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INTERNATIONAL SOCIETY
FOR THE STUDY OF
EMERGING DRUGS



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PROGRAMME

Eighth international conference on novel psychoactive substances

17–19 November 2021
Online

| Introduction

In recent years, there has been a dramatic increase in the number of new psychoactive substances (NPS) detected across the world. The NPS market remains highly dynamic and is characterised by the emergence of large numbers of new substances reported in a growing number of countries.

Between 2009 and 2021, 133 countries and territories reported the emergence of 1 087 NPS to the United Nations Office on Drugs and Crime (UNODC), through the UNODC Early Warning Advisory on NPS. In Europe, since 1997, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), has been monitoring and responding to NPS appearing in the EU through the EU Early Warning System on NPS. At the end of 2021, the EMCDDA was monitoring around 870 NPS, 80% of which were identified for the first time in the last decade.

The increase in the number and availability of NPS in recent years has largely been driven by globalisation, the internet and rapid changes in technology. Yet, recently, there have been some encouraging signs. For example, the number of NPS reported annually for the first time in Europe has dropped from a high of around 100 in 2014 and 2015 to around 50 in 2017 — a trend that continued in successive years.

Nevertheless, NPS continue to pose numerous challenges in terms of: detecting and monitoring; understanding patterns of use and harms caused; and developing appropriate public health responses. In Europe, around one new substance is still detected every week, increasing the overall number that needs to be monitored. Major new problems have also emerged, that have led to an increasing number and range of risks for people who use psychoactive substances. These include an increase in the number of highly potent NPS on the market — many of which are synthetic cannabinoids or synthetic opioids — and the impact of the ongoing COVID-19 pandemic.

Faced with the numerous challenges posed by NPS, the International Society for the Study of Emerging Drugs (ISSED) strives to: strengthen multidisciplinary and international collaboration, enhance knowledge and improve the quality of information-sharing in this complex area in a more coordinated way. In this context, the NPS conference series, now in its 8th edition, is the major international forum on NPS, attracting hundreds of participants worldwide. This year's conference is jointly organised by the ISSED, UNODC, the EMCDDA, the World Anti-Doping Agency (WADA), the University of Hertfordshire (UH) and the Centre for Forensic Science Research & Education (CFSRE).

I Opening and plenary sessions

DAY 1: Wednesday 17 November 2021

Opening session

09.00–09.30 EST
15.00–15.30 CET

Welcome and introduction to the activities of the International Society for the Study of Emerging Drugs (ISSED)

Ornella Corazza (University of Hertfordshire)
Barry Logan (CFSRE)
Roumen Sedefov (EMCDDA)
Justice Tetley (UNODC)
Olivier Rabin (WADA)

Plenary session I — The impact of COVID-19 on NPS markets: new drug landscapes

Chairs: *Francesco Botrè (University of Lausanne) and Sherri Kacinko (NMS Labs)*

09.30–10.00 EST
15.30–16.00 CET

Keynote: Ana Gallegos (EMCDDA)

Plenary session II — Treatment services for NPS: what works?

Chairs: *Martin Raithelhuber (UNODC) and Melissa Fogarty (CFSRE)*

10.00–10.45 EST
16.00–16.45 CET

Keynote: Owen Bowden-Jones (University College London)

10.45–11.00 EST
16.45–17.00 CET

Break

Oral session I — General session: monitoring new psychoactive substance markets

11.00–12.30 EST, 17.00–18.30 CET

Moderators: *Martin Raitelhuber (UNODC) and Valeria Catalani (University of Hertfordshire)*

11.00 EST 17.00 CET	<p>A taste for novel psychoactive substances: wastewater analysis from 12 countries over 2019–20 and 2020–21</p> <p>R. Bade, J.M. White, M. Ghetia, S. Adiraju, S. Adhikari, J.A. Baz-Lomba, F. Been, L. Bijlsma, T. Boorgaerts, D.A. Burgard, S. Castiglioni, A. Celma, A. Chappell, A. Covaci, E. Emke, R.U. Halden, A.L.N. van Nuijs, J.-E. Oh, S. Park, M.A. Pineda Castro, N. Salgueiro-Gonzalez, B. Subedi, R. Steenbeek, D. Wang, V. Yargeau, E. Zuccato, C. Gerber, Queensland Alliance for Environmental Health Sciences (QAEHS), University of Queensland, Australia</p>
11.15 EST 17.15 CET	<p>A survey of drugs seized at New Zealand music festivals: the Eutylone Boogaloo</p> <p>L. Philip, L. Clark, C. Johnson, C. Stansfield, D. Kappatos, Institute of Environmental Science and Research (ESR), New Zealand</p>
11.30 EST 17.30 CET	<p>Emerging non-fentanyl-related synthetic opioids in the United States</p> <p>C.A. Herdman, M.L. Van Linn, W.J. Heuett, D.P. Pressley, L.L. Wong, T.L. Boos, Drug Enforcement Administration, United States of America</p>
11.45 EST 17.45 CET	<p>Novel synthetic opioid trends from NPS Discovery 2018–2021</p> <p>B.K. Logan, A.J. Krotulski, CFSRE, United States of America</p>
12.00 EST 18.00 CET	<p>Synthetic psychoactive substances advertised on one cryptomarket over a one-year period</p> <p>F.R. Lamy, Mahidol University, Thailand</p>
12.15 EST 18.15 CET	<p>Q&A/panel discussion</p>
12.30–12.45 EST 18.30–18.45 CET	<p><i>Break</i></p>

Focus panel I — Performance- and image-enhancing drugs and book launch**Chairs:** Ornella Corazza (University of Hertfordshire) and Claude Guillou (European Commission)

12.45–13.30 EST

Presenters:

Irene Mazzoni (WADA)
 Renzo Ferrante (Carabinieri)
 Julien Sieveking (WADA)
 Tyler Hamilton (Athlete)
 Olivier Rabin (WADA)

18.45–19.30 CET

Book launch: *Emerging Drugs in Sport* (Springer 2021)**Parallel session I — Early-warning systems and toxicovigilance**

13.30–14.45 EST, 19.30–20.45 CET

Moderators: Claude Guillou (European Commission) and Elisabeth Prevete (Sapienza University)

13.30 EST

Drug seizure monitoring in prisons as early-warning systems of new psychoactive substance use: synthetic cannabinoids and other emerging psychoactive substances

19.30 CET

C. Norman, F. Cruickshanks, D. Edwards, D. Fletcher, O. Semenova, F. Alteneiji, R.N. Reid, N. NicDaeid, C. McKenzie, University of Dundee, United Kingdom

13.45 EST

NPS Discovery — Evolution of an open-access drug early-warning system

19.45 CET

A. Krotulski, B.K. Logan, CFSRE, United States of America

14.00 EST

Type of NPS and the consumer profile in the Canary Islands

20.00 CET

G. Burillo-Putze, C. Gironés-Bredy, M. Almeida, C. Almeida-Gonzalez, J. Hamid-Cedrés, I. Guigou-Tudela, J. Pavón, M. García-Rodríguez, F. Fernández-Pérez, M.A. López-Hernández, L.D. Boada, Fundación Instituto de Investigación Sanitario de Canarias (FIISC), Canary Islands, Spain

14.15 EST

Pharmaco-toxicological effects of (±)cis-4,4'-DMAR and (±)trans-4,4'-DMAR: neuro-behavioural, physiological, immunohistochemical and metabolic studies in mice

20.15 CET

M. Marti, University of Ferrara, Collaborative Centre for the Italian National Early-Warning System, Italy

14.30–14.45 EST

Q&A/panel discussion

20.30–20.45 CET

End of Day 1

Parallel session II — Policy and legislation

13.30–14.45 EST, 19.30–20.45 CET

Moderators: *MJ Menendez (CFSRE) and Sabrina Levissianos (UNODC)*

13.30 EST 19.30 CET	Scheduling and its impact on the emergence of NPS A.L.A. Mohr, B.K. Logan, MJ Menendez, CFSRE, United States of America
13.45 EST 19.45 CET	Legal impasse on the use of Ketum (<i>Mitragyna speciosa</i>) in Malaysia D. Singh, S. Narayanan, B. Vicknasingam, Centre for Drug Research, Universiti Sains Malaysia, Malaysia
14.00 EST 20.00 CET	Controlled new psychoactive substances in New Zealand C.S. Johnson, Institute of Environmental Science and Research (ESR), New Zealand
14.30–14.45 EST 20.30–20.45 CET	Q&A/panel discussion <i>End of Day 1</i>

DAY 2: Thursday 18 November 2021**Plenary session III — Findings from assessing NPS — *in-vivo* assessment of potential harms and toxicity of NPS****Chair:** *B.K. Logan (CFSRE)*

09.00–09.30 EST

Keynote: Michael Baumann (NIDA)

15.00–15.30 CET

Focus panel II — Impact of drug checking programmes on NPS identification**Chair:** *Amanda LA Mohr (CFSRE)*

09.30–10.15 EST

Presenters:

15.30–16.15 CET

Alex Krotulski (CFSRE)
Malcolm McLeod (Australian National University)
Cameron Johnson (ESR)
Karen McDonald (Toronto Drug Checking Service)
Ruben Vrolijk (DIMS, The Netherlands)
Anton Luf (Checkit!, Austria)

Parallel session III — NPS pharmacology and toxicology 10.15–11.45 EST, 16.15–17.45 CET	
Moderators: <i>Andrés Roman-Urrestarazu (Stanford University) and Mandi Mohr (CFSRE)</i>	
10.15 EST 16.15 CET	Synthesis, functional evaluation and molecular docking of NBOME and NBF positional isomers E. Pottie, O. Kupriyanova, A. Brandt, R. Laprairie, V. Shevyrin, C. Stove, Ghent University, Laboratory of Toxicology, Belgium
10.30 EST 16.30 CET	Activity profiling of recent non-fentanyl synthetic opioids via three different μ-opioid receptor activation assays M.M. Vandeputte, M. Persson, D. Walther, S. Vikingsson, R. Kronstrand, M.H. Baumann, H. Green, C.P. Stove, Faculty of Pharmaceutical Sciences, Ghent University, Ghent, Belgium
10.45 EST 16.45 CET	Structure-activity relationship of cumyl derived indole and indazole SCRA: evaluation of alkylic and cyclic tails L. Janssens, A. Ametovski, E. Sparkes, M. Connolly, H. Liu, R. Boyd, E. Cairns, R.R. Gerona, S.D. Banister, C.P. Stove, Faculty of Pharmaceutical Sciences, Ghent University, Ghent, Belgium
11.00 EST 17.00 CET	Preclinical abuse liability assessment of tianeptine using intracranial self-stimulation in rats T.R. Baird, S.A. Marsh, S.S. Negus, Virginia Commonwealth University, United States of America
11.15 EST 17.15 CET	Systematic <i>in vitro</i> and estimated <i>in vivo</i> pharmacokinetics studies on synthetic cannabinoid receptor agonists as an aid to interpretation of toxicological casework data A.M. Brandon, S. Baginski, F. Alteneiji, J. Riley, O. Epomolu, D.A. McKeown, K.R. Read, C. McKenzie, Leverhulme Research Centre for Forensic Science, University of Dundee, United Kingdom
11.30 EST 17.30 CET	Q&A/panel discussion
11.45–12.00 EST 17.45–18.00 CET	<i>Break</i>

Parallel session IV — NPS use settings, experience and trends (I) 10.15–11.45 EST, 16.15–17.45 CET	
Moderators: <i>Conor Crean (UNODC) and Francesco Di Carlo (University of Chieti-Pescara)</i>	
10.15 EST 16.15 CET	A systematic review of (pre)clinical studies on the therapeutic potential and safety profile of kratom in humans E. Prevede, K.P.C. Kuypers, E.L. Theunissen, O. Corazza, G. Bersani, J.G. Ramaekers, Maastricht University, The Netherlands
10.30 EST 16.30 CET	New emerging trends of drug consumption among young individuals during the COVID-10 pandemic V. Rapaccini, S. Biscontini, A. Savini, O. Corazza, A. Metastasio, ADHD Regional Centre, Italy
10.45 EST 16.45 CET	New psychoactive substance (NPS) trends in the United States E.D. Lockhart, US Drug Enforcement Administration, United States of America
11.00 EST 17.00 CET	Did the use of crystal meth increase with the easing of COVID-19 lockdown restrictions, leading to increased hospital admissions? E. Manning, R. Buckland, E. Abrol, G. Cesnaite, A. Metastasio, Camden and Islington NHS Foundation Trust, United Kingdom
11.15 EST 17.15 CET	Emerging novel designer benzodiazepine trafficking trends and risk to public health O.O. Kalejaiye, S.R. Tella, T.L. Boos, US Drug Enforcement Administration, United States of America
11.30 EST 17.30 CET	Q&A/panel discussion
11.45–12.00 EST 17.45–18.00 CET	<i>Break</i>

Parallel session V — NPS use settings, experience and trends (II)

12.00–13.30 EST, 18.00–19.30 CET

Moderators: *Irene Mazzoni (WADA) and Attilio Negri (University of Hertfordshire)*

12.00 EST 18.00 CET	Impact of the COVID-19 pandemic on novel psychoactive substance (NPS) use, experience and risk awareness E. Deligianni, F. Schifano, G. Papazisis, L. Lione, Aristotle University of Thessaloniki, Greece
12.15 EST 18.15 CET	The detection, prevalence and modes of use of novel benzodiazepine-type drugs in prisons A.M. Brandon, V. Marland, F. Cruickshanks, H. Menard, N. Nic Daied, D.A. Mckeown, K.D. Read, C. McKenzie, University of Dundee, United Kingdom
12.30 EST 18.30 CET	Focus on over-the-counter drug abuse: a systematic review on the diversion of antihistamines, cough medicines and decongestants S. Chiappini, A. Miuli, A. Mosca, J.M. Corkery, A. Guirguis, G. Martinotti, F. Schifano, University of Hertfordshire, United Kingdom
12.45 EST 18.45 CET	Concomitant findings in medico-legal death investigation and driving under the influence of drugs cases containing novel psychoactive substances S.L. Kacinko, B.K. Logan, NMS Labs, United States of America
13.00 EST 19.00 CET	Excessive exercise and IPED use among sport disciplines during the coronavirus disease 2019 pandemic M. Shibata, Department of Neuropsychiatry, Kyoto University, Japan
13.15–13.30 EST 19.15–19.30 CET	Q&A/panel discussion

Parallel session VI — Detection, identification and characterisation 12.00–13.30 EST, 18.00–19.30 CET	
Moderators: <i>Christophe Stove (University of Ghent) and Alex Krotulski (CFSRE)</i>	
12.00 EST 18.00 CET	From isotonitazene to etonitazepyne: the continuing saga of newly emerging 'Nitazene'/2-benzylbenzimidazole opioids M.M. Vandeputte, K. Van Uytvanghe, N.K. Layle, D.M. St. Germaine, D.M. Iula, C.P. Stove, Laboratory of Toxicology, Ghent University, Ghent, Belgium
12.15 EST 18.15 CET	Large-scale activity-based SCRA screening on patient plasma samples: CB1 bioassay supported by machine learning L. Janssens, D. Boeckaerts, S. Hudson, D. Morozova, A. Cannaeert, D.M. Wood, C. Wolfe, B. de Baets, M. Stock, P. Dargan, C.P. Stove, Laboratory of Toxicology, Ghent University, Ghent, Belgium
12.30 EST 18.30 CET	Designer benzodiazepines identified online: evaluation of their binding affinity for kappa, mu and delta opioid receptors through docking studies V. Catalani, M. Botha, J.M Corkery, A. Guirguis, A. Vento, F. Schifano, University of Hertfordshire, United Kingdom
12.45 EST 18.45 CET	The pharmacoepidemiological value of para-Fluorofentanyl D.M. Papsun, A.J. Krotulski, C. Noble, B.K. Logan, NMS Labs, United States of America
13.00 EST 19.00 CET	Qualitative analysis of drug impregnated paper samples from England and Wales prisons in 2019 and 2020 A. Avci Akca, L. Couchman, A. Frinculescu, A. Johnston, T. Shine, Queen Mary University of London, United Kingdom
13.15–13.30 EST 19.15–19.30 CET	Q&A/panel discussion
Closing session	
13.30–14.00 EST 19.30–20.00 CET	Presenters: Ornella Corazza (University of Hertfordshire) Barry Logan (CFSRE) Michael Evans-Brown (EMCDDA) Justice Tettey (UNODC) Olivier Rabin (WADA) MJ Menendez (CFSRE) <i>End of Day 2</i>

DAY 3: Friday 19 November 2021**Parallel workshop I — Identification, characterisation and analysis of NPS**

09.00–13.00 EST, 15.00–19.00 CET

09.00–09.45 EST 15.00–15.45 CET	The use of combined seized drug and toxicology workflows for rapid identification of emerging substances in response to public health threats Alex Krotulski (CFSRE)
09.45–10.30 EST 15.45–16.30 CET	Synthesis, development and naming of NPS reference materials Donna Iula (Cayman Chemical)
10.30–10.45 EST 16.30–16.45 CET	<i>Break</i>
10.45–11.30 EST 16.45–17.30 CET	Implementing responsive analytical workflows for NPS in a toxicology laboratory Donna Papsun (NMS Labs)
11.30–12.15 EST 17.30–18.15 CET	A role for bio-assays in NPS screening, characterisation and prioritisation Christophe Stove (University of Ghent)
12.15–12.30 EST 18.15–18.30 CET	<i>Break</i>
12.30–13.00 EST 18.30–19.00 CET	Live panel discussion

Parallel workshop II — Intervention, risks, harms and clinical management of novel psychoactive substances (NPS) 09.00–13.00 EST, 15.00–19.00 CET	
09.00–09:30 EST 15.00–15.30 CET	Epidemiology of NPS Giovanni Martinotti (University of Chieti-Pescara)
09.30–10.00 EST 15.30–16.00 CET	Policy, scheduling and economics of NPS Andrés Roman-Urrestarazu (<i>Stanford University</i>)
10.00–10.30 EST 16.00–16.30 CET	NPS, behaviour and the mind: controlled and naturalistic studies with NPS Jan Ramaekers (Maastricht University)
10.30–10.45 EST 16.30–16.45 CET	<i>Break</i>
10.45–11.15 EST 16.45–17.15 CET	Clinical management of NPS in different settings (clinical cases) Owen Bowden-Jones (University College London) Antonio Metastasio (Camden and Islington NHS Foundation Trust)
11.15 – 11.45 EST 17.15 –17.45 CET	Emergencies cases, hospitalisation and fatalities Andrew Stolbach (Johns Hopkins Medicine)
11.45 – 12.15 EST 17.45–18.15 CET	NPS guidelines and educational resources Owen Bowden-Jones (University College London)
12.15–12.30 EST 18.15–18.30 CET	<i>Break</i>
12.30–13.00 EST 18.30–19.00 CET	Live panel discussion

Posters

Detection, identification and characterisation

The development of methodologies for the identification and prediction of new synthetic cannabinoids — M. J. Abbott, A. R. Davidson, J. C. Dunnett and J. W. Wheeler, Staffordshire University, United Kingdom

NNL-3: a synthetic intermediate or a new class of hydroxybenzotriazole (HOBt) esters with cannabinoid receptor activity? — M.H. Deventer, A. Ametovski, E.A. Cairns, K.E. Grafinger, A. Cannaert, S. Chen, X. Wu, R. Kevin, R. Ellison, R. Gerona, K. Blakey, I.S. McGregor, M. Glass, C. Stove, V. Auwärter, S.D. Banister, Laboratory of Toxicology, Ghent University Belgium

Identification of three arylcyclohexylamines (MXPr, MXiPr, and DMXE) in illegal products in Japan — R. Tanaka, M. Kawamura, S. Mizutani, T. Hakamatsuka, R. Kikura-Hanajiri, National Institute of Health Sciences, Japan

Detection of cannabinoids from fingernails by ATR-FTIR coupled with principle component analysis using chemometrics — S. S. Tiwari, S. P. Mishr, Rashtriya Raksha University, India

Developing class-specific GC-MS methods for enhanced confirmation of NPS — E. Sisco, National Institute of Standards and Technology, United States of America

Investigation of plant powder products distributed in Japan called “Acacia” — J. Ogata, M. Kawamura, S. Mizutani, T. Hakamatsuka, R. Kikura-Hanajiri, National Institute of Health Sciences, Kanagawa, Japan

Advancements in detection of drugs of abuse and novel psychoactive substances for forensic investigations — S. S. Tiwari, A. R. Pattath, Rashtriya Raksha University, India

Bromazolam: monitoring the increasing prevalence of an emergent designer benzodiazepine — D.M. Papsun, A.J. Krotulski, R. Matstrovito, S. Walton, L. Domonoski, B.K. Logan, NMS Labs, United States of America

Early-warning systems and toxicovigilance

NPS as ingredients of ecstasy tablets — B. Byrska, R. Stanaszek, D. Zuba, Institute of Forensic Research in Krakow, Poland

Monitoring new psychoactive substances

Correlation of self-reported psychiatric disorders, self-report scales and co-use of substances from an online survey among people who use Kratom — O. Grundmann, A. Alshamaa, E. Cinosi, O. Corazza, G. Martinotti, D. Morcos, D. Singh, M. Swogger, C. Veltri, Z. Walsh, University of Florida, Gainesville, United States of America

Synthetic psychoactive substances advertised on one cryptomarket over a one-year period — F. Di Carlo, G. Martinotti, S. Chiappini, M. Pettorruso and M. di Giannantonio, University of Chieti-Pescara, Italy

A pandemic during the pandemic? Impact of COVID-19 on cannabis use, patterns and settings for drugs use support — E. Deligianni, L. Lione, I. Ezquerra-Romano, D. de Segovia Vicente, University of Hertfordshire, United Kingdom

The shifting synthetic cannabinoid market in New Zealand, August 2020 to March 2021 — L. Philp, C. Johnson, C. Stansfield, R. Somerville, H. Partington, K. Walsh, Institute of Environmental Science and Research (ESR), New Zealand

Media depiction of Ketum (*Mitragyna speciosa*) issues in mainstream Malay-Language newspapers in Malaysia — D. Singh, M. Singh, Universiti Sains Malaysia, Malaysia

NPS pharmacology and toxicology

Amphetamine-like stimulants induce oxidative stress and DNA damage in human neuroblastoma SH-SY5Y cell line — D. Rašić, Institute for Medical Research and Occupational Health, Croatia

Not just the mental issues: NPS implications in cardiology — M. Prilutskaya, A. Shukimbayeva, Semey Medical University, Kazakhstan

Cyclopropylfentanyl prevalence and analysis, 2017–2020 — J.J. Bierly, NMS Labs, United States of America

Safety profile and effects of mitragynine in healthy volunteers — R. Paci, E. Prevete, K. P. C. Kuypers, E. L. Theunissen, J. Reckweg, G. Bersani, O. Corazza, J. G. Ramaekers, Faculty of Psychology and Neuroscience, Maastricht University, The Netherlands

Alprazolam-related deaths in Scotland — J.M. Corkery, Drug Misuse and Novel Psychoactive Substances Research Unit, University of Hertfordshire, United Kingdom

Alternative matrices in forensic testing: comparative evaluation of different analytical protocols on dried spots — M. Mazzarino, X. de la Torre, C. Stacchini, F. Botrè, Laboratorio Antidoping FMSI, Italy

Safe testing in the COVID age: selective inactivation of coronaviruses in urine forensic samples by intermittent microwave irradiation — F. Botrè, University of Lausanne, Switzerland

NPS use, settings and trends

Novel psychotropic substances in sports: forensic review — S. Sharma, Rashtriya Raksha University, India

The use patterns of novel psychedelics: experiential and contextual fingerprints of substituted phenethylamines, tryptamines and lysergamides — P. Mallaroni, Maastricht University, The Netherlands

Prevention, harm reduction, treatment and clinical management

Incorporation of novel psychoactive substance testing into routine outpatient healthcare toxicology testing menus — A.C. Holt, Aegis Sciences Corporation, United States of America