Institution: University College London

Unit of Assessment: 4 - Psychology, Psychiatry and Neuroscience

Title of case study: Increasing public awareness of and informing policy relating to the effects of recreational drug use

1. Summary of the impact

Our research on cannabis, ketamine and MDMA (ecstasy) has used pioneering methods to provide a unique new evidence-base on which illegal drugs can be evaluated. This work has influenced government policy and legal proceedings in the UK and abroad. We have engaged widely with drug users, other members of the public, drug services and the media to disseminate our findings widely, and increase public knowledge of the topic. Our research on the effects of recreational drug use thus has changed national and international media discourse about this topic, and has increased public awareness and engagement.

2. Underpinning research (indicative maximum 500 words)

The UCL Clinical Psychopharmacology Unit (CPU), under the direction of Professor Val Curran, has pioneered human research on the effects of major recreational drugs. We have carried out acute challenge studies in the laboratory, as holders of a Home Office licence for this type of work. We have also undertaken chronic naturalistic studies with drug users, where samples of drugs are taken for biological analyses. Finally, we have performed naturalistic studies, setting up mobile laboratory conditions in nightclubs. This case study describes the research and impact relating to three major drugs we have studied: cannabis, ketamine and MDMA ('ecstasy').

In the largest ever study of its kind, we tested 620 **cannabis** users aged 16 to 23 both when intoxicated with their chosen cannabis and when sober **[1, 2]**. Through this research, we demonstrated why some individuals are more vulnerable than others to the harmful effects of cannabis. Cannabis contains around 100 unique ingredients ('cannabinoids'), of which THC is the cannabinoid that users seek (it makes them 'stoned'). We discovered that the second most abundant cannabinoid in herbal and resin forms of cannabis – cannabidiol (CBD) – protects against the harmful amnesic and addiction-related effects of THC. This has also deepened our understanding of the dangers of 'skunk' – a type of cannabis with high levels of THC but virtually no CBD. This research was funded by three MRC grants. In recognition of the importance of these findings, Curran received an award under the MRC Alexander Fleming Dissemination Scheme (2012-4) to fund the dissemination of these new discoveries about cannabis to young people across the UK. This discovery is now being translated into the clinic as Curran and Morgan have received new MRC funding of £1.5m (2013-7) for a trial of CBD in treating cannabis addiction.

Over 90% of research to date on **ketamine** abuse has been carried out by the CPU. Ketamine is an important medicine in both specialist anaesthesia and pain management; it is also being studied as a potential antidepressant. At the same time, its use as a recreational drug has spread in many parts of the world over the past few years. It is now the fourth most popular club drug in the UK and the top drug of abuse in Hong Kong. By accumulating a large population of users engaged in our research, and following them in a 12-month ESRC-funded longitudinal study, the CPU has discovered that frequent use of the drug is associated with both neurocognitive impairment and addiction. It can also produce physical harms including ketamine-induced ulcerative cystitis which may require bladder removal and replacement **[3, 4]**.

Since discovering the 'mid-week blues' that followed acute **MDMA** ('ecstasy') use in the first study of its kind (a laboratory at a 'rave') **[5]**, the CPU has determined the long-term effects of this drug, finding that neurocognitive function, altered mood and serotonergic changes whilst individuals take this drug are attenuated if not fully reversed after use is stopped **[6]**. This research has been funded by a range of agencies (e.g. ARUK, Parkinson Disease Society) and most recently our

neuroimaging study of acute MDMA was funded by Channel 4 television.

3. References to the research (indicative maximum of six references)

[1] Morgan CJ, Curran HV. Effects of cannabidiol on schizophrenia-like symptoms in people who use cannabis. Br J Psychiatry. 2008 Apr;192(4):306-7. http://doi.org/d2fq5h

[2] Morgan CJ, Freeman TP, Schafer GL, Curran HV. Cannabidiol attenuates the appetitive effects of Delta 9-tetrahydrocannabinol in humans smoking their chosen cannabis. Neuropsychopharmacology. 2010 Aug;35(9):1879-85. http://dx.doi.org/10.1038/npp.2010.58

[3] Curran HV, Morgan C. Cognitive, dissociative and psychotogenic effects of ketamine in recreational users on the night of drug use and 3 days later. Addiction. 2000 Apr;95(4):575-90. http://dx.doi.org/10.1046/j.1360-0443.2000.9545759.x

[4] Morgan CJ, Curran HV; Independent Scientific Committee on Drugs. Ketamine use: a review. Addiction. 2012 Jan;107(1):27-38. http://dx.doi.org/10.1111/j.1360-0443.2011.03576.x

[5] Curran HV, Travill RA. Mood and cognitive effects of +/-3,4-methylenedioxymethamphetamine (MDMA, 'ecstasy'): week-end 'high' followed by mid-week low. Addiction. 1997 Jul;92(7):821-31. http://dx.doi.org/10.1111/j.1360-0443.1997.tb02951.x

[6] Selvaraj S, Hoshi R, Bhagwagar Z, Murthy NV, Hinz R, Cowen P, Curran HV, Grasby P. Brain serotonin transporter binding in former users of MDMA ('ecstasy'). Br J Psychiatry. 2009 Apr;194(4):355-9. http://dx.doi.org/10.1192/bjp.bp.108.050344

4. Details of the impact (indicative maximum 750 words)

The CPU has made a range of contributions to discussion, debate and decision-making at national policy level. In 2006, Curran presented expert evidence to the Home Office's Advisory Council on the Misuse of Drugs (ACMD) on ketamine which contributed to the Government's decision in 2006 to classify ketamine as Class C; use did not subsequently decline and in 2012, Home Secretary Teresa May requested a new ACMD review with Curran appointed to the working group (decision due in 2014) **[a]**. Meanwhile, the Independent Scientific Committee on Drugs (ISCD) commissioned us to write the 'Ketamine Review' (ref 4 above) and BBC News timed a feature on ketamine to go out on the day this was published **[b]**. Curran gave evidence about new psychoactive substances to the All-Party Parliamentary Group on Drug Policy Reform at the House of Lords in May 2012 **[c]**. The report of this committee will form a basis for Government policy on emerging new drugs. Curran has also advised the ACMD on ecstasy and methamphetamine.

Internationally**,** Curran was a key witness on the subject of MDMA sentencing guidelines for the trial *U.S. v. McCarthy, 2011* (WL 1991146) which took place in New York in December 2010. Her five-hour testimony played the major role in the Judge's decision (in July 2011) to reduce the custodial sentencing for MDMA possession by 60%. The trial details are available on the web training resource for federal defenders in the US and have been cited by the Federal Public and Community Defenders and the American Civil Liberties Union in comments on proposed amendments to the US sentencing guidelines **[d]**. In 2013 the research on THC influenced policy-makers in the Netherlands to recommend separate legal penalties for high-potency THC cannabis (>15%) compared with low-potency THC cannabis **[e]**.

Our research has impacted on national and international media discourse about, public awareness of, and engagement with the effects of recreational drug use. Our activities have fallen into three areas: providing accurate, scientifically based information to improve public understanding of the topic; engaging directly with drug users to disseminate the findings of our research; and engaging with the media in novel ways.

Members of the unit have given talks at national and international conferences with mixed audiences of academics, policy-makers, healthcare professionals and the public. For example, in

January 2011, Curran gave a public talk entitled 'What is a drug?' at the Wellcome Trust's 'High Society' Exhibition, and Morgan gave an interactive lunch time seminar on drug use **[f]**. As a member of the Independent Scientific Committee on Drugs, Curran contributes to their website giving information on psychoactive drugs to the public **[g]**.

The CPU also contributed to public engagement with drug issues by organising public events, notably 'K-Day' which took place in November 2009. To address a lack of engagement between researchers, healthcare professionals, users and policy makers, 'K-day' brought these groups together for seven hours of activities, stalls and workshops run in a 'village fete' format, bringing together 152 ketamine users, predominantly aged 15-25, and 50 professionals. A key theme emerging from focus group discussions was that the day made ketamine users feel valued and many commented that nobody had ever asked them their opinion about ketamine before or about their experiences. A quiz testing both users' and professionals' knowledge was distributed before and after the event, there was an average 50% improvement rate of people's knowledge of the subject after the day. Each attendee was given a bag at the beginning containing various informational leaflets we prepared for the day and further contact details as well as details of current research projects. As a result of K-day, a number of collaborations and treatment initiatives are occurring. These include an experimental ketamine detox service being trialled in Devon and a UK ketamine-addiction-urology research group being set up between the CPU and UCLH (with Dr Dan Wood, urologist); the CPU is also collaborating with the Bristol Drugs Project **[h]**.

Using the Alexander Fleming Award, we are making a DVD with 'gangs' of young people who have written a rap about our cannabinoid discoveries backed by a professional video animation. This will be shown and piloted in schools before being released on the web.

We have engaged widely with the media in order to disseminate our research findings to as wide an audience as possible **[i]**. In 2010 our discovery that CBD blocked the memory impairing effects of THC made the front page of Nature news. An article in Newsweek based on the same finding bemoaned the lack of similar research being done in the USA. The CPU labs and our naturalistic studies were filmed by BBC3 as the central science content of the documentary 'How Drugs Work: Cannabis' (first transmitted in January 2011). Curran has been interviewed about ketamine on Woman's Hour on BBC Radio 4) and for the Telegraph and also contributed to a podcast which is available on the website of the British Journal of Psychiatry.

In 2012, we (Curran and David Nutt, Imperial) conducted a live fMRI study of the effects of MDMA, which formed the basis of a two-part documentary, 'Drugs Live: the ecstasy trial', funded and broadcast by Channel 4. This was watched by over two million people across the UK (audience of 1.92m on first episode, Wed 26th Sept 2012) and prompted the biggest online debate of any programme on that channel to date (including twitter, Channel 4's own data, newspapers, podcasts). The programme was described by C4's commissioning editor as "a programme that only Channel 4 would be brave enough to transmit" **[j]**.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[a] Corroboration of Curran's contributions to the ACMD can be obtained from ACMD secretary, UK Home Office. Contact details provided.

[b] http://www.bbc.co.uk/news/uk-14221907

[c] http://www.drugpolicyreform.net/p/inquiry.html Link to report 'Towards a Safer Drug Policy' is provided towards the bottom of the page: https://docs.google.com/file/d/0B0c_8hkDJu0DODg3UXpfa2U0SFk/edit?usp=sharing

[d] U.S. v. McCarthy Memorandum and Order (S.D.N.Y.) in MDMA Sentencing - Opinion in U.S. v. McCarthy (S.D.N.Y.) finding that a 500:1 MDMA-to-marijuana equivalency would give rise to a sentence that is greater than necessary to serve the objectives of sentencing, and adopting a marijuana equivalency of 200 grams for MDMA (ecstasy).

http://www.fd.org/docs/select-topics---sentencing/mccarthy-opinion.pdf#search=McCarthy
See also the case's wider citations: Comments on Proposed Amendments to Sentencing Guidelines from the American Civil Liberties Union, March 2012: https://www.aclu.org/files/assets/aclu_comments_to_ussc_on_bzp_mdma_and_immigration_3-19-12.pdf See p. 3 for full description of the case.
Federal Public and Community Defenders submission to the US sentencing commission on proposed priorities for amendment, July 2013, in which Curran's input is also referenced: http://www.fd.org/docs/select-topics---sentencing/defender-comment-on-ussc%27s-notice-of-proposed-priorities-for-amendment-cycle-ending-may-1-2014.pdf?sfvrsn=6

[e] A report from the Netherlands Institute of Mental Health and Addiction used our research in its recommendations. http://www.trimbos.nl/webwinkel/productoverzicht-webwinkel/alcohol-en-drugs/af/~/media/files/inkijkexemplaren/af1148%20thc%20concentraties%202012_web.ashx
The Netherlands government decision is described in this EU report: http://www.trimbos.org/~/media/Programmas/Internationalisering/Further%20insights%20into%20aspects%20of%20the%20EU%20illicit%20drugs%20market.ashx See p.75.

[f] http://www.wellcomecollection.org/whats-on/exhibitions/high-society/events.aspx

[g] http://www.drugscience.org.uk/about/committee-members/. Corroboration of the impact of the ketamine review and our other impact through the ISCD can be obtained from the organisation's director. Contact details provided.

[h] Full description of K-Day, including list of project partners:
http://www.ucl.ac.uk/slms/engagement/slms-pe/case/ketamine
Evaluation report:
http://www.ucl.ac.uk/public-engagement/documents/casestudies/kdayevaluationreport

[i] Media activities:
- Woman's Hour: http://www.bbc.co.uk/programmes/b011c220
- Telegraph: http://www.telegraph.co.uk/health/8544166/The-rise-and-dangers-of-party-drug-ketamine.html
- British Journal of Psychiatry podcast: http://www.psychiatrycpd.co.uk/podcasts/curranimpactofcannabidiol.aspx
- 'How Drugs Work: Cannabis' http://www.bbc.co.uk/programmes/b00x9ddq
- Nature: http://www.nature.com/news/2010/101001/full/news.2010.508.html
- Newsweek: http://mag.newsweek.com/2010/11/03/why-it-s-hard-to-do-marijuana-research.html

[j] 'Drugs Live: the ecstasy trial' http://www.youtube.com/watch?v=4coPYeGs2y4& Further corroboration of impact can be obtained from the CEO of Renegade Films, which made the documentary. Contact details provided.

Viewing figures obtained from www.barb.co.uk

Reviews of the programme:
- Telegraph: http://www.telegraph.co.uk/culture/tvandradio/9569797/Drugs-Live-the-Ecstasy-Trial-Channel-4-review.html
- Independent: http://ind.pn/StZAuM
- Coverage of Twitter participation: http://metro.co.uk/2012/09/26/drugs-live-the-ecstasy-trial-gets-twitter-talking-as-viewers-play-along-at-home-586482/

Comments from Channel 4's commissioning editor are included in:
http://www.radiotimes.com/news/2012-09-26/drugs-live-and-channel-4s-most-controversial-moments