Project Details	
Project Code	MRC23NMHBa Husbands
Title	Advanced detection of synthetic cannabinoids used in prisons in the South West (GW4) region
Research Theme	Neuroscience and Mental Health
Summary	Drug use can have serious neuronal effects leading to major mental health issues. We will apply advanced detection methods to synthetic cannabinoid receptor agonists (Spice) in an interdisciplinary project assaying samples related to drug use in the SW England. We will then research mental health and cognitive consequences of Spice use in prisons in the South West, using outcomes data to track how this predicts social and psychological functioning following release
Description	Cannabis and cannabinoids continue to generate considerable scientific and public interest. The cannabinoid receptor partial agonist tetrahydrocannabinol (THC) can now be prescribed in the UK. Synthetic cannabinoid receptor agonists (SCRAs) found in street products such as "Spice" are prohibited from medicinal use. Due to their high activity, SCRAs carry a substantial risk of adverse effects including mental (psychotic symptoms, anxiety) and physical outcomes (seizures, death). A recent study of UK prisons found SCRAs were the most widely used drug with 33% of prisoners using in the last month. In 2020 a report commissioned by the Home Office confirmed SCRA use in prisons is leading to increased levels of violence, disorder and health issues. SCRA use also remains a significant issue amongst rough sleepers. Clinical management of SCRAs is hindered by a lack of evidence-based guidelines. Detection is obfuscated by the rapidly evolving nature of different SCRA compounds and the inability of conventional methods to detect these. This studentship will address these challenges through novel, interdisciplinary Open Science studies: 1) Novel analytical techniques to improve detection of SCRAs: The student will be trained in quantitative Nuclear Magnetic Resonance (q-NMR) spectroscopy and advanced Mass Spectrometry (supervised by Husbands and Blagbrough). These studies feed into our work to develop a new device for the rapid detection of SCRAs based on fluorescence spectral fingerprinting (with Dr Pudney, Biology and Biochemistry, Bath). We will apply these methods to analyse samples of SCRAs supplied by the Police, including from South-West Prisons. 2) The student will work within HMP Exeter and HMP Dartmoor, with potential to expand to HMP Channings Wood, investigating the impacts of SCRAs on cognition, aggression and mental and psychological health (Supervisors Prof Morgan, University of Exeter and Drs Freeman and Scott). Whilst the student is in their first year vetting processes will be undertaken and ethical approval for the prison project sought. The Exeter team, led by Prof Morgan, have privileged access to the prisons and existing collaborations with Exeter Drugs Project, providing drug services to prisons and working with probation services on discharge. The student will be trained in qualitative analysis to interview inmates identified as SCRA users, themes will be extracted to understand use experiences and potentially inform the development of a behavioural intervention for use in prisons (latter supervised by Scott). We use a prison approved device (experience sampling method) to allow inmates to monitor their mood and wellbeing dynamically over

	a 7 day period and will link this with confidential self-reported drug use and urinalysis. The student will be trained in advanced statistical techniques such as multilevel modelling to analyse this complex dataset. 3) Can analytical techniques inform clinical management of SCRAs? The student will lead in combining data from studies 1&2 to answer the questions: Can what is inhaled be quantified? Does the inhalation profile of SCRAs predict withdrawal or dependency at clinical presentation? This truly interdisciplinary studentship offers high-quality training opportunities in analytical chemistry, psychopharmacology and advanced quantitative methods and qualitative analysis, providing broad training in mixed methods and data science skills. The PhD will be challenging, but feasibility is supported by previous cross-disciplinary collaborations and publications across this group of supervisors. The student will be trained in dissemination to generate impact through national clinics (Morgan), the EU Drugs Agency (Freeman) and the Society for the Study of Addiction (Freeman, Morgan) and charities (Scott). They will learn about knowledge transfer as part of the Bath Course and gain practical experience as our SCRA rapid detection device is developed and released.

Supervisory Team

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