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SAFER NIGHTLIFE PROGRAMME 2022

Results from 'back of house' drug testing

HSE Social Inclusion

DRUGS.ie
Drug and Alcohol Information and Support

Contents

Foreword 2

Summary 4

Background 5
- The Emerging Drug Trends and Drug Checking Working Group 6
- Key recommendations 7
- 'Back of house' drug monitoring 8

The HSE Safer Nightlife Programme 2022 9

Implementation of the pilot drug monitoring programme 11
- The communication process 12

Analytical Processes 13
- Fourier Transform Infrared Spectroscopy 13
- Mass Loss Analysis 14
- Liquid Chromatography–Mass Spectrometry 14

Analytical results 15
- MDMA contents 15
- Cocaine powders 16
- Ketamine powders 17
- Benzocaine as the main active component 17
- New Psychoactive Substances 17
  - Powders 17
  - Tabs 19
  - Unidentified tabs 19
  - Flualprazolam tablet 20
  - 3-CMC crystals 20
- Other submissions 20

Communications 21

Discussion 24
- Application of a 'back of house' approach in an Irish context 24
- MDMA trends 25
- Synthetic cathinones 26
- New psychoactive substances 27

Conclusion 29

Future actions 29

Reference list 30

Foreword

It is with great pleasure that I launch this report on the analytical findings from the first 'back of house' drug monitoring programme in Ireland. This pilot project was the result of substantial and on-going work led by the HSE National Social Inclusion office in partnership with the National Drug Treatment Centre, the Department of Health, the Department of Justice and An Garda Síochána, with support from the Department of Culture, Arts, Gaeltacht, Sport and Media. Successful interdepartmental and interagency working is essential to implement the actions contained within our National Drugs and Alcohol Strategy. The pilot drug monitoring programme is a real example of this collaboration where all agencies agreed on the need to collaborate to identify emerging drug trends with an aim of protecting the health of people who use drugs. As new trends and health threats are likely to occur in the future, we must tailor our responses so Ireland is prepared to manage drug market shifts.

I want to thank An Garda Síochána for their support and in particular the National Drugs and Organised Crime Bureau, Detective Superintendant Séamus McCormack, Detective Chief Superintendent Séamus Boland as well as the local division in Portlaoise. Without the collaboration of these units and individuals, this pilot would not have been possible. I wish to thank the HSE National Drug Treatment Centre and in particular William Ebbitt and Siobhan Burke and the lab team for invaluable time and their expertise on the preparation and delivery of the analytical components through the use of new and portable methods for the purpose of this pilot. I look forward to future collaboration with this team as we expand our work in 2023. In addition, I want to thank the HSE Emergency Management and HSE Communication Divisions, Nicola Corrigan and the teams of harm reduction volunteers who contributed their expertise and personal time this summer across three events including this pilot programme. These dedicated teams positively represented our work and a harm reduction ethos as they engaged with the public. Finally, I want to thank Festival Republic and in particular their Director Melvin Benn for facilitating the first pilot programme at Electric Picnic. This pilot is historic in terms of drug policy developments and we feel that our presence at Ireland's largest music and arts festival represents a significant milestone for health responses at Irish events. I consider our partnership with both Gardaí and Electric Picnic as a great success given the extensive reach of our risk communication messages, which were circulated on screens and online. These messages led to on-going discussions throughout campsites at the event and on social media in relation to harm reduction approaches towards drugs.

While this report represents a relatively small number of samples numerically, we must recognise the importance of this pilot project and our findings.

As a proof of concept, the HSE accessed substances from the public to inform health-led analysis and responses. We obtained quantitative estimates of MDMA being used in Ireland and were in a position to issue three separate risk communications from the festival. Further, this pilot engaged with hidden and niche user groups whom we otherwise would not have contact

with through addiction services. Of the samples submitted, eleven were considered as new psychoactive substances and less documented trends.

Of these, three substances had never been identified before in Ireland. Of particular concern is the emergence of cathinone type substances given their link with adverse mental health outcomes and suicidality. Moving forward, we now need to further expand analytical services and extend our harm reduction services to meet the needs of a changing landscape around drug use in Ireland.

Professor Eamon Keenan

HSE National Clinical Lead Addiction Services

Cross-sector partnership with Justice, Garda and event organisers

National Drug Treatment Centre portable laboratory

FT-IR TECHNOLOGY

46 samples submitted to the HSE for analysis

2 surrender bins located in HSE and Code Blue medical tents

74% of samples identified on-site using FT-IR (n=34)

17% identified in NDTC laboratory (n=8)

4 samples remain unconfirmed

Drug content identified in 42 samples (91%)

19 MDMA samples submitted (8 powders and 11 pills)

5 MDMA powders contained almost pure MDMA

'Ecstasy' pills ranged from 36mg to 235mg of MDMA

3 3 new psychoactive substances not yet detected in Ireland (3-CMC, 5-MAPB, 4-HO-MiPT)

12 novel substances submitted - 7 tabs, 4 powders/crystals and 1 tablet

3 risk communications issued over 3 days relating to;

- High strength 'Mybrand' purple skull pill
- The potency of MDMA powders
- The emergence of 3-CMC

Background

The drug landscape has been evolving for some time with greater volumes of use now recorded across all strands of Irish society. The past decade has been significant in terms of global drug market developments which have resulted in increased access and a greater diversity of substances now available (EMCDDA, 2022a). Technological advances have significantly transformed all areas of life and new communication channels quickly amplify substance use cultures and trends, while also acting as innovative supply mechanisms (Manning, 2014; EMCDDA, 2016a). Despite these changes, there has been limited local information available on Irish drug market developments to inform healthcare providers, with analytical identification mainly being applied for law enforcement purposes and not for interventions, health communications or real-time warnings. For some time, analytical information on drug trends has been sourced from European and UK services which may not accurately represent the Irish situation and can lead to delays in necessary health-led responses.

The volatile and changing nature of the drug market is a major area of concern for health care providers as new and more potent substances continue to emerge internationally (EMCDDA, 2022a; UNODC, 2022). Concern has been expressed for some time regarding Ireland's preparedness for possible drug market shifts in the absence of routine monitoring. Increases in prevalence rates recorded across all strands of Irish society (Mongan, Miller and Galvin, 2021; Mongan et al., 2022), means that there are now potentially more people at risk to drug market shifts, should they occur. It is recognised that drug monitoring systems and early warning mechanisms have the potential to reduce drug-related harm (EMCDDA, 2019; Rigter & Van der Gouwe, 2019; Artigiani & Wish, 2020).

In addition to the area of substance identification, concern has been expressed in relation to gaps in service provision. Initially traditional service structures were developed in response to opioid use and as a result services continue to mainly still engage with those experiencing dependency issues, while there is little focus on occasional and novel user groups. Tailored health responses in nightlife settings such as drug checking provision are recognised approaches which can help healthcare providers not only engage with often hidden and novel user communities for the first time but can also detect drug market trends (Kriener, 2001; Measham, 2019). The need to develop analytical methods and new styles of harm reduction services has been discussed for some time and a series of recommendations were published by the HSE in 2021, initially directing the development of pilot projects across festival settings (Keenan, Killeen and the Emerging Drug Drugs and Drug Checking Working Group, 2021). These recommendations were established as a result of the work conducted by the Emerging Drug Trend and Drug Checking Working Group in advance of the COVID-19 pandemic throughout 2019 and in early 2020.

The Emerging Drug Trends and Drug Checking Working Group

The Emerging Drug Trends and Drug Checking Working Group convened in September 2019 to address Strategic Action 1.3.11 of the National Drug and Alcohol Strategy: 'Reducing Harm, Supporting Recovery: A health-led response to drug and alcohol use in Ireland 2017–25'. The role of the Working Group was to review evidence in relation to health responses applicable to the night-time economy and drug checking provision to help inform recommendations on these areas. The group was led by the HSE National Social Inclusion Office, with the Department of Health identified in the National Drug Strategy as the main partner for the delivery of this action. A cross-sectoral group was formed to consult and inform deliberations on this area. The membership of the group was intentionally broad to reflect the reality that this issue impacts on a number of Departments, agencies and drug user groups in Ireland. An Garda Síochána were represented on the group as an associate member in order to provide observation and advice regarding recommendations.

↑
Professor Eamon Keenan, Robbie Kitt (Music composer, DJ and nightlife advocate), Somhairle (Vicky) Brennan (Former Union of Students in Ireland Welfare Officer), Fionnuala Moran (Radio Presenter), Craig Connolly (District Magazine), Sophie Ridley (Event Safety Controller/ Events expert), Nicki Killeen, HSE National Social Inclusion Office at the HSE Safer Nightlife event.

Overall, the Working Group were in agreement that 'back of house' drug checking is a beneficial harm reduction measure that should be considered as an extension of current health structures, both within the night-time economy and across community settings in Ireland. However, while it was agreed that drug checking can yield many benefits, further cross-Departmental discussions are required to identify how this approach could be fully applied in an Irish context to inform harm reduction and alert mechanisms. The group published an initial fifteen recommendations on a number of key areas on the topic of emerging drug trends, nightlife drug use and drug checking provision.

Key recommendations

Pilot a ‘back of house’ drug checking system in a festival setting through a collaborative agreement with law enforcement, health care providers and other relevant stakeholders. Support from the Department of Justice and An Garda Síochána is required. Should the pilot evaluation of a ‘back of house’ system prove positive, a comprehensive ‘front of house’ approach should be considered.

A dedicated service is required to provide education, prevention and harm reduction services in the night-time economy, similar to services provided in other European countries. In the absence of a dedicated service, a national volunteer training programme should be established for delivering interventions within nightlife settings.

Government consideration is required for the development of a dedicated laboratory for drug market monitoring purposes. Stationary laboratories utilising robust technologies were considered to provide the most accurate results.

On-going funding should be sought from Government for further developments in the area of emerging drug trend monitoring.

‘Back of house’ drug monitoring

The term ‘back of house’ is generally applied to approaches that involve the analysis of substances that are not directly obtained from people who use drugs such as through the use of ‘amnesty bins’ or ‘surrender bins’, from substances involved in medical emergencies or from law enforcement seizures (Makkai et al., 2018; Barratt & Measham, 2022).

> “Should the pilot evaluation of a ‘back of house’ system prove positive, a comprehensive ‘front of house’ approach should be considered”

A ‘back of house’ approach was selected by the Working Group, with this considered as an initial and necessary step so the HSE could obtain and analyse drugs without needing detailed policy amendments. Applying this approach meant that a pilot programme could be quickly progressed without delay in 2022 to gain valuable experience and insights into drug contents. It was recognised by the Group that evidence from this approach should then be used to inform further developments.

While the Working Group recognised that a ‘back of house’ monitoring programme was the necessary first step for an Irish context, a number of both advantages and disadvantages to this approach were also recognised and published by the Working Group as part of their review.

Advantages of this approach:

* This approach would require less detailed policy amendments.
* It will provide valuable drug market insight into the most recent contents at that point in time which would be otherwise unknown in Ireland.
* Contribute to the development of appropriate harm reduction communications and interventions.

Disadvantages of this approach:

* This approach relies on people who use drugs willingly using the amnesty bin.
* There is limited intervention. Face to face interventions by health care providers generally don’t form part of this approach.
* This approach may not engage with hidden populations and will only represent those at nominated events.

(Keenan, Killeen and the Emerging Drug Trends and Drug Checking Working Group, 2021)

The HSE Safer Nightlife Programme 2022

As recommended within the Working Group report, in the absence of a dedicated service, a national volunteer training programme should be established for delivering interventions within nightlife settings. In response, the HSE National Social Inclusion Office launched a multi-component programme in May 2022 to engage with people who use drugs specifically in festival settings. This approach involved a media campaign, the development of resources, recruiting and training volunteers and coordinating outreach teams at Life, Indiependence (Indie) and Electric Picnic Festivals.

- Media campaign & resources
- Partnership with 3 festivals
- Volunteer recruitment, training & outreach
- Proposals on 'Back of house' drug monitoring

The aim of the programme was to engage with and support festival attendees in a non-judgmental way on the topic of substance use and related issues that emerge in nightlife spaces. The programme was based on a harm reduction ethos to support people to implement practical steps to reduce drug-related harms. A review will be published on the different elements of the Safer Nightlife and volunteer programme in early 2023.

HSE Harm Reduction Volunteers Brenda Keane, Martina Dunne, Allie Landingham and Niamh Mc Guinness at Life Festival 2022

As part of the development of this programme, a proposal was submitted by the HSE National Social Inclusion Office to the Department of Health, The Department of Justice and An Garda Síochána for the implementation of a pilot programme to monitor drug trends in three festival settings in 2022. The proposals detailed HSE concern in relation of the current direction of the drug market and concern for Ireland's preparedness to respond to emerging health threats. It was proposed that a 'back of house' approach would be implemented at three festivals in 2022 as part of the Safer Nightlife outreach programme through the use of a designated bin in a HSE service at nominated events.

> "The HSE recommend that a secure surrender bin will be located in a purpose built 'HSE Centre' at three named festivals. This will be a secure bin where the public can dispose of substances but will be unable to access the contents within. This HSE centre will be a designated area where festival attendees can attend to receive general health advice on the topics of substance use, sexual health and mental health and securely depose of substances. The purpose built HSE Centre needs to be established in a zone which will be recognised as a health-led service for the purposes of informing public health responses to reduce drug harms. In agreement, it is proposed that those within the health centre will be able to dispose substances for public health monitoring without prosecution by law enforcement" (HSE Personal Records 'Drug monitoring through 'Back of House' mechanisms to identify public health threats in nightlife settings in Ireland 2022'). "

Due to delays in processing of the proposals it was not achievable to deliver this programme across three events in 2022 as originally intended. However, the sign-off of the proposals was provided within the timeframe to quickly develop a small pilot programme for implementation at the Electric Picnic festival on the 2nd, 3rd and 4th of September.

Implementation of the pilot drug monitoring programme

Prof Eamon Keenan, Minister Frank Feighan and Nicki Killeen

Sinéad McNamara, Jenny Hannon and Siobhán Stokes

The final implementation plans for the pilot programme at Electric Picnic were as a result of HSE deliberations with Festival Republic, An Garda Síochána Drugs and Organised Crime Bureau and the local Garda Division in Portlaoise. These negotiations occurred within a relatively short timeline in the weeks leading up to the event.

The use of 'surrender bins' located within HSE and Code Blue medical tents was chosen as the preferred approach by event organisers and Gardaí. Often people attending HSE harm reduction and medical services are in possession of substances while receiving specific interventions on a range of different health topics. It was also acknowledged that not every person frequenting these settings is in possession of drugs and may attend for various other reasons. Therefore these settings offered a viable and secure space for people to anonymously dispose of drugs. In general, health protection is the main priority within these environments.

Central to the pilot was agreement with An Gardai Síochána that these spaces would remain as health-led settings, meaning that law enforcement would have no involvement unless necessary, such as situations of violence or threat towards staff or the public. Therefore, people could attend, discuss substance use and securely submit substances, should they wish. This agreement with An Gardai Síochána was successfully upheld throughout the weekend as people attended the HSE tent to surrender substances. However, normal policing plans applied throughout the event as initially agreed.

The communication process

Substances submitted to the bins by festival attendees would subsequently become the possession of the HSE for health analysis purposes. This pilot project did not involve the return of substances to the public or personalised intervention based on the results. Those surrendering drugs were fully informed that their samples would not be returned and that communication would only be issued by the HSE in cases of concern. Those submitting samples were also reminded of the knowledge gaps associated with a 'back of house' approach and reminded that they should apply caution to all substances at all times as pills and powders from the same batch can vary in contents and there are always a number of different risks associated with use.

In agreement with festival organisers, substances of concern were communicated on large screens throughout the event, on the specific festival application and across their social media channels. The HSE issued communication reminding the public to engage with their teams at the event and to follow their Drugs.ie social media channels for updates live from the event.

Analytical Processes

Analysis was conducted by the HSE National Drug Treatment Centre (NDTC) laboratory onsite in a portable laboratory away from public access at the event. The laboratory has an existing 'Controlled Drug Licence' which is granted annually by The Health Products Regulatory Authority (HPRA) so they can be in the possession of substances for the purpose of analysis conducted in their fixed site lab in Pearse Street, Dublin 2. A new licence was granted for the purpose of the pilot programme so the laboratory could operate remotely at a festival and receive unknown substances from the public. In line with the arrangements made with Gardaí, the movement of substances from surrender bins at the event was overseen by a HPRA licence holder at all times.

Fourier Transform Infrared Spectroscopy

For a number of reasons such as transportation to remote locations and the real time communication of results, generally services operating within the nightlife environment will use methods that are portable and adaptable (Bartle & Lee, 2019). Following initial review, Fourier-transform infrared spectroscopy (FT-IR) was selected as the main analytical approach for the pilot programme. The advantages of utilising an FT-IR are both the low cost and portability. The portability of the FT-IR meant that less detailed logistical plans were required for the HSE to transport the instrument to a festival setting and the relatively low cost, in comparison with other instrumentation, was suitable for the initial pilot with the knowledge that large volumes of substances may not be obtained. Currently, FT-IR instrumentation is implemented as part of a series of techniques by a number of international drug checking agencies.

The FT-IR uses electromagnetic radiation to get information about the structure of a substance (Bartle & Lee, 2019) but the accuracy of this approach is slightly less compared to other methods and the FT-IR method may miss substances present at a low concentrations (Harper, Powell & Pilj, 2017; Mc Crae, 2020). Therefore, when a smaller amount of drug is present in a substance, it can easily go undetected. If required and in cases of emergency, it was agreed that the HSE NDTC team would transport substances from the event to their Dublin 2 laboratory to conduct secondary analysis through the use of Liquid Chromatography-Mass Spectroscopy (LC-MS) if necessary. However, this was not a requirement during the event.

A Bruker Alpha FT-IR instrument was operated with the application of the Tic Tac spectra library which analyses for a significant amount of substances and hundreds of NPS. Libraries were also available from SWGDRUG and one was also shared with the HSE from the Loop Drug Checking Service in the UK so the most recent UK festival trends were included in the identification process.

Mass Loss Analysis

To estimate the quantification of MDMA products, a technique called Mass Loss Analysis (MLA) was applied. A proof of concept of the MLA methodology was practised by the lab in advance of the event using MDMA tablets as well as 500mg paracetamol tablets.

The basis of this technique is that the tablet is weighed prior to analysis to determine the mass. It is then ground to a powder and quantitatively transferred to a filtration device attached to a pump. The powder is then washed a number of times successively with methanol. The methanol dissolves and removes the MDMA present in the tablet (to waste). The residual powder is then dried and weighed and the mass lost from the original weight of the tablet is deemed to be MDMA content of the tablet. This approach is currently utilised by the Loop UK who offered additional guidance to the HSE lab on applying this technique.

Liquid Chromatography–Mass Spectrometry

In addition to the FT-IR and MLA techniques, secondary analysis was further conducted on a number of samples following the event through the use of Liquid Chromatography–Mass Spectrometry (LC-MS) in the HSE NDTC lab. This process was able to further identify any substances not detectable or identifiable by FT-IR at the Electric Picnic laboratory.

Analytical Results

A total of 46 samples were submitted to the HSE as part of the pilot 'back of house' drug monitoring programme at Electric Picnic 2022. Analysis was conducted on 39 of these samples onsite at Electric Picnic with drug content identified in 34 of these. Secondary analysis was then conducted on a number of samples in the NDTC laboratory (n=32) which led to the confirmation of the contents of a further eight samples which were not detected at the event through the use of portable FT-IR techniques.

The contents of 42 samples have therefore been identified by the laboratory as part of this pilot, while the contents of four samples remain unconfirmed.

Of the submissions, three substances (3-CMC, 5-MAPB, 4-HO-MiPT) analysed as part of this pilot were novel and had not yet been detected in Ireland. These substances were formally notified to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) Early Warning System as the first identification of these drugs appearing in Ireland as a result of this pilot.

Substances	Number of submissions
MDMA 'Ectasy' pills	11
MDMA crystal/powder	8
Cocaine powder	6
Ketamine powder	5
Benzocaine as the active component	2
4-FMPH (4-Fluoro-Methphenidate) powder	1
5-MAPB (1-(benzofuran-5-yl)-N-methylpropan-2-amine) powder	1
4-HO-MiPT (4-hydroxy-N-methyl-N-isopropyltryptamine) powder	1
Novel benzodiazepines (tabs and pill)	4
3-CMC (3-Chloromethcathinone) crystals	1
Unconfirmed tabs (labelled as novel psychedelics)	4
CBD (Cannabidiol) resin	1
Other submissions (capsule)	1

MDMA contents

MDMA 'ECSTASY' PILLS

MDMA pills submitted to the HSE at the event ranged from containing approximately 36mg to 235mg of MDMA. Some pills did not contain sufficient amounts of MDMA to be successfully

Pill submitted to the HSE containing < 50mg of MDMA

Different types of 'Mybrand' skull pills submitted, ranging from 36mg to 235mg of MDMA

identified by FT-IR in the laboratory onsite at the festival but were later found to contain low levels of MDMA in the NDTC laboratory through secondary analysis using LC-MS.

A series of six different 'Mybrand' skull shaped pills were submitted to the HSE throughout the weekend consisting of one gold pill, one purple and four silver pills. Four identical silver pills were found to contain low levels of MDMA through secondary analysis after the event. It is estimated that these four pills contained approximately 36mg of MDMA.

The most potent and concerning MDMA pill identified throughout the event was a purple 'Mybrand' pill which contained approximately 235mg of MDMA and led to the HSE issuing a risk communication on the first day of the festival.

Despite slight inconsistency in the quality of the pill press and their contents, all 'Mybrand' skull shaped pills submitted contained a 'Mybrand' 'MB' signature engraved on the back. All of the skulls were also produced so they could be split in half, which is now a prominent feature of MDMA pills currently available in Europe due to the increased size and purity of products. However, some of the 'Mybrand' pills surrendered to the HSE were difficult to break.

One MDMA pill (orange triangle with 'illuminati' symbol) was also found to contain the cathinone drug mephedrone (4-MMC) although at low levels.

MDMA POWDERS

High strength MDMA powders were identified among the powders/crystals submitted with five of the eight MDMA powders testing as almost pure MDMA. Powders also ranged in appearance from pink, yellow and light brown to dark brown in appearance.

Cocaine powders

Of the seven cocaine samples submitted, they all contained benzocaine with one sample also containing lidocaine. Both benzocaine and lidocaine are drugs with anaesthetic effects commonly used as cutting agents in cocaine.

Ketamine powder

Similar to cocaine powders, all of the six ketamine samples were found to also contain benzocaine.

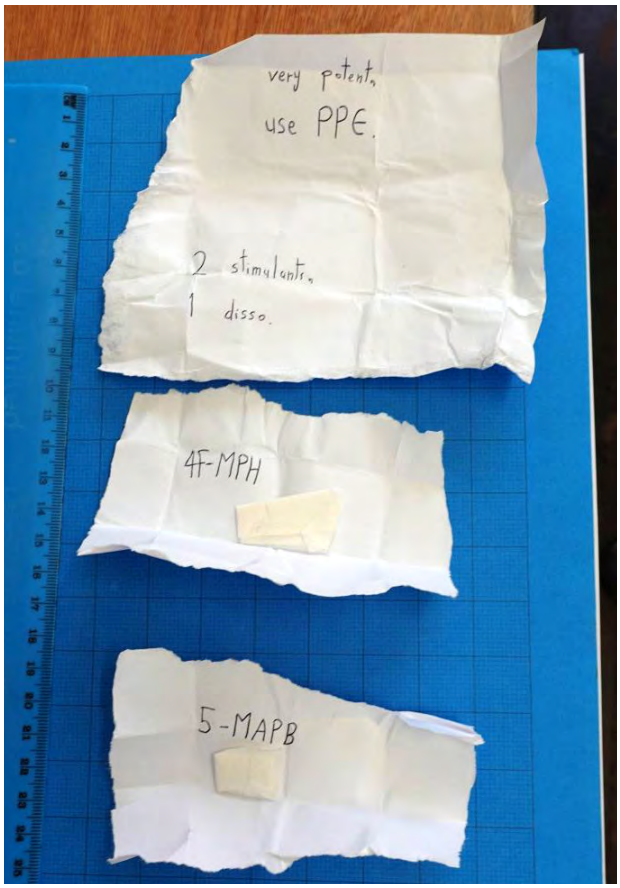
Benzocaine as the main active component

Benzocaine was the main component in two powders with one powder containing ketamine and one powder containing cocaine. Benzocaine was also present in one low dose MDMA pill.

New Psychoactive Substances

A total of 12 new psychoactive substances (NPS) were received throughout the weekend from four different submissions to the HSE surrender bins. A risk communication was issued on the Sunday of the event relating to the emergence of a sizable amount of the substance 3-CMC which was submitted to a surrender bin located in a medical tent.

A single package containing 9 individual samples (three powders and six tabs) was submitted to a surrender bin which contained a series of different NPS. Each substance was individually wrapped in paper and clearly labelled with the suspected contents contained within by the person surrendering the drugs. Based on documentation contained within this package, it was felt that the submission represented a unique user group and that the novel trends identified did not relate to the types of drugs commonly used among the mainstream festival user population.
Those submitting the package provided a supporting note to state that this submission was 'not urgent' and therefore risk communication was not issued on the emergence of these substances at the event.



It was also felt that those surrendering the samples were likely well informed about the contents of the substances, with the package including a warning to staff advising on the use of personal protective equipment (PPE) before handling.

POWDERS

In the package of 9 samples, three powders were labelled as '4F-MPH' (powder), '5-MAPB' (white crystal) and '4-HOMiPT' (brown powder) which were analysed onsite at the event using FT-IR technology and were confirmed as containing the active substance labelled on their packaging.

← Package of novel powders submitted to the HSE surrender bin

→ **4F-MPH (4-Fluoro-Methylphenidate)**

4F-MPH is considered a potent stimulant type drug and comes from a series of substances closely related to prescription drug methylphenidate known as ADHD medication (Ritalin). This series has emerged as 'research chemicals' over recent years (Mc Loughlin et al., 2017; Shoff et al., 2019). It has a relatively short history of recreational use and it was first notified to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) Early Warning System in 2015 after identification in the United Kingdom (EMCDDA, 2016c).

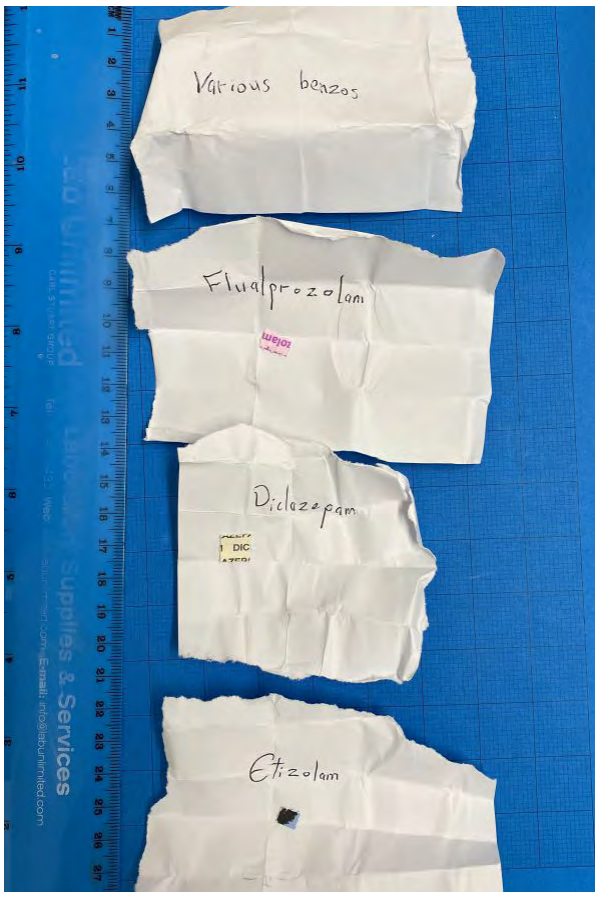
4F-MPH was only recently identified for the first time in Ireland in 2022 by Forensic Science Ireland (FSI) who detected this substance in a sample of green plant material presented to their lab as suspected cannabis seized by Gardai (FSI, Personal Communication, 2022).

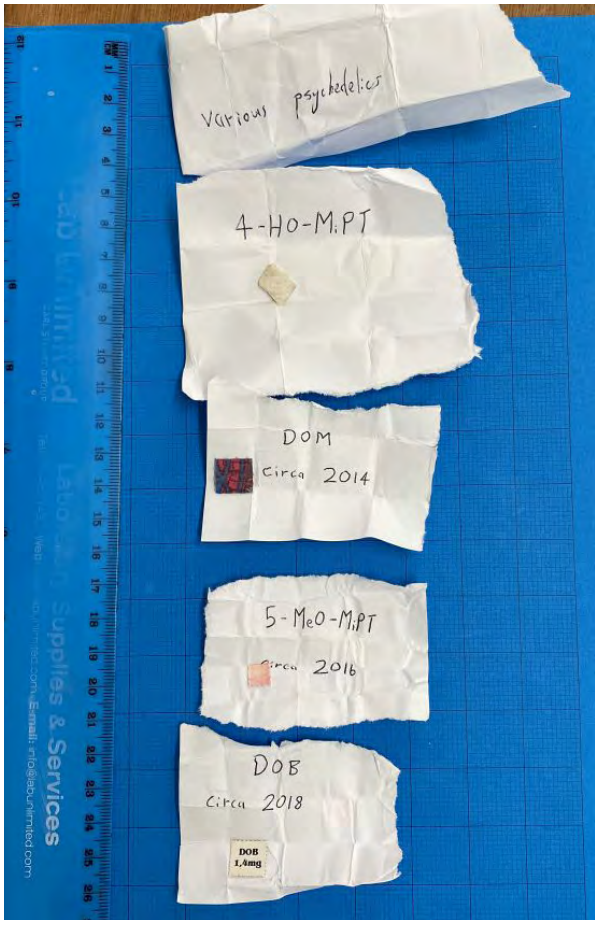
→ **5- MAPB (1-(benzofuran-5-yl)-N-methylpropan-2-amine)**

This pilot has identified 5-MAPB for the first time in Ireland. It was first detected in Europe in the United Kingdom alongside 6-MAPB in 2013 as reported by the EMCDDA Early Warning System (EMCDDA, 2014). 5-MAPB is belongs to what is known as the 'novel benzofuran' family of drugs which are amphetamine type drugs with close chemical structures to MDMA. It is known for providing mood enhancing, euphoria, increased empathy, psychedelic effects and stimulation (Hofer et al., 2017; Welter et al., 2015). Benzofuran substances became well known in the mid-2000s during the operation of Head Shops and Smart Shops in Europe which sold 'Benzo Fury' products, mainly as pills, across high streets and online markets (EMCDDA, 2014).

→ **4-HO-MiPT (4-Hydroxy-N-methyl-N-isopropyltryptamine)**

This pilot has identified 4-HO-MiPT for the first time in Ireland. 4-HO-MiPT is considered a new psychoactive substance from a diverse group of compounds known as 'tryptamines'. They are used recreationally for their psychedelic effects, with natural occurring versions known as psilocybin in 'Magic mushrooms' and dimethyltryptamine (DMT) which is present in Ayahuasca brews (Tittarelli et al, 2015). In recent times, new and potent synthetically produced versions of tryptamines began appearing on the market which were available on Internet sites (Araújo et al., 2015). While the prevalence of tryptamines is very low, their use is documented as increasing in some locations (Malaca et al., 2020).





Package of novel tabs submitted to the HSE surrender bin

TABS

In the NPS package, six samples were tabs labelled as 'DOM circa 2014', '5-MeO-MiPT', 'DOB circa 2018', 'Flualprazolam', 'Diclazepam' and 'Etizolam'. In addition, a single tab of '1P-LSD' was obtained from a separate submission.

All of the tabs received are considered lesser known substances based on their labels. Of these, three are classed as novel benzodiazepines (Flualprazolam, Diclazepam and Etizolam). The remaining four tabs are considered very novel and potent psychedelic type drugs which would be considered uncommon in Ireland (DOM (2, 5-Dimethoxy-4-methylamphetamine), 5-MeO-MiPT (5-methoxy-N-methyl-N-isopropyltryptamine) and 1P-LSD (1-propionyl-lysergic acid diethylamide).

Substances contained on tabs are not suitable for analysis using FT-IR technology, therefore on-site analysis of these submissions was not conducted at the event. Where reference standards were available, analysis on these substances was conducted at the HSE NDTC laboratory through the use of LC-MS.

Of the three tabs labelled as novel benzodiazepines, the contents of two were confirmed to match their label. Both the tabs labelled as 'Flualprazolam' and 'Etizolam' matched their description. The tab labelled as 'Diclazepam' was found to contain a mixture of both flualprazolam and etizolam, but it contained no traces of Diclazepam as indicated by the label.

UNIDENTIFIED TABS

The final four remaining tabs labelled as novel psychedelic type drugs could not be identified by the NDTC laboratory as the reference standards were not available for these substances. Therefore we cannot confirm the presence of DOM, 5-MeO-MiPT, DOB and 1P-LSD in the tabs.

FLUALPRAZOLAM TABLET

Secondary analysis using LC-MS was conducted on an individual submission of a small orange tablet after the event. Secondary analysis was required due to the low concentration of the drug present in the pill which could not be identified using the FT-IR at the event. Analysis confirmed that this pill contained NPS benzodiazepine flualprazolam.

3-CMC CRYSTALS

A sizable sample of the synthetic cathinone type substance '3-CMC' (3-chloromethcathinone) was obtained in the form of large white crystals in a medical facility bin, which suggests the possible connection of this sample to adverse negative health reactions at the event.

Other submissions

Other submissions came in the forms of CBD (cannabidiol) resin and a black and red capsule.

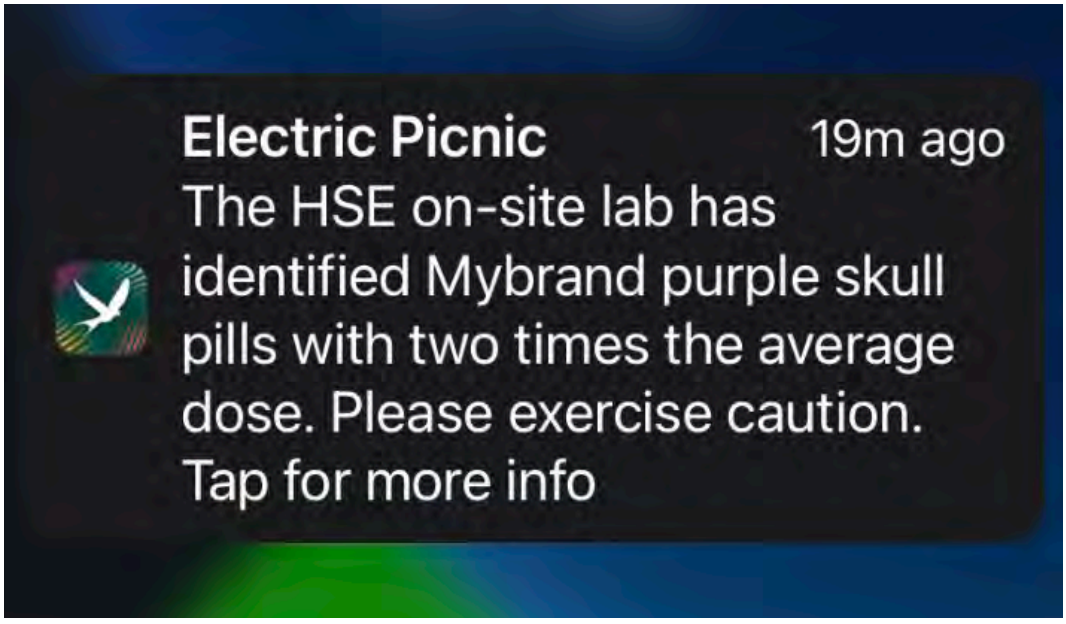
The CBD was identified in the resin giving a low match on the FT-IR but nevertheless indicating that CBD was probably present in the sample as labelled. The probable presence of yeast was indicated in the capsule.

→ 3-CMC

3-CMC is what's known as a synthetic cathinone derivative which can cause stimulant effects. The synthetic cathinone family of drugs would be recognised following their original sale in Head Shops in Ireland. This was the first occurrence of 3-CMC in Ireland and it has been monitored as a new psychoactive substance in Europe since 2014 following identification in Sweden. 3-CMC is part of a large and evolving family of drugs which continue to be monitored in Europe (EMCDDA, 2021a). Adverse mental health consequences are a prominent feature associated with these substances. There is currently limited available information on the current use of cathinones, however, it is likely that 3-CMC is being sold as a substance in its own right for sought after stimulant effects , but it may also be mis-sold to people as other drugs unknowingly (EMCDDA, 2021a).

Communications

In total, three risk communications were issued by the HSE at the event relating to the potency of MDMA pills and powders and as a result of the identification of synthetic cathinone 3-CMC. These results were shared on large display screens located throughout the event, including at the main stage. Messages were also shared across the Electric Picnic social media channels and issued as a push notification on their festival application. All communications were shared with the Code Blue medical teams to further support their work onsite.



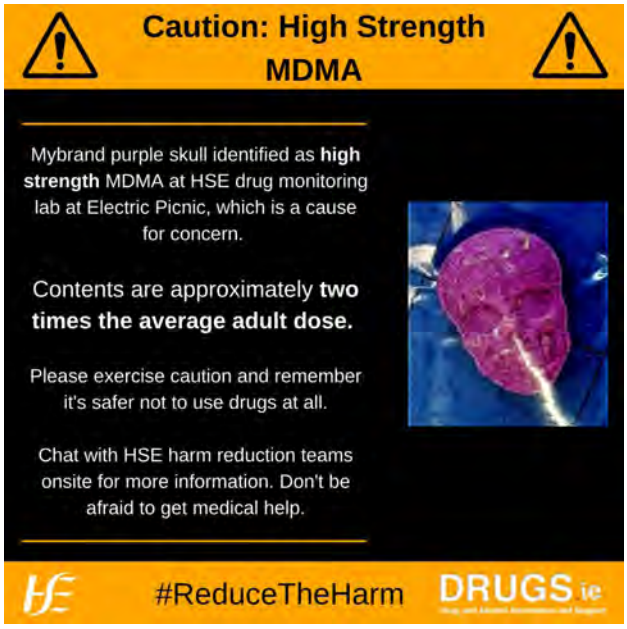
↑ HSE risk communication at Electric Picnic 2022

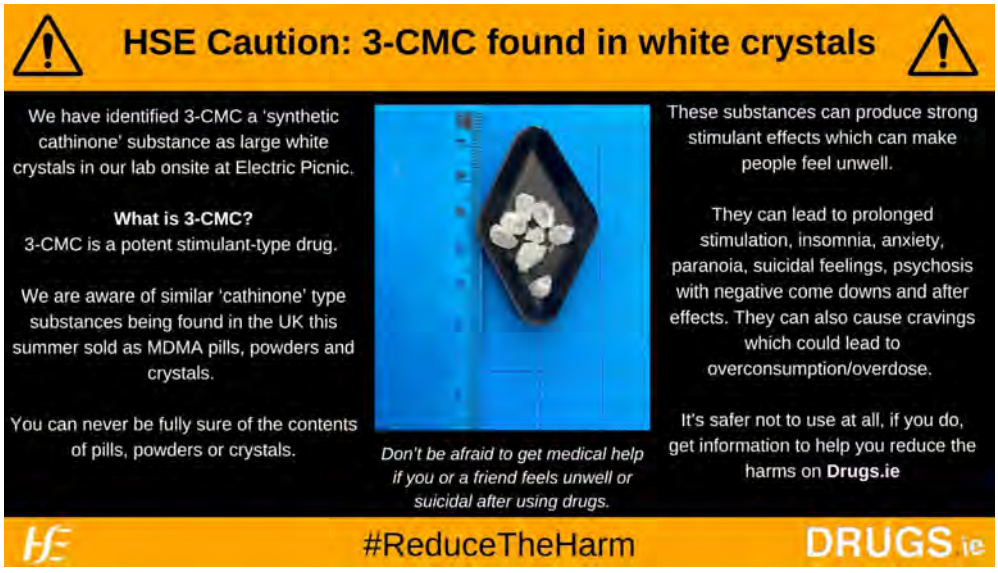
← Push app notification at Electric Picnic 2022

SOCIAL MEDIA RESULTS

The Drugs.ie Twitter account received a total of 550k impressions on posts throughout the weekend of the pilot programme from launch to completion, with a total of 320k impressions achieved following the HSE issuing the first caution on the Friday night of the event following the identification of the purple 'Mybrand' skull. As a result of this work, September was a hugely successful month for Drugs.ie on social media platforms with the Twitter account alone receiving 161k profile visits over a relatively short period of time while also gaining 545 new followers.

The main HSE Twitter account was also used for the sharing of risk communication messages to engage with a more diverse audience for the duration of the event. Overall the account gained 120k impressions with 97k of those associated with the caution issued on the Friday night. There was also significant reach of 100k across the HSE Instagram platform and over 435k on Facebook. A significant number of well-known Irish profiles circulated the risk communication messages across a range of social media channels showing their support.





↖ HSE caution relating to purple 'Mybrand' skull identified, Friday 2nd September 2022

↑ HSE harm reduction update relating to the potency of powder products, Saturday 3rd September 2022

← HSE caution issued on the emergence of 3-CMC, Sunday 4th September 2022

650,000 people reached through HSE Ireland's social media channels

550,000 Drugs.ie Tweet impressions over 3 days

161,000 Drugs.ie Twitter profile visits in September

190 media features (May – September)

All messages shared by Drugs.ie on social media also sign posted to relevant HSE harm reduction content based on the analytical findings.

THE DRUGS.IE WEBSITE

For the duration of five days from the 31st of August to the 4th of September, the Drugs.ie website received engagement from 18,562 users. Of these, 3,821 people accessed the specific drug monitoring page (drugs.ie/drug_monitoring) which contained the risk communication messages issued at the event and a further 2,145 people accessed the HSE festival harm reduction content (drugs.ie/festivals). Furthermore, during this time period, 502 people accessed the HSE information about 'The contents of MDMA in Europe' and 205 people searched for general harm reduction content on the site.

MEDIA PROMOTION

The HSE promoted a series of messages relating to drugs and harm reduction from May – September as part of the overall Safer Nightlife Programme to engage with people who may attend events throughout the summer months. In total, two press releases were issued to initially promote the programme in May ahead of Life festival, followed by a second release in August to launch the drug monitoring pilot at Electric Picnic. During this five month period, a total of 25 media interviews were organised and approximately 190 media clippings were logged in the HSE media coverage book. All major media outlets featured the HSE risk communication message which was issued on the Friday of the event and media interest continued for the duration of the pilot.

Discussion

Application of a 'back of house' approach in an Irish context

While this report documents a relatively low number of samples numerically, the pilot programme marks a significant milestone in Irish drug policy developments. This programme is the first of its kind in Ireland, whereby the HSE accessed substances from people who use drugs to conduct real-time analysis for the purpose of sharing risk communications at a festival. As a result, the HSE were able to quickly share accurate information with the public to encourage harm reduction discussions both in person and online over the course of the event.

While other countries operate 'front of house' services including tailored interventions directly with the person using the drug (Barratt & Measham, 2022), it has taken a substantial amount of work, meetings and deliberations over the past number of years to get to this point of 'back of house' service delivery in Ireland. The pilot can be considered a success for those involved who have worked tirelessly while often facing persistent challenges and implementation barriers. The HSE recognises that harm reduction interventions delivered as part of a 'front of house' service can positively influence behaviour change (Measham 2019; Makkai et al., 2018; Valente et al., 2019), a key objective of drug checking service provision (Giulini et al, 2022). However, it was not possible for the HSE to operate a 'front of house' service at this moment in time and therefore a 'back of house' approach was recommended for the initial pilot programme (Keenan, Killeen and the Emerging Drug Trend and Drug Checking Working Group, 2021).

By definition, services that do not receive, test and disseminate results directly to service users are not considered as a 'drug checking service' by the Trans European Drug Information (TEDI) network (TEDI, 2022). However, it has been recently recognised that 'back of house' services underpinned by harm reduction principles can also have benefits (Barratt & Measham, 2022). As part of a series of approaches, non-public testing through 'back of house' mechanisms has proved useful in the UK. While acting as a stepping-stone, a 'back of house' approach provides an opportunity for services to build trust amongst stakeholders and help laboratories gain necessary field work experience (Barratt & Measham, 2022). A 'back of house' mechanism can also help healthcare providers gain necessary insight on drug market trends in situations where there are current knowledge gaps (West et al., 2021). By implementing this approach in 2022, it provided the HSE with a unique opportunity to quickly obtain and analyse drugs to inform the public while not needing detailed policy amendments.

'Back of house' services that apply a series of measures such as rapid testing coupled with the dissemination of results through support services, media, social media, early warning systems and other platforms similar to approaches adapted by the Loop UK are recognised as being useful (Pascoe et al., 2022). Elements of this approach were applied for the purpose of the Irish pilot to ensure that 'back of house' substance analysis was not in isolation and was combined with quality education, harm reduction interventions and tailored risk communication messages for discussion at the event and across social media channels. Harm reduction teams were available in a fixed site tent and through outreach across campsites to engage with festival attendees over the three day period. This approach ensured that the public could discuss their concerns regarding drug trends directly with workers and receive the best available harm reduction advice. The harm reduction

workers acted as a link between festival attendees, the lab and onsite medics so that information about drugs and possible concerns emerging at the event could flow in multiple directions and across different stakeholder communication channels.

This 'back of house' approach resulted in the HSE issuing three separate risk communications to the public regarding high strength MDMA products and the emergence of 3-CMC. This important information and analysis of trends would otherwise have been unrecorded in Ireland. The HSE risk communications gained a remarkable level of attention throughout the event, on social media and throughout the mainstream media. The first communication on the Friday of the event regarding the purity the purple 'Mybrand' pill enhanced the public's trust of the HSE and the pilot programme at the event and led to a series of positive engagements particularly with the HSE volunteer staff working at the event. The level of positive attention across media platforms may have contributed to more open and transparent conversations about drug trends and harm reduction across Irish society that is to be welcomed.

In 2023, efforts should focus on improving and expanding this approach to ensure that drug monitoring occurs at a number of events across a variety of settings next year to identify drug trends of concern. Evaluations of the impact of this approach should be conducted to identify if real behavioural change in relation to harm reduction can be identified. High-level discussions should also be initiated on the establishment of a fixed site laboratory to conduct routine drug monitoring for the purposes of identifying emerging trends to inform early warning mechanisms outside of nominated nightlife events.

MDMA trends

For the first time, the HSE have been able to attain an estimate on the strength of MDMA products available on the Irish market. This area has been one of concern for the HSE as the proliferation of MDMA use across nightlife settings in Ireland has been occurring at a time when the purity of products has been at an all-time high in Europe greatly increasing the risks for people who use. MDMA use is significant in terms of both festival and nightlife culture. After alcohol, MDMA powders and crystals were identified in research conducted by the HSE and Trinity College Dublin as the most commonly used substance by a sample of Irish festival attendees in 2019 (Ivers, Killeen & Keenan, 2021). Ireland is considered to have one of the highest rates of MDMA use in Europe based on general population studies, second only to the Netherlands (EMCDDA, 2021b), yet there has been a relative absence of information on Irish MDMA users, their patterns of use and the contents of MDMA available in Ireland.

Our findings can now confirm that Ireland is also witnessing dangerously potent MDMA pills, powders and crystals appearing on the market, similar to trends identified across to the rest of Europe (EMCDDA 2016b, 2022b). Two of the three risk communications issued as part of this pilot programme related to high purity MDMA products. Of particular concern, are the five almost pure varieties of powders and crystals that were analysed. Potent powders and crystals may create new

harm reduction challenges if people aren't educated on the risks and necessary harm reduction techniques.

The results from the pilot also suggest that there may be great disparity in the contents a person may encounter. A total of six 'Mybrand' skulls were obtained, one gold pill, one purple and four silver pills. All of these pills were pressed to contain the signature 'Mybrand' logo on the back. All pills had slight variations in appearance but contained great disparity in their contents which ranged from containing approximately 36mg to 235mg of MDMA. As observed by the EMCDDA some time ago, known styles of pills emerge on the market from time to time which are known for their 'brand' and suspected quality, but copied versions can follow and contain significantly lower quantities of MDMA (EMCDDA, 2016b). Based on a number of drug checking organisation sites and social media channels, a series of risk communications have been issued in Europe relating to 'Mybrand' skull pills containing various quantities of MDMA. Our results confirm that there is no way to visually distinguish the contents of pills to know which ones are high strength and therefore higher risk. While we obtained a significantly potent 'Mybrand' skull pill as part of our pilot, we also recorded 'Mybrand' skull pills in different colours containing different MDMA content which confirms the availability of copycat versions. Therefore, the use of online sites documenting the contents of pill brands by user groups should be approached with caution.

Overall, pills submitted to the HSE ranged from less than 36mg to 235mg of MDMA. If people are to encounter such disparity in the purity of MDMA products they use from time to time, they will have no way to estimate their tolerance or predict how to accurately dose MDMA for harm reduction purposes. However, as this pilot represents a relatively small sample size, we have no way of knowing if our findings represents trends across the wider Irish MDMA market and further studies are required to provide a more accurate baseline on the diversity of MDMA contents nationally. Immediate follow up analytical studies are necessary to help the HSE identify the trajectory of the local market to inform new and tailored harm reduction responses.

Synthetic Cathinones

A sizable sample of the synthetic cathinone type substance '3-CMC' in the form of large white crystals was surrendered in a medical facility bin. This was the first time that this substance has been found in Ireland. Synthetic cathinones first appeared on the European illicit drug market in 2005 with 3-CMC first identified in 2014 in Sweden (EMCDDA, 2015a, 2021a). This family of drugs surged in popularity in Ireland and throughout Europe when 'Head Shops' and 'Smart Shops' were in operation on high streets and across online spaces. More recently, there has been increased attention on cathinone type drugs available on the European market with this family of drugs evolving and dominating seizures made in 2020. By the end of 2021, the EMCDDA was monitoring 884 NPS, with synthetic cathinones representing the second-largest category of NPS monitored after synthetic cannabinoids (EMCDDA, 2022b).

In 2021, shifts were observed specifically relating to the recreational drug market by the Loop UK. Results from their substance analysis at music festivals confirmed the adulteration of a variety of MDMA products with caffeine and cathinones. Cathinones were identified as the primary component in 19.4% of samples submitted to their service, with 4-CMC (4-Chloromethcathinone) representing more than half of all cathinones detected (Pascoe et al., 2022). Worryingly, over three quarters

of the cathinones identified by The Loop in 2021 were in tablet form and were visually indistinguishable from ecstasy tablets containing MDMA analysed by the service (Pascoe et al., 2022). A variety of different cathinones in both powders and pills are similarly being identified by number of drug checking agencies across Europe which can be observed through the information published online to update local user groups (Energy Control, 2022; WEDINOS, 2022; Check it, 2022; Safer Dance Swiss, 2022).

Unintentional synthetic cathinone use can greatly increase health harms and of particular concern is the impact that these drugs can have on mental health due to their association with self-harm ideation (Schifano et al., 2012; Marinetti and Antonides,2013). Recent findings from the Netherlands also suggest increases in the intentional use of the cathinone 3-MMC (3-methylmethcathinone) with this selectively used among nightlife user groups leading to increased reports of 3-MMC poisonings to the Dutch Poisons Information Centre (Nugteren-van Lonkhuyzen et al., 2022). Earlier this year, the HSE identified the cathinone 3-MMC in samples obtained through syringe analysis (Mc Namara et al., 2022), however, due to nature of this syringe analysis study, we cannot confirm if the user group represented are actively purchasing 3-MMC or if it is being sold as another stimulant type drug.

Similarly, due to the nature of the 'back of house' approach, we are not in a position to distinguish if the emergence of 3-CMC at the festival was due to the person unknowingly purchasing this substance instead of MDMA crystals or if they actively chose to use it. However, we can be certain that the emergence of 3-CMC as part of this pilot correlates with the person accessing medical facilities at the event. In this case, the HSE identified a substance previously undetected in Ireland. This case provides valuable evidence on how obtaining substances from the public in settings such as festival medical services can capture otherwise unknown drug trends and extra risky substances which may be circulating. We also can't prove if mephedrone (4-MMC) was intentionally added to the MDMA pill analysed by the HSE or if it emerged as a contaminant from equipment used in the production process. Further analytical studies are required to identify if cathinones are appearing under the guise of MDMA and other traditional stimulants. The emergence of cathinones could lead to increased healthcare harms, particularly as noted above mental health harms, if they begin to appear across the Irish drug market and further analysis should now be conducted to explore seizure, hospital presentations and death data.

New psychoactive substances

As well as 3-CMC, the pilot identified a series of other novel substances in the form of powders and tabs, two of which (5-MAPB & 4-HO-MiPT) have never been detected before in Ireland. At a general population level in Ireland, the use of new psychoactive substances or 'research chemicals' is considered low and as a result there has been minimal investigation in this area since the closure of Head Shops. General population studies have many benefits, but can only collect robust information on patterns of use for the most commonly used drugs across society and as a result this approach may not capture less frequently used drugs or novel trends such as the use of research chemicals in Ireland (Mongan et al., 2022). More targeted approaches such as self-selecting online surveys

and targeted engagement in nightlife settings have proved useful internationally to reach hidden populations such as NPS users (Palamar et al., 2016; Korf et al., 2021; Belackova & Drapalova, 2022). The recent European Web Survey on Drugs (EWSD) 2021 was promoted in Ireland with an objective to overcome current knowledge gaps in an attempt to reach hidden populations such as NPS user groups. Overall, the survey engaged with a total of 5,782 Irish participants with 214 of these identifying as NPS users (Mongan et al., 2022). A direct correlation was recognised in the findings between NPS user communities and the use of online market places, similar to results from other EWSD participating countries in the past (Karden & Stizek, 2022). While numerically representing a small NPS user community, the EWSD identified niche use practices, mainly relating to the use of novel psychedelic type substances otherwise not captured in the context of Ireland.

Building on these findings, the HSE was able to directly engage with this novel user community on outreach for the first time as part of the pilot drug monitoring programme. A series of very niche substances were presented to the HSE on the final day of the pilot programme, 9 of which were contained within one package from a group. This group could be considered as a novel user community or 'psychonauts' who may be part of a specific community of 'recreational' drug users (EMCDDA, 2015c; Catalani et al., 2021). As these trends may not represent the mainstream festival community, a risk communication was not issued at the event relating to the emergence of these substances. The substances ranged from psychostimulant powders, novel psychedelics and benzodiazepine tabs. These substances, particularly the potent psychedelics, may be harmful without prior knowledge of the contents (Orsolinil et al., 2017; Balíková, 2005). The application of new and targeted approaches has assisted the HSE in reaching otherwise hidden and unknown user communities. Further surveys should therefore be conducted alongside the development of analytical projects to monitor NPS trends among hidden populations.

Conclusion

This pilot represents a significant milestone for harm reduction responses in Ireland and illustrates a successful collaboration between the HSE, Garda, festival organisers and on-site medics. The analytical results from this pilot have confirmed that there are dangerously high levels of MDMA contained in some products which can greatly increase the risks for those who use them. A number of new psychoactive substances were also identified, including three new substances never before detected in Ireland.

Based on the concerning and novel trends identified as part of this pilot, expansion of analytical services is required to gain further insight on areas of concern to help protect the health of people who use drugs across Irish society.

Future actions

Following the initial review of the analytical findings from the pilot drug monitoring programme, the HSE will further evaluate their work in this area with an aim to improve the delivery of harm reduction responses across nightlife settings. This review will involve consultation with nightlife stakeholders, medical service providers in night-time economy settings, HSE volunteers and people who use drugs.

The following actions will be implemented by the HSE National Social Inclusion Office throughout Quarter 4 of 2022 and Quarter 1 of 2023

1. **Engage with nightlife stakeholders and HSE volunteers who participated in the 2022 programme:** Obtain feedback across stakeholder groups with an aim to improve HSE night-time economy responses in 2023.
2. **Conduct a survey among festival and nightlife attendees who use substances:** Access and evaluate feedback from people who use drugs in nightlife spaces on the pilot Safer Nightlife Programme and drug monitoring pilot to inform future approaches.
3. **Review how to further access substances from people who use drugs for health purposes:** Review the available mechanisms to access substances directly from people who use drugs in consultation with the Department of Health, Department of Justice and An Garda Síochána. Consider drug policy implications and amendments which may be required to support future programmes.
4. **Support the expansion of drug monitoring activities in Ireland through the recruitment of additional analytical staff.**
5. **The formation of a Working Group to oversee health and safety responses in nightlife settings.** To review and oversee nightlife responses, including the development of guidelines on the provision of welfare services in festival settings.
6. **Continue to liaise with the Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media and the Implementation Group on the Report of the Night-Time Economy Taskforce to improve harm reduction responses in night-life settings.**

Reference list

- Arendt, V., Guillorit, L., Origer, A., Sauvageot, N., Vaillant, M., Fischer, A., Goedertz, H., François, J.H., Alexiev, I., Staub, T., Seguin-Devaux, C. (2019). **Injection of cocaine is associated with a recent HIV outbreak in people who inject drugs in Luxembourg.** PLoS One. May 16;1 4(5):e0215570. doi: 10.1371/journal.pone.0215570.
- Araújo, A. M., Carvalho, F., Bastos, M., Guedes de Pinho, P., and Carvalho, M. (2015). **The hallucinogenic world of tryptamines: an updated review.** Archives of toxicology, 89(8), 1151–1173. doi.org/10.1007/s00204-015-1513-x
- Artigiani, E.E., and Wish, E.D. (2020). **Introducing the National Drug Early Warning System.** Current Opinion in Psychiatry, 33, (4), pp. 319-325. doi: 10.1097/YCO.0000000000000610
- Balíková, M. (2005). **Nonfatal and fatal DOB (2,5-dimethoxy-4-bromoamphetamine) overdose.** Forensic Sci Int 153:85–91.doi.org/10.1016/j.forsciint.2005.04.022
- Barratt, M., and Measham, F. (2022). **What is drug checking, anyway?** Drugs, Habits and Social Policy, special issue on drug checking, 23 (4). doi.org/10.1108/dhs-01-2022-0007
- Belackova, V,. and Drapalova, E. (2022). **Web surveys as a method for collecting information on patterns of drug use and supply**, in Monitoring drug use in the digital age: studies in web surveys, EMCDDA Insights, available at www.emcdda.europa.eu/system/files/publications/14717/insights-paper-ch01-proof.pdf
- Catalani, V., Corkery, J. M., Guirguis, A., Napoletano, F., Arillotta, D., Zangani, C., Vento, A., and Schifano, F. (2021). **Psychonauts' psychedelics: A systematic, multilingual, web-crawling exercise.** Journal of the European College of Neuropsychopharmacology, 49, 69–92. doi.org/10.1016/j.euroneuro.2021.03.006
- **Check it!** (2022). Drug Checking, Warnings. Retrieved September 15th, 20202, from checkit.wien/warnungen/
- European Monitoring Centre for Drugs and Drug Addiction (2014). **EMCDDA–Europol 2013 Annual Report on the implementation of Council Decision 2005/387/JHA**, Implementation reports, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction. (2015a). **Perspectives on drugs: Injection of synthetic cathinones.** Perspectives on drugs, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2015b). **New psychoactive substances in Europe.** An update from the EU Early Warning System (March 2015), Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2016a). **The internet and drug markets**, EMCDDA Insights 21, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2016b). **Recent changes in Europe's MDMA/ecstasy market.** EMCDDA Rapid Communication, Publications Office of the European Union, Luxembourg.

- European Monitoring Centre for Drugs and Drug Addiction (2016c), **EMCDDA–Europol 2015 Annual Report on the implementation of Council Decision 2005/387/JHA**, Implementation reports, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2019). **EMCDDA operating guidelines for the European Union Early Warning System on new psychoactive substances**, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction and Europol (2021a). **EMCDDA initial report on the new psychoactive substance 1-(3-chlorophenyl)-2-(methylamino)propan1-one (3-chloromethcathinone, 3-CMC).** In accordance with Article 5b of Regulation (EC) No 1920/2006 (as amended), Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2021b). **European Drug Report 2021: Trends and Developments**, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2022a), **New psychoactive substances: 25 years of early warning and response in Europe.** An update from the EU Early Warning System. Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2022b). **European Drug Report 2022: Trends and Developments**, Publications Office of the European Union, Luxembourg.
- European Monitoring Centre for Drugs and Drug Addiction (2022c). **Report on the risk assessment of 2-(methylamino)-1-(3-methylphenyl) propan-1-one (3-methylmethcathinone, 3-MMC) in accordance with Article 5c of Regulation (EC) No 1920/2006** (as amended), Publications Office of the European Union, Luxembourg.
- Energy Control (2022). **Alerts**. Retrieved October 7th, 20202, from www.energycontrol.org/alertas/
- Giulini, F., Keenan, E., Killeen, N. & Ivers, J.I. (2022). **A systematized review of drug-checking and related considerations for implementation as a harm reduction intervention.** Journal of Psychoactive Drugs, pp. 1-9. doi: 10.1080/02791072.2022.2028203
- Harper, L., Powell, J., and Pijl, E. M. (2017). **An overview of forensic drug testing methods and their suitability for harm reduction point-of-care services.** Harm reduction journal, 14(1), 52. doi.org/10.1186/s12954-017-0179-5
- Hofer, K. E., Faber, K., Müller, D. M., Hauffe, T., Wenger, U., Kupferschmidt, H., and Rauber-Lüthy, C. (2017). **Acute Toxicity Associated With the Recreational Use of the Novel Psychoactive Benzofuran N-methyl-5-(2 aminopropyl)benzofuran.** Annals of emergency medicine, 69(1), 79–82. doi: 10.1016/j.annemergmed.2016.03.042
- Ivers, J.I., Killeen, N. and Keenan, K. (2021). **Drug use, harm-reduction practices and attitudes toward the utilisation of drug safety testing services in an Irish cohort of festival attendees.** Irish Journal of Medical Science, 191, 1701–1710 (2022). doi.org/10.1007/s11845-021-02765-2
- Karden, A., and Strizek, J. (2022). **The potential for using web surveys to investigate drug sales through cryptomarkets on the darknet**, in Monitoring drug use in the digital age: Studies in web surveys, EMCDDA Insights. Available at www.emcdda.europa.eu/publications/insights/web-surveys/potential-web-surveys-investigate-drug-sales-cryptomarkets-darknet_en

- Keenan, E., Killeen, N. and The Emerging Drug Trends and Drug Checking Working Group (2021). **Report of the Emerging Drug Trend and Drug Checking Working Group.** The Health Service Executive, Dublin.
- Korf, D., Benschop, A., Werse, B., Werse, B., Kamphausen, B., Felvinczi, K., Dabrowska, K., Herniques, S., Nabben, T., Wieczorek, L., Bujalski, M., Kalo, Z., Hearne, E., and Van Hout, M.C (2021). **How and Where to Find NPS Users: a Comparison of Methods in a Cross-National Survey Among Three Groups of Current Users of New Psychoactive Substances in Europe.** Int J Ment Health Addiction 19, 873–890. doi.org/10.1007/s11469-019-0052-8
- Kriener, H. (2001). **An inventory of on-site pill-testing interventions in the EU.** European Monitoring Centre for Drugs and Drug Addiction. Lisbon
- Manning, P. (2014). **Drugs and Popular Culture in the Age of New Media.** Routledge. Volume 15 of Routledge advances in criminology.
- Makkai, T., Macleod, M., Vumbaca, G., Hill, P., Caldicott, D., Noffs, M., Tzanetis, S., and Hansen, F. (2018). **Report on the ACT GTM Pill Testing Pilot: A Harm Reduction Service.** Harm Reduction Australia. Available at www.harmreductionaustralia.org.au/wp-content/uploads/2018/06/Pill-Testing-Pilot-ACT-June-2018-Final-Report.pdf
- Malaca, S., Lo Faro, A.F., Tamborra, A., Pichini, S., Busardò, F.P., Huestis, M.A. (2020). **Toxicology and Analysis of Psychoactive Tryptamines.** Int J Mol Sci, 21(23):9279.doi: 10.3390/ijms21239279
- Marinetti, L. J., and Antonides, H. M. (2013). **Analysis of synthetic cathinones commonly found in bath salts in human performance and postmortem toxicology: method development, drug distribution and interpretation of results.** Journal of analytical toxicology, 37(3), 135–146.
- McCrae, K., Tobias, S., Grant, C., Lysyshyn, M., Laing, R., Wood, E., and Ti, L. (2020). **Assessing the limit of detection of Fourier-transform infrared spectroscopy and immunoassay strips for fentanyl in a real-world setting.** Drug and alcohol review, 39(1), 98–102. doi.org/10.1111/dar.13004
- McLaughlin, G., Morris, N., Kavanagh, P. V., Power, J., D., Dowling, G., Twamley, B., O'Brien, J., Hessman, G., Murphy, B., Walther, D., Partilla, J. S., Baumann, M. H., and Brandt, S. D. (2017). **Analytical characterization and pharmacological evaluation of the new psychoactive substance 4-fluoromethylphenidate (4F-MPH) and differentiation between the (±)-threo and (±)-erythro diastereomers.** Drug testing and analysis, 9(3), 347–357. doi: 10.1002/dta.2167
- McNamara, S., Killeen, N., Stokes, S., & Keenan, E. (20220). **Irish Syringe Analysis Pilot Project, The identification of current injecting trends in the Dublin and Midland Region through the application of syringe analysis methodology.** Health Service Executive, Dublin.
- Measham, F. C. (2019). **Drug safety testing, disposals and dealing in an English field: Exploring the operational and behavioural outcomes of the UK's first onsite 'drug checking' service.** The International journal on drug policy, 67, 102–107. doi.org/10.1016/j.drugpo.2018.11.001
- Mongan, D., Millar, S. and Galvin, B. (2021). **The 2019–20 Irish National Drug and Alcohol Survey: main findings.** Health Research Board Ireland, Dublin.
- Mongan, D., Killeen, N., Evans, D., Millar, S.R., Keenan, E. & Galvin, B. (2022). **European Web Survey on Drugs 2021: Irish Results.** Health Research Board. Dublin.

- Nugteren-van Lonkhuyzen, J.J, Essink, S., Rietjens, S.J., Ohana, D., W. de Lange, D., van Riel, A.J.H.P., and Hondebrink, L. (2022). **3-Methylmethcathinone (3-MMC) Poisonings: Acute Clinical Toxicity and Time Trend Between 2013 and 2021 in the Netherlands.** Annals of Emergency Medicine, Volume 80, Issue 3,pp 203-212. doi.org/10.1016/j.annemergmed.2022.04.022
- Orsolini, L., St John-Smith, P., McQueen, D., Papanti, D., Corkery, J., and Schifano, F. (2017). **Evolutionary Considerations on the Emerging Subculture of the E-psychonauts and the Novel Psychoactive Substances: A Comeback to the Shamanism?** Curr Neuropharmacol.15(5):731-737. doi: 10.2174/1570159X15666161111114838
- Palamar, J.J., Barratt, M.J., Ferris, J.A., Winstock, A.R. (2016). **Correlates of new psychoactive substance use among a self-selected sample of nightclub attendees in the United States.** Am J Addict. 2016 Aug;25 (5):400-7. doi: 10.1111/ajad.12403
- Pascoe, M.J., Radley, S., Simmons, H. T. D., Measham, F. (2022). **The Cathinone Hydra: Increased Cathinone and caffeine adulteration in the English MDMA market after Brexit and COVID-19 lockdowns.** Drug Science, Policy and Law Volume 8: 1–12. doi.org/10.1177/20503245221099209
- Safer Dance Swiss (2022). **Warnings**. Retrieved September 15th, 20202, from www.de.saferdanceswiss.ch/warnungen
- Schifano, F., Corkery, .J, and Ghodse, A.H (2012). **Suspected and confirmed fatalities associated with mephedrone (4-methylmethcathinone; 'meow meow') in the UK.** J Clin Psychopharmacol 2012;32:710-4.
- Shoff, E. N., Kahl, J. H., Hime, G. W., Coburn, M., AND Boland, D. M. (2019). **4-Fluoromethylphenidate: Fatal Intoxication Involving a Previously Unreported Novel Psychoactive Substance in the USA.** Journal of analytical toxicology, 43(8), 666–672. doi: 10.1093/jat/bkz061
- Smit-Rigter L., van der Gouwe, D. (2019). **The Drugs Information and Monitoring System (DIMS) Factsheet on drug checking in the Netherlands.** Trimbos institute, Utrecht.
- www.drugsandalcohol.ie/37203/1/**Factsheet_on_drug_checking_in_the_Netherlands.pdf**
- Trans European Drug Information (2022). **"TEDI guidelines", Drug Checking Methodology**, available at: www.tedinetwork.org/wp-content/uploads/2022/03/TEDI_Guidelines_final.pdf
- Tittarelli, R., Mannocchi, G., Pantano, F., and Romolo, F. S. (2015). **Recreational use, analysis and toxicity of tryptamines.** Current neuropharmacology, 13(1), 26–46. doi: 10.2174/1570159X13666141210222409
- United Nations Office on Drugs and Crime (2022). **World Drug Report 2022, Executive Summary Policy Implications.** United Nations Office on Drugs and Crime. Austria.
- Valente, H., Martins, D., Carvalho, H., Pires, C. V., Carvalho, M. C., Pinto, M., and Barratt, M. J. (2019). **Evaluation of a drug checking service at a large scale electronic music festival in Portugal.** The International journal on drug policy, 73, 88–95. doi.org/10.1016/j.drugpo.2019.07.007
- **Welsh Emerging Drugs and Identification of Novel Substances (WEDINOS) (2022)**. Sample Results. Retrieved September 15th, 20202, from www.wedinos.org/sample-results
- Welter, J., Kavanagh, P., Meyer, M. R., and Maurer, H. H. (2015). **Benzofuran analogues of amphetamine and methamphetamine: studies on the metabolism and toxicological analysis of 5-APB and 5-MAPB in**

urine and plasma using GC-MS and LC-(HR)-MS(n) techniques. Analytical and bioanalytical chemistry, 407(5), 1371–1388. doi: 10.1007/s00216-014-8360-0

- West, H., Fitzgerald, J., Hopkins, K., Li, E., Clark, N., Tzanetis, S., Greene, S. and Reid, G. (2021), **"Early warning system for illicit drug use at large public events: trace residue analysis of discarded drug packaging samples".** Journal of the American Society for Mass Spectrometry,Vol.32 No.10,pp.2604-2614.

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