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What have we learned and what can we do about NPS?

Oscar D'Agnone

Professor Oscar D'Agnone is the Medical Director, based at CRI, London, UK and an Honorary Professor, Faculty of Health and Medical Sciences, Institute of Brain Behaviour and Mental Health, University of Manchester, Manchester, UK.

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Abstract

Purpose – *The purpose of this paper is to describe and summarize the recent emergence of NPS onto the drug market. To show the international and national responses, legal and guidance. To indicate some of the challenges NPS present to jurisdictions. To indicate some of the challenges NPS present to treatment agencies. To outline what is known about prevalence and effects.*

Design/methodology/approach – *A narrative account of the substances becoming known and the response made by jurisdictions.*

Findings – *The use and effects of NPS are slowly becoming known and exchanged between jurisdictions and treatment agencies. The user group appears to differ from the "traditional" substance users groups with which agencies are familiar. The use of the internet is a characteristic of this new market and user group.*

Research limitations/implications – *New substances are constantly being identified. Previous treatment approaches may not be fully relevant to NPS. The new area of cognition enhancement is being gradually realized.*

Practical implications – *Treatment agencies need to develop new approaches, both to treat the effects of NPS use and to attract NPS users, who do not identify as "drug users".*

Social implications – *A new user group appears to be emerging. Cognition enhancement is a feature of NPS composition and use/attraction.*

Originality/value – *An attempt to summarize existing understanding of NPS use and marketing and to predict future trends and needs.*

Keywords *Marketing, Internet, Treatment, Cognition, NPS, Stimulants*

Paper type *Technical paper*

We have been here before

Over the last decade we have learned that the production, dealing, marketing and use of new psychoactive substances are taking place all over the world. The emergence of NPS on the drug scene is not a new phenomenon: what is new is the number of such substances being identified. Four substances were controlled by the 1912 Hague International Opium Convention. The number increased to 85 at the time of the 1961 UN Single Convention on Narcotic Drugs; to 130 at the time of the 1971 UN Convention on Psychotropic Substances; and to 234 by the time of the 2012 United Nations Office on Drugs and Crime convention.

The emergence of new substances in the drug markets has clearly gained pace over the last decade: 251 NPS had been identified by UN Member States as of mid-2012. This exceeds the 234 psychoactive substances that are controlled by the international drug conventions. An ever-increasing number of NPS has emerged worldwide over the past few years, including a number of piperazines, synthetic cathinones and synthetic cannabinoids which were marketed as "legal" alternatives to controlled substances (United Nations, 2012a, b). Well-known examples of NPS include substances such as synthetic cannabinoids contained in various herbal mixtures, piperazines (e.g. N-benzylpiperazine (BZP)), products sold as "bath salts"

(i.e. cathinone-type substances such as mephedrone and methylenedioxypyrovalerone) and various phenethylamines.

The creation of new substances was carried out exploiting loopholes and gaps in drugs control legislation, has been a feature of the international drug control system since it was first established, and it will continue to be – some call it "market forces". Most experts, researchers and academics agree that a great deal of such proliferation over the last years has been the result of the legendary work done by Ann and Alexander Shulgin (Shulgin and Shulgin, 1991) on phenethylamines and tryptamines in the 1960s and the 1970s. The Shulgins reported over 230 psychoactive compounds that they had synthesized and evaluated for their psychedelic and entactogenic (a class of psychoactive drugs that produce distinctive emotional and social effects similar to those of MDMA – ecstasy) potential.

The term "designer drugs[1]" (substances that have been developed especially to avoid existing drug control measures, manufactured by making a minor modification to the molecular structure of controlled substances, resulting in new substances with pharmacological effects similar to those of the controlled substances) was coined more than 30 years ago. The term originally referred to various synthetic opioids, mostly based on modifications of fentanyl (e.g. alpha-methylfentanyl), and was later mainly related to MDMA. However, when ecstasy arrived on the scene other substances became regulated and controlled at the national level, and the term designer drug became inappropriate (United Nations, 2010; European Monitoring Centre for Drugs and Drug Abuse/European Police Office, 2012). In some circles designer drugs are called "club drugs". This encompasses a far broader range of controlled and non-controlled substances, used mainly by teenagers and young adults at bars, nightclubs, concerts and parties. This includes: ecstasy, methamphetamine, gamma-hydroxybutyric (GHB) acid, flunitrazepam (Rohypnol)), lysergic acid diethylamide (LSD) and ketamine.

Another term which emerged in the late 1990s and early 2000s is "research chemicals". This term seems to have emerged more from drug marketers than designer drugs chemists. The term was coined to introduce market-specific psychedelic drugs belonging to the tryptamine and phenethylamine families. The idea was to relate these products to scientific research with the intent of by passing the clauses and provisions of various analogue drug laws. A similar strategy was behind the marketing of some other substances labelled as "not intended for human consumption".

"Legal highs" (European Monitoring Centre for Drugs and Drug Abuse/European Police Office, 2012) is an additional and successful term drug marketers introduced to describe unregulated (new) psychoactive substances or products intended to mimic the effects of controlled drugs. This emphasizes the idea of legality, in the same way "research chemicals" implies some legitimate research use; herbal highs the element of plant origin; and some level of safety also related to the so-called party pills, where the word "drug" has been completely removed.

To better serve policymaking at the regional and international levels, the Commission on Narcotic Drugs introduced the term New Psychoactive Substance (NPS) at the international level in its resolution 55/1 of 16 March 2012. NPS had earlier been legally defined by the European Monitoring Centre for Drugs and Drug Addiction as a "new narcotic or psychotropic drug, in pure form or in preparation, that is not controlled by the 1961 United Nations Single Convention on Narcotic Drugs or the 1971 United Nations Convention on Psychotropic Substances, but which may pose a public health threat comparable to that posed by substances listed in these conventions" (Council Decision 2005/387/JHA).

Smart drugs or smart drug marketing? Re-branding addiction

"Smart drugs" is another term introduced to substitute the more technical word nootropic. This refers to a group of substances now mostly used by students for enhancing their academic performance. This phenomenon is not new, but the marketing operation behind it is. Amphetamines were in common use among students in the 1970s to improve academic performance, at a time when perceptions of "drugs" were different. Those were the days of LSD, marijuana and speed. Nobody knew much about the long term effects of drugs until unexpected

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effects started to happen: people having a bad trip or trying to lose weight ended up with a chronic psychotic state; heavy cannabis smokers had long-lasting cognitive impairment, memory loss and attention deficits. Drug use in those days was more related to a counter-culture movement, not to a brain dysfunction. It is not surprising that in the age of smart phones and applications, drug marketing came up with the term "smart drugs". Those making a profit out of marketing and supplying these drugs are the smart ones. They are presenting drugs like methylphenidate, amphetamine derivates, modafinil and others in new clothes, but the reality is that they have been around for a long time.

Amphetamine was synthesized in 1887 by Romanian chemist Lazăr Edeleanu and did not at the time attract special attention. MDMA (now marketed as ecstasy) was first produced in 1912: this synthesis also went largely unnoticed at the time. In the 1920s, both methamphetamine and an optical isomer of amphetamine dextroamphetamine (dexedrine) were synthesized. Methylphenidate was first synthesized in 1944, but was identified as a stimulant ten years later – 60 years ago. Modafinil was created in France in the late 1970s – 35 years ago – for treating narcolepsy. In the scientific community some of these drugs, along with supplements, nutraceuticals, and functional foods that purportedly improve mental functions such as cognition, memory, intelligence, motivation, attention, and concentration, were known and referred to variously as smart drugs, memory enhancers, neuro-enhancers, cognitive enhancers, or intelligence enhancers.

These marketing strategies are neither new nor exclusive to selling novel drugs. "Old" antidepressants like bupropion are now marketed as medicines for smoking cessation. Terms like antidepressant or smoking cessation medicines are more related to marketing than pharmacology. Scientists look at drugs in terms of neural pathways and systems, neurotransmitters and specific receptors, but that is usually very complex for the clinicians dealing with high number of patients in their surgeries or the health economist who needs to decide on budgets and write protocols including medicines for treating diseases.

It is easier to create an association between a clinical condition, a medication, its protocol and SOP (standard operation procedure). Thus, drugs like bupropion are marketed with different brands by the same manufacturer. The antidepressant is called Welbutrin and the medication for smoking cessation is called Zyban. In terms of popular perceptions (and prejudices), smokers, for example, do not want to be treated with "psychiatric medication". This can be seen as a further example of smart (or aware) marketing. Young drug users and dealers want to differentiate themselves from "junkies" and street dealers and many see themselves as clubbers and young informal entrepreneurs.

The new friendly trustable drug dealer

A survey carried out by Student Beans in February 2012[2] amongst 1,903 university students across the UK showed that 65 per cent of university students have used illegal drugs at some point (it is worth mentioning that 35 per cent have not). However when asked about their peers the perception was that 90 per cent of them have used. "Everybody does it" is another false normative assumption that marketers and dealers profit from, because it makes the non-user more likely to use too (peer-led pressure)[3].

Of those who admit to taking drugs while at university, 77 per cent say they have used cannabis, 39 per cent ecstasy and 24 per cent cocaine. In absolute terms this means that, according to the Student Beans survey, approximately 25 per cent of students have used ecstasy, and even fewer have used cocaine. Ketamine had been tried by one in six of the students who took part in the survey but also tops the list of drugs respondents say they would never try (63 per cent rule it out), followed by LSD (61 per cent) and mephedrone (57 per cent). In total, 26 per cent stated they would definitively not want to try legal highs. This informative survey also shows that drug-taking does not start at university: four out of five students had already used illegal drugs before they arrived on campus, and nearly half of them had tried drugs by the age of 16. Three-quarters of students are using drugs no more than once a month, and half spend <£10 a month on them.

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Most NPS dealers are not violent criminals on the fringes of society: they are popular university students, friendly and trustworthy. In 2009 the Daily Telegraph reported on the case of three drug dealers in Southampton enrolling in university courses securing loans of up to £6,928 a year, which they used to buy a stash of drugs[4]. In 2012 a survey carried out by *Varsity*[5], the student newspaper for the University of Cambridge, found that one in seven students who used drugs also admitted to selling them for profit. The *Varsity* survey showed that 45 per cent of those who take drugs admitted to buying illegal drugs for their friends, and 8 per cent of all students who took the survey, or 14 per cent of those who had used illegal drugs, admitted having sold drugs for a profit.

A 22-year-old philosophy student from Merseyside claims to only make £200 on a Friday night, "but it's better than £6 an hour in a bar. He added 'I don't think of myself as a drug dealer in the popular sense of the word. It's more like a hobby that pays for drugs, going out, rent, and holidays'". Soon after the interview he moved to a house in the city where he could expand his operation making £1,000 per week (Daly, 2014) Students dealing with peers make them feel safer both ways. The dealer knows his client and they buy from and sell to "one of them". Some researchers like Dr Leah Moyle, from Plymouth University's Drug and Alcohol Research Unit, think that "social supply" (Coomber *et al.*, 2014, p. 55) should become a distinct criminal offence in order to differentiate the type of low-level dealer most common in universities from "professional" drug dealers driven only by profit.

Some think social perception plays a very important role in NPS use[6]. Thus using NPS does not make you an addict, and selling NPS at a profit doesn't make you a dealer. It is an example of the way in which many regard their own behaviours as "normal" and acceptable, but regard others', similar, behaviours as unacceptable. It is a sort of hierarchy, and part of the purpose seems to be to set up groups and behaviours which are described or regarded as unacceptable or wrong as a way of justifying and normalizing the behaviour of those making that judgement. It is scape-goating, though elaborately constructed and disguised. Those with experience in this field know that denial is one of the foundation stones where addictions and other behavioural problems lie. "'I promise I won't die' were last words of tragic ecstasy boy to his mother". He was among five friends who had paid £80 for the drug before the party[7].

These are some of the complex situations that drug information and education based on fear and, in many cases, denial produce. Young people should be educated to live with drugs without the need to use them. They should be encouraged to learn about and discuss the multiple consequences of using drugs, not just on themselves but also on others.

The internet generation

A further significant finding of the Student Beans survey in 2012 was that the most popular way of getting information about drugs is via the internet (67 per cent) – which is also a very popular place for buying NPS. There is little doubt that the internet plays an important role in the NPS business. In a recent UNDOC survey "88% of the responding countries with a domestic NPS market indicated that the Internet was a key source for NPS" (European Monitoring Centre for Drugs and Drug Abuse/European Police Office, 2012, p. 72). The number of online shops offering to supply customers in European Union countries with NPS increased from 170 in January 2010 to 314 in January 2011 and 693 in January 2012 (European Monitoring Centre for Drugs and Drug Addiction, 2012). The most frequent NPS searched over the internet during the period 2008-2012 were Spice, followed by ketamine, *Salvia divinorum* and kratom[8]. However, cannabis still remains the most searched-for drug, ahead of amphetamine-type stimulants, cocaine and heroin. The interest in amphetamine-type stimulants, including ecstasy, seems to have declined recently.

NPS: look east

Data from the International Narcotics Control Board (United Nations, 2012a) and European Police Office (Europol) (European Monitoring Centre for Drugs and Drug Addiction/European Police Office 2013) shows that though some manufacture take place in Europe, America and

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other regions, most NPS come from Asia (mainly China and, to a lesser degree, India.) These are usually legally imported as chemicals (air fresheners, herbal incenses, bath salts, plant fertilizers, collectors' items, etc.) supported by sophisticated and aggressive marketing operations (European Monitoring Centre for Drugs and Drug Addiction/European Police Office, 2012, p. 25).

NPS in the UK and Europe

In Europe approximately 2.9 million people, or 4.8 per cent of the population between 15 and 24 years of age, had experimented with legal substances that imitate the effects of illicit drugs, and five countries (UK 23 per cent, Poland 17 per cent, France 14 per cent, Germany 12 per cent and Spain 8 per cent) account for 74 per cent of NPS[9]. NPS use increases with age: those aged 19-22 use more than those aged 15-18. Most NPS users obtained the drugs from a friend (54 per cent), were offered them at a party or in a club (36 per cent), bought them in specialized shops (33 per cent), or over the internet (7 per cent) (United Nations, 2012b). NPS users, in common with other illicit drug users, showed low risk perception of the negative effects on health of illicit drugs when compared with general population. This is important because low risk perception is always associated with actual use of different varieties of NPS, and even cocaine (European Commission, 2011a).

The largest European market for NPS is the UK. It is mainly associated with mephedrone (annual prevalence rate of 1.4 per cent among the population aged 16-59 in England and Wales), and ketamine (0.6 per cent), Spice (0.1 per cent) and BZP (0.1 per cent) (Home Office, 2012). The UK was also the European country that showed the highest number of NPS users (30 per cent) during the period 2010/2011 (European Commission, 2011b). However, recent data for England and Wales suggest that from 2011/2012 the use of mephedrone started to decline following an import ban and its classification as a class B substance under the Misuse of Drugs Act in 2010[10]. By 2012 mephedrone ranks fourth after cannabis (6.9 per cent), cocaine (2.2 per cent) and ecstasy (1.4 per cent) among the general population. Marginal declines were also observed in the use of ketamine and of Spice (Home Office, 2012)[11].

What have we learnt from "before" that is relevant to NPS?

There is not much evidence about what can we do about this new trend in drug use, which is changing the profile of the user, the dealer and the public perception of using – self-proclaimed "smart, legal, club or designer" drugs. Is the spread of NPS use qualitatively different to previous phases in illegal drug use, e.g. amphetamines in the 1970s and 1980s, ecstasy in the 1990, VSA intermittently? What "lessons" might we draw from that history? Given the nature and the limitations of this paper, we will restrict our coverage to describing the strategies and we invite readers interested in obtaining deeper knowledge to search the source references.

It is clear that a holistic approach involving a number of factors – prevention, treatment, legal status, improving precursor controls, cracking down on trafficking rings – has to be applied to tackle the situation. The standard interventions models to prevent contain and minimize the effects of drug use can be classified in three levels: before, during and after drugs use becomes regular. In the case of NPS there are two basic strategies aimed at reducing the supply and reducing the demand. Supply reduction strategies focus on policies for controlling new psychoactive substances, introducing criminal sanctions including threat of prison to deter suppliers, and not criminalizing the users. The major challenge for these strategies and policies is the combination of the diversity of new substances and the speed with which they have been appearing. The burden falls on national legal systems, which were not developed to face such a phenomenon. Many governments are using these strategies, but the problem they face is finding an appropriate way of banning a group (sharing the same chemical core) of substances rather than every new one resulting from minimal structural chemical modifications (see e.g. European Commission, 2011a, b).

NPS are not included in the schedules of the 1961 and 1971 International Drug Control Conventions. However, whenever a Party or the World Health Organization (WHO) has

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information relating to a substance not yet under international control which in its opinion requires that substance to be added to any of the schedules of the Conventions, it must notify the Secretary-General and furnish him with the information in support of that notification. The notification is then transmitted to the Parties, to the Commission on Narcotic Drugs and to WHO. Based on the recommendations on control measures, the Commission may decide that the substance must be added to, transferred from one schedule to another, or removed from any of the schedules of the respective Convention. The decisions of the Commission are subject to review by the Economic and Social Council at the request of a Party. The WHO Expert Committee on Drug Dependence has reviewed several NPS, for example benzylpiperazine or ketamine (United Nations Office on Drugs and Crime, 2013).

A number of countries have introduced early warning systems aiming to provide timely information so that policymakers can make evidence-based decisions (Coulson and Caulkins, 2012). Most scheduling systems, analogue and generic, operate only after a substance has been found to pose a severe risk to health and is already in wide circulation. Generic control systems go a step further, because they start from a core molecular structure. The law then specifies variations of the structure of this substance, which would lead to the automatic control of such substances under the national legislation[12]. Another approach considered by UK[13] and adopted by New Zealand[14], is the application of consumer protection laws to fight the flow of NPS into the local market. Given the complexities related to their regulation, a few countries (Japan, New Zealand, the Republic of Korea, and the USA) (United Nations Office on Drugs and Crime, 2013, p. 28) have started to implement specific legislation on new psychoactive substances, Ireland being one of the first to do so, in 2012 (Kavanagh and Power, 2014). Finally, it is interesting to note that since December 2014 all "legal highs" are now considered illegal in Guernsey (BBC, 2014).

Education

Education is one of the most important preventive interventions to counter aggressive NPS marketing strategies. It is important to let people know that there is not anything "smart" about these drugs. They are the product of profit-motivated individuals with the technical knowledge to produce, market and distribute them using the gaps and cracks of the legal systems. European researchers have recommended that primary prevention strategies for dealing with NPS and other drugs should be focused in life skill training aiming to enhance individual and social competences. This approach also includes information on specific drugs prevalent in one region or on vulnerable populations (Weichold and Giannotta, 2014). NPS information and education should focus on facts and pharmacology, use patterns, marketing, distribution, health risks and most important, the dynamics leading to these drugs emergence rather than aiming to create panic or scare potential users (Khey *et al.*, 2014). There is a lot of information available online, not all of it reliable or unbiased[15].

Addressing patients' NPS use

Addressing

NPS patients first contact with doctors can be at hospital in an Emergency room, in a sexual health clinic or at their GP surgery (Winstock and Mitcheson, 2012). Non-emergency clinical presentations related to NPS use can occur for two reasons:

- the patient might have clear concerns about their drug use or have a problem that they think is a consequence of drug use (e.g., withdrawal on cessation of GBL); and
- the patient might report a problem that could be drug related, but is not recognized as such (e.g., urinary symptoms related to ketamine use).

Like in any other consultations addressing drug use, these are unique opportunities to ask questions about lifestyle, alcohol and drug use. When intending to address drug- or alcohol-related behaviours, doctors usually face reluctance or open resistance from patients. However, a sensitive non-judgemental approach will always facilitate the discussion.

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As we have seen, NPS is a name given to a diverse group of substances, many of them not related pharmacologically. Therefore, the chemistry, clinical effects, pharmacodynamics and health risks are very different. Many NPS users are resistant to being referred to secondary care specialized services for treatment, even when their behaviour becomes disruptive, the amount and type of NPS used increase, and health and social problems appear. This is because they think that using so-called smart, club, design or legal highs make them different to other users. However, despite the pharmacological differences, most of the addictive behaviour patterns remain the same as "traditional" drug use.

NPS harm minimization interventions

Treating the consequences of prolonged use of NPS is the third line of prevention. Users can become addictive to most of these substances but very few of them have the potential to create physiological dependency. At present there is no evidence or consensus on effective harm minimization interventions (HMI) for NPS. Since NPS are a very diverse group of substances very different in their chemical structure, pharmacological effects and purity, HMI will need to be complementary to those applied to better known drugs like alcohol or heroin. No doubt, additional HMI will emerge in the near future, shadowing new NPS and trends in use. The first big difference is the extent of physiological dependence that results in withdrawal symptoms. There are specific medications licensed for treating alcohol or heroin withdrawals, but there is only symptomatic relief for NPS withdrawals, and almost no evidence-base of interventions. NPS withdrawal interventions are mostly empirical ones.

It is difficult to provide advice on substances when even the user does not know what he or she has been using, and as we have seen in many cases the actual chemical composition of the drug they thought they were taking was not what they expected or believed. But it is not just the unknown chemistry that makes advice difficult. The unknown concentration and combination with other substances makes any advice as reliable as the NPS itself. For example, skunk is only one of 100 or so varieties of cannabis plant which have high levels of tetrahydrocannabinol. Other marijuana-like substances are sold as "Spice", which refers to a wide variety of herbal mixtures marketed as "safe herbal smoking blend", or sold as "ethno drugs" or legal substitute for cannabis are meant to produce subtly different effects. However several recent studies are showing a close relation between the spice group and the onset of schizophrenia like psychosis in many users – the so-called Spiceophrenia (Papanti *et al.*, 2013).

The association between needle exchange programmes and the reduction of blood-borne viruses is well established. There is no possible harm in supplying an injector with clean needles. As we have seen before, some users have died after taking one or two tablets of ecstasy (Schifano, 2004), whilst others were resistant. More research is needed in this area of tertiary prevention.

Discussion: emerging horizons in drug use

Nobody knows for sure what will come after NPS, but many experts point towards more synthetic drugs designed to produce specific cognitive alterations and cognitive enhancement.

Some of these drugs will be the result of limited modifications of current stimulants; some will be new. Among them are the NBOME-series, which are the next level of psychedelic stimulants (Bersani *et al.*, 2014). These are structural variations on Shulgin's 2C class of substituted phenethylamines (i.e. organic compounds extracted from phenethylamine itself). With few exceptions (e.g. mescaline-NBOMe) compounds in this group are active at very low sub-milligram doses. These chemicals have little history of human use prior to 2010 when they first became available online[16]. Seven patients, all young adult males, presented to hospitals in the northeast of England with clinical toxicity after recreational drug use in January 2013 (Advisory Council on the Misuse of Drugs, 2013)[17]. Severe clinical toxicity may occur following recreational use of 25I-NBOMe, with stimulant and serotoninergic features predominating. These include: tachycardia, hypertension, agitation, aggression, visual and auditory hallucinations,

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seizures, hyperpyrexia, clonus, elevated white cell count (two), elevated creatine kinase, metabolic acidosis and acute kidney injury (Hill *et al.*, 2013).

Another growing phenomenon we will probably witness over the next years is the availability of NPS, the ones we know and future ones, across the Dark Web one-stop pharmacies. Many NPS users access the so-called Dark or Deep Web using The Onion Router (TOR). TOR is an online free software enabling anonymous internet browsing which was developed in the mid-1990s by the US Naval Research Laboratory and Defense Advanced Research Projects Agency. It is now used every day for a wide variety of purposes by a range of groups in the wider population, including the military, journalists, law enforcement officers, activists, and many others[18]. TOR is also the engine of the legal high marketplace. It is what allows makers, buyers, sellers and users of new psychoactive substances to fly under the radar.

Never before has the legal murkiness of "legal" highs placed the growing number of designer drugs, and all those who make, sell, and consume these substances, so far beyond the grasp of international controls. This is because drug designers, drug marketers and dealers able to exploit the gaps and cracks of national and international regulation are outpacing official regulators. Alexander Shulgin (the Godfather of ecstasy) predicted there will be 2,000 new psychoactive drugs available over the next 30 years, also claiming he had already developed 750 of them (Cusick, 2014). We can also expect changes in public perceptions, ethics and policies.

Notes

1. Eventually several of these "ecstasy"-type substances were scheduled as well (e.g. methylenedioxyamphetamine (MDA) and methylenedioxyethylamphetamine (MDE) at the international level in 1990). Alpha-Methyl-4-methylthiophenethylamine (4-MTA) and 4-bromo-2,5-dimethoxy phenethylamine (2C-B), one of the designer drugs first synthesized by Alexander Shulgin in the 1970s, were scheduled in 2001.
2. Drug culture at UK universities – study findings: 2012. The survey, carried out by Student Beans, included 1,401 university students across the UK. The Guardian Series for Students (www.theguardian.com/education/interactive/2012/oct/12/university-drug-culture-survey?guni = Article:in%20body%20link).
3. "Serena just wanted to be like everybody else her age. We believe Serena got out of her depth and gave in to peer pressure". The teenage daughter of a drugs counsellor died after taking ecstasy to impress a boy she had a crush on, a court has heard, as her parents blame peer pressure and "glorifying" drug web sites for her loss. Drugs are everywhere and "glorified" say grieving parents. *Daily Telegraph*: July 2012 (www.telegraph.co.uk/news/uknews/crime/9438740/Drugs-are-everywhere-and-glorified-say-grieving-parents.html).
4. Drug dealers enroll at universities to get student loans. *Daily Telegraph*: December 2009 (www.telegraph.co.uk/education/universityeducation/6811214/Drug-dealers-enroll-at-universities-to-get-student-loans.html).
5. *Varsity* drug survey: the score (www.varsity.co.uk/news/4484).
6. A study published in the *British Journal of Sociology of Education* found that nearly a third of women working in strip clubs are students, often from middle-class families. Academics at Leeds University interviewed nearly 200 dancers working in the UK. In total, 29 per cent of them were in some form of education. Sociologist Teela Sanders told the *Times Higher Education* magazine that some saw themselves as "dancers, not sex workers" because "selling striptease had become more palatable and socially acceptable". One in three strippers "are students paying for their education" (www.independent.co.uk/student/news/as-many-as-a-third-of-women-strippers-are-students-trying-to-pay-for-their-education-9158808.html).
7. "I promise I won't die" – last words of tragic ecstasy boy to mum: *Daily Express*, January 2014 (www.express.co.uk/news/uk/455190/I-promise-I-won-t-die-last-words-of-tragic-ecstasy-boy-to-mum).
8. Google Trends, January 2008 to December 2012.
9. Eurobarometer survey of 12,000 randomly selected young people conducted across the European Union in 2011.

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10. Mixmag's Drug Survey: the results: March 2012: www.mixmag.net/drugssurvey. The results of this (non-random) internet survey were based on information from some 7,700 respondents from the UK with a mean age of 28. See: Patrick Butler: How the Guardian/Mixmag survey was constructed: *The Guardian*: 15 March 2012.
11. Additional statistics on young people's drug and substance use can be found in the ESPAD Reports "Alcohol and other drug use amongst students in European countries" compiled by the Swedish Council for Information on Alcohol and Other Drugs and the European Council's Pompidou Group; and in the annual "Smoking drinking and drug use amongst young people in England" reports compiled by the Health and Social Care Information Centre for the UK Office of National Statistics.
12. Responding to new psychoactive substances: European Monitoring Centre for Drugs and Drug Addiction (www.emcdda.europa.eu/…/att_145850_EN_EMCDDA_DiF22_EN.pdf).
13. House of Lords, Library Note Debate on 17 October 2013: Drugs Policy.
14. The New Zealand Law Commission, Controlling and Regulating Drugs – A Review of the Misuse of Drugs Act 1975, 2011; The Psychoactive Substances Act 2013.
15. Legal Highs: Talk to Frank (www.talktofrank.com/drug/legal-highs)
16. NBOMe series. Erowind (www.erowid.org/chemicals/nbome/nbome.shtml).
17. On 28 February 2013 the UK Focal Point reported the detection of the new psychoactive substance 25I-NBOMe, linked to a series of seven non-fatal intoxication cases in January 2013. The patients, all young adult males, presented to hospitals in the north east of England with toxicity after recreational drug use. Clinically observed features included tachycardia ($n = 7$), hypertension ($n = 4$), agitation and aggression ($n = 6$), visual and auditory hallucinations ($n = 6$), seizures ($n = 2$), hyperpyrexia ($n = 3$), clonus ($n = 2$), elevated white blood cell count ($n = 2$) and metabolic acidosis ($n = 3$). Two patients required admission to intensive care. One patient had severe rhabdomyolysis leading to renal failure. All of the cases had elevated creatine kinase to varying degrees. Routes of administration were insufflation (four), oral (one) and intravenous (one). LC-MS-MS analysis was performed at the Medical Toxicology Centre, Newcastle University, with 25I-NBOMe identified as the main active substance in the plasma and urine in all seven cases. One patient had intravenously injected a liquid form of the drug which was purchased from a dealer. The six other patients bought the drug from the internet and as a powder inside capsules. Some users swallowed the capsules, whilst others broke them open and insufflated the powder.
18. www.torproject.org/about/overview.html.en

References

Advisory Council on the Misuse of Drugs (2013), "6-APB and 5-APB: a review of the evidence of use and harm", Advisory Council on the Misuse of Drugs letter to Home Secretary Rt. Hon: Theresa May MP, 29 May, p. 13.

BBC (2014), "All 'legal highs' now illegal in Guernsey", available at: www.bbc.co.uk/news/world-europe-guernsey-30262592 (accessed 2 December 2014).

Bersani, F.S., Corazza, O., Albano, G., Valeriani, G., Santacroce, R., Posocco, F.B.M., Cinosi, E., Simonato, P., Martinotti, G., Giuseppe Bersani, G. and Schifano, F. (2014), "25C-NBOMe: preliminary data on pharmacology, psychoactive effects, and toxicity of a new potent and dangerous hallucinogenic drug", *BioMed Research International*, available at: http://dx.doi.org/10.1155/2014/734749

Coomber, R., Moyle, L., Hatton, Z. and Gavin, J. (2014), *A Rapid Appraisal of the Illicit Drug Market in the City of Plymouth*, Plymouth University Drug and Alcohol Research Unit, Plymouth.

Coulson, C. and Caulkins, J.P. (2012), "Scheduling of newly emerging drugs: a critical review of decisions over 40 years", *Addiction*, Vol. 107 No. 4, pp. 766-73.

Cusick, R. (2014), "In memoriam: Alexander Shulgin the Godfather of ecstasy", *The HighTimes*, 4 JuneRReenarani.

Daly, M. (2014), "The rise and rise of the UK's student drug 410290684dealers", Vice.com, 10 April.

European Commission (2011a), "Youth attitudes on drugs: analytical report: Gallup Organisation", Flash Eurobarometer Series No. 330, European Commission, Brussels, July.

Downloaded by TASHKENT UNIVERSITY OF INFORMATION TECHNOLOGIES At 02:18 14 November 2016 (PT)

European Commission (2011b), "Commission staff working paper on the assessment of the functioning of Council decision 2005/387/JHA on information exchange, risk assessment and control of new psychoactive substances", European Commission Document SEC(2011) 912, European Commission, Brussels, 11 July.

European Monitoring Centre for Drugs and Drug Addiction (2012), "The state of the drugs problem in Europe", Annual Report, European Monitoring Centre for Drugs and Drug Addiction, Lisbon.

European Monitoring Centre for Drugs and Drug Addiction/European Police Office (2012), *EMCDDA-Europol 2011 Annual Report on the Implementation of Council Decision 2005/387/JHA*, European Monitoring Centre for Drugs and Drug Addiction/European Police Office, Lisbon.

European Monitoring Centre for Drugs and Drug Addiction/European Police Office (2013), *EU Drug Markets Report: A Strategic Analysis*, Publications Office of the European Union, Luxembourg.

Hill, S.L., Doris, T., Gurung, S., Katebe, S., Lomas, A., Dunn, M., Blain, P. and Thomas, S.H. (2013), "Severe clinical toxicity associated with analytically confirmed recreational use of 25I-NBOMe: case series", *Clin Toxicol (Phila)*.

Home Office (2012), "Drug misuse declared: findings from the 2011/12 British Crime Survey for England and Wales: London.

Kavanagh, P.V. and Power, J.D. (2014), "New psychoactive substances legislation in Ireland – perspectives from academia", *Drug Test Analysis*, Vol. 6 Nos 7/8, pp. 884-91.

Khey, D.N., Stogner, J. and Miller, B.L. (2014), "New trends in psychoactive drug use: in: emerging trends in drug use and distribution", *Springer Briefs in Criminology*, Vol. 12, pp. 1-12.

Papanti, D., Schifano, F., Botteon, G., Bertossi, F., Mannix, J., Vidoni, D., Impagnatiello, M., Pascolo-Fabrici, E. and Bonavigo, T. (2013), "'Spiceophrenia': a systematic overview of 'spice'-related psychopathological issues and a case report", *Hum Psychopharmacol*, Vol. 28 No. 4, pp. 379-89.

Schifano, F. (2004), "A bitter pill. Overview of ecstasy (MDMA, MDA) related fatalities", *Psychopharmacology*, Vol. 173 No. 3/4, pp. 242-8.

Shulgin, A. and Shulgin, A. (1991), *Phenethylamines I Have Known and Loved: A Chemical Love Story*, Transform Press, Berkeley, CA.

United Nations (2010), "Report of the International Narcotics Control Board for 2010", p. vi.

United Nations (2012a), "Report of the International Narcotics Control Board for 2012.

United Nations (2012b), "World Drug Report 2012.

United Nations Office on Drugs and Crime (2013), "The challenge of new psychoactive substances", a report from the Global SMART Programme, March.

Weichold, K. and Giannotta, F. (Eds) (2014), *Theory-Based Approaches to Substance Misuse and Abuse Prevention in School*, *New Directions for Youth Development*, Jossey-Bass.

Winstock, A.R. and Mitcheson, L. (2012), "New recreational drugs and the primary care approach to patients who use them", *British Medical Journal*, Vol. 344, p. e288.

Corresponding author

Professor Oscar D'Agnone can be contacted at: Oscar.Dagnone@cri.org.uk

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