the experiment. These benefits may be most particularly acute when, as is the case here, these results tell a complicated tale which could suggest a null finding for the experimental treatment.