CLINICAL UPDATE

CPD READING LEARNING MODULE

0.5 HOURS

Novel psychoactive substances: types, mechanisms of action, and effects

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In 2016 the Psychoactive Substances Bill banned trading but not possession of all current and future novel psychoactive substances (NPS), sometimes incorrectly called "legal highs," in an attempt to overcome rapid proliferation of these compounds. Over 560 substances are currently monitored by the European Monitoring Centre for Drugs and Drug Addiction, with 100 new agents identified in 2015 alone. Stimulants and synthetic cannabinoids account for the vast majority and are the types most commonly clinically encountered.[1] Online purchases are increasing according to the 2016 Global Drug Survey,[2] potentially in response to legislative changes, as is overall NPS use: lifetime consumption was reported by 8% of younger individuals in 2015, up from 5% in 2011, with figures relatively similar between sexes and different countries.[3]

Professionals report feeling less confident about managing NPS compared with established recreational drugs.[4] Information on NPS primarily stems from case reports and case series. However, there is evidence that risks associated with NPS are often different from those seen with established recreational drugs. This article classifies NPS into their major groupings and provides information on the desired effects of these compounds, their pharmacology, and the risks associated with their use. The linked Practice article[7] provides advice on what to ask and do when consulting with a patient who may be using NPS.

WHAT YOU NEED TO KNOW

- Novel psychoactive substances (NPS, "legal highs") are compounds designed to mimic existing established recreational drugs.
- Legislation regarding NPS varies internationally. In the UK it is now illegal to distribute or sell NPS, but possession is not a criminal offence
- NPS should not be regarded as safer than established recreational drugs
- The most commonly clinically encountered NPS are stimulants (such as mephedrone) and cannabinoids (such as "spice")
- Psychiatric and rehabilitation units, prisons, and schools face particular challenges in detecting and preventing use

HOW PATIENTS WERE INVOLVED IN THE PRODUCTION OF THIS ARTICLE

A patient with long term harmful use of NPS, including associated mental ill health, was involved in the initial design of this article. This particularly helped frame the discussion on the potential harms of these compounds. The patient wishes to remain anonymous.

INFORMATION FOR PATIENTS WHO ASK ABOUT NPS

- In the UK the Psychoactive Substances Bill states that individuals will be prosecuted for trading, but not possession, of NPS. It is uncertain how monitoring and enforcing will work in practice, but one effect is that supply chains will move away from high street "head shops"
- NPS do not seem to be safer than established recreational drugs, either in the short or longer term, though there is considerable variation in risks between individual NPS and classes of NPS
- If using a novel substance, as with any drug, start with a very small dose and increase to obtain desired effects
- Individuals can have different responses to the same drug, and combining with other recreational, prescription, or over the counter drugs or alcohol can increase risks
- Seek urgent medical help if you or a friend feel unwell after using an NPS (as with any recreational drug). Call 999 for an ambulance; take the compound or any information on it with you if possible

Cannabinoid NPS

Synthetic cannabinoid receptor agonists (SCRAs)

"Spice" "Noids" "Black mamba"

"Clockwork Orange" "Pandora's Box"

Typically full agonists of cannabinoid receptors, producing a pleasant state of relaxation and of feeling "stoned"

Smoked after being sprayed on to herbal mixtures

Inhaled using e-cigarettes and vapourisers

Short term risks:

Psychosis · Agitation · Confusion · Slurred speech · Cognitive impairment · Renal failure · Tachycardia · Hypertension · Myocardial infarction · Pulmonary damage · Seizures

Long term risks:

Psychological dependency · Addictive potential · Psychotic illnesses

Psychological withdrawal effects likely after cessation

Depressant NPS

Opioids

AH-7921 MT-45

Novel fentanyls

Similar to established recreational opioids, but with the potential for much longer durations of action

Benzodiazepines

Diclazepam

Flubromazepam

Sedative, anxiolytic, hypnotic, and anticonvulsant properties–some with long duration of action

Smoked

Swallowed Pills / tablets

Injected

Nasal

Short term risks:

Overdose · Confusional states · Seizures after withdrawal

Novel opioids may need more naloxone than traditional opioids

Long term risks:

Addiction · Impaired cognition

Potential for withdrawal effects after cessation

Stimulant NPS

Cathinone family, such as mephedrone (M-cat)

"Bath salts" "Plant food"

Increase synaptic levels of serotonin, dopamine, and/or noradrenaline to produce a sense of euphoria and wellbeing—a "high"

Commonly: Swallowed "Bombing"/pills · Nasal "Snorting"

Less commonly: Injected "Slamming" · Rectal "Plugging"

Short term risks:

Agitation · Psychotic symptoms · Hyperthermia · Anxiety · Hypervigilance · Cardiovascular toxicity · Seizures · Renal / respiratory failure · Delirium · Serotonin syndrome · Stroke

Long term risks:

Impulsive behaviour · Dependency · Depression · Cognitive impairments · Psychosis

Psychological withdrawal effects common after cessation

Hallucinogenic NPS

Psychedelics

5-MeO-DALT

NBOMe-series

2C-series

Produce perceptual alterations and quasi-mystical experiences. Some have stimulant properties

Dissociatives

Methoxetamine (mexxy)

Similar to ketamine and phencyclidine

Produce a euphoric, dissociated state, with a perception of disconnection from physical body

Swallowed Paper/capsules/liquid

Swallowed "Bombing"/pills · Nasal "Snorting"

Injected

Short term risks:

Accidents / trauma · Aggressive / psychotic states · Acute cerebellar toxicity · Cardiovascular toxicity · Respiratory failure

Long term risks:

Addiction · Problems with mood / memory · Cardiovascular problems · Abdominal pain · Kidney / bladder / urinary tract damage

(ketamine/methoxetamine)

What are NPS and how do they work?

NPS are compounds designed to mimic existing established recreational drugs such as "ecstasy" (MDMA) and cannabis. Before changes in the law, manufacturers would tweak the pharmacological structure of existing compounds to create a new "legal" substance, which earned them their familiar name "legal highs." There is no universally agreed way to categorise NPS. However, they can be broken down into four, somewhat overlapping, main categories: stimulants, cannabinoids, hallucinogens, and depressants (see infographic).

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Cannabinoid NPS

Cannabis is the most widely used established recreational drug.[1] NPS variants are the synthetic cannabinoid receptor agonists (SCRAs), and there are over 150 different SCRAs available, usually sold having been sprayed onto herbal mixtures that are smoked. They are sometimes referred to as "spice" or "noids." Liquid SCRAs also exist for use in electronic cigarettes and vapourisers. They produce a pleasant state of relaxation and of feeling "stoned."

The major psychoactive component of cannabis is tetrahydrocannabinol, a partial agonist at cannabinoid receptors that ordinarily have roles in neuronal homeostasis and immune functioning.[27] However, SCRAs are typically full agonists of, and bind in a different pattern to, cannabinoid receptor subtypes. SCRAs also lack cannabidiol, an antipsychotic and anxiolytic compound found in cannabis that dampens some of the effects of tetrahydrocannabinol. These pharmacological differences may explain the variation in the subjective and physiological effects of SCRAs compared with cannabis.[28-30]

Risks

As well as a subjective effect of feeling stoned, cannabis and SCRAs can be both stimulating and sedating, anxiogenic and anxiolytic.[27 31] Both can cause anxiety, paranoia, and psychotic symptoms.[32 33]

Side effects have been reported more frequently with SCRAs than with cannabis,[28] and, as they are most commonly sprayed onto compounds for smoking, their strength and effects can be less predictable. Some highly potent agents can induce considerably agitated states.[31]Unlike cannabis, some produce a "hangover" state.[34] Emergency department case reports describe additional features with SCRA use not typically seen with cannabis, such as confusion and cognitive impairment, slurred speech, and excessive sweating, as well as symptoms of stimulant toxicity (hypertension, tachycardia),[32 35] renal failure, pulmonary damage, myocardial infarction, seizures, and stroke.[32-38]

In the longer term, cannabis is not traditionally considered to produce physical dependency, though individuals can demonstrate a psychological dependency.[39] Case reports and user discussion forums suggest that SCRAs have a higher potential for addiction and withdrawal effects.[40-42]

Depressant NPS

Depressant NPS subcategories—benzodiazepines and opioids—seem to carry a similar picture for acute emergency presentations but differ in their mental health implications. They are generally sold and consumed in pill or powder form. They are perhaps the least understood of the NPS. This may be because they are so similar to established recreational drugs that clinicians may not be aware that an individual has used an NPS version. NPS benzodiazepines include diclazepam and flubromazepam. Fewer NPS opioids have appeared in isolation, but they may be sold as part of NPS cannabinoid smoking mixtures, as has been reported for AH-7921.[62]

Benzodiazepines

These are positive allosteric modulators of the GABA receptor, enhancing inhibitory signalling in the central nervous system.[10] Alcohol has a similar pharmacodynamic mechanism and can potentiate their effects.[10] Acutely, NPS benzodiazepines have similar clinical effects to those of established compounds such as diazepam, with sedative, anxiolytic, hypnotic, and anticonvulsant properties. Some users of NPS benzodiazepines report that they have much longer durations of actions and effects than established agents, and several compounds have long half lives (flubromazepam, for example, having a half life of 100 hours[63]). While this reduces dependency potential, unwanted effects can persist for a long time and there are greater risks of accidental overdose. There are reports of NPS benzodiazepine induced confusional states lasting several days.[64] Acute withdrawal may cause seizures.[65] Long term use is associated with risk of addiction and impaired cognition,[66] physiological and mental health sequelae consistent with traditional benzodiazepines.[65]

Opioid NPS

Little is known about any specific subjective effects of NPS opioids to differentiate them from established recreational opioids. However, self experimentation reports suggest that some can have much longer durations of action.[67 68] They exert their euphoric effects through presynaptic μ-opioid receptors. Novel agents such as AH-7921, MT-45, and novel fentanyls seem to have similar mechanisms of action.[67 69]

Case reports of NPS overdoses are congruent with those of traditional opioids, though animal data suggest AH-7921 has a higher overdose risk than morphine.[67] Both human case series and animal studies have shown that naloxone can reverse the toxicity seen with novel opioids, although the doses of naloxone required may be higher than for traditional opioids, particularly in cases of novel fentanyl toxicity.[67-71] There have been reports of unusual toxicity related to the use of MT-45, including short-to-medium term hearing loss.[71]

No long term NPS risk data exist, though animal models have shown AH-7921 to be similar to morphine in addictive potential and withdrawal effects,[67] and MT-45 and novel fentanyls are probably similar.

Stimulant NPS

Stimulants are taken to produce a sense of euphoria and wellbeing, or "a high." This is one of the largest NPS groups, typically sold as powders or pills. Mephedrone is the most commonly available variant. They are structurally related to MDMA (ecstasy), cocaine, and amphetamines and can be swallowed (users often talk about "bombing," when the drugs are swallowed wrapped in paper), inhaled ("snorting"), and, less commonly, injected or administered rectally.

Stimulants increase synaptic levels of serotonin, dopamine, and/or noradrenaline. Agents act as neuronal reuptake pump inhibitors or as active releasers, and each has an unique effect on neurotransmitter concentrations.[8 9] Neurotransmitter releasers are associated with greater addiction and neurotoxicity.[10 11] NPS variants, such as the large cathinone family, are commonly associated with enhanced neurotoxicity compared with traditional stimulants.[9 12]

The ratio of serotonin to dopamine activation is important in achieving the desired effects. The more serotonergic drugs, similar to ecstasy, produce more empathy and emotional openness.[13 14] More dopaminergic drugs, similar to cocaine, produce more euphoric and mania-like experiences.[15] Some NPS stimulants, such as the NBOMe- and 2C-series, also produce psychedelic or hallucinogenic experiences.[16 17]

Risks

Acute adverse presentations are most commonly associated with agitation, anxiety, psychotic symptoms, hypervigilance, cardiovascular toxicity (arrhythmias and hypertension), and hyperthermia. Case reports also describe seizures, delirium, and renal and respiratory failure following ingestion.[18-21] Serotonin syndrome—autonomic instability, confusion, and neuromuscular problems—can be life threatening and is particularly associated with use of multiple serotonergic recreational drugs, or concomitant use of serotonergic prescription medication or over the counter medicines such as St John's wort.[15 22]

Long term, traditional stimulants are associated with impulsive behaviour, abuse, and dependency,[15] and NPS stimulants seem no different.[23] Depression and cognitive impairments are recognised sequelae,[24] and there are case reports of psychoses.[25 26] Cessation can lead to a psychological withdrawal syndrome of fatigue, insomnia, lethargy, flu-like symptoms, impaired concentration, and lability of mood.[23] There is considerable variation between individuals, but such outcomes are more commonly associated with longer term and more regular drug use.

Hallucinogenic NPS

Hallucinogens fall into two subcategories—dissociatives and psychedelics (or classical hallucinogens). Dissociatives are particularly associated with harmful side effects.

Dissociatives

Dissociatives produce a unique euphoric "dissociated" state, with a perception of an absence of time, weightlessness, and disconnection from the physical body. They can be inhaled, swallowed, or injected. The first agents in this class, ketamine and phencyclidine (PCP), were originally used as general anaesthetics, but they have generally been discontinued because of postoperative dissociative side effects. The spectrum of NPS dissociatives runs between some milder than ketamine to others as strong as phencyclidine.[10] The common variant methoxetamine (sometimes called "mexxy") is generally reported to produce more intense and longer lasting dissociative effects than ketamine.[43] In extremis, users may enter an "m hole" (similar to a "k hole" with ketamine), a state of profound dissociation that some people find highly pleasurable and others unpleasant.[10-47] They primarily act as uncompetitive antagonists at glutamatergic NMDA receptors,[48] but also bind at opioid and monoaminergic receptors.[10]

Risks

Most risk data come from the parent compounds ketamine and phencyclidine, though the evidence emerging from NPS case studies literature fits with these.[46 47] Deaths are primarily accidental, through impulsive and careless behaviours,[10] although there are reports of fatalities directly linked to methoxetamine toxicity.[49 50] Consistent with ketamine and phencyclidine, there are case reports of aggressive, psychotic, and catatonic states with dissociative NPS use, acute cerebellar toxicity, cardiovascular incidents, and renal and acute respiratory failure.[10-51] Methoxetamine was anecdotally sold as a physically safer alternative to ketamine, but there is limited evidence to support this currently.[50]

Longer term, dissociatives often produce considerable cravings and binge consumption patterns, although there is some evidence that methoxetamine may be less addictive than ketamine.[50] Long term sequelae of use can include neurocognitive deficits and deterioration in mood.[52 53] Physical health complications include abdominal pain ("M cramps"), nausea, vomiting, and diarrhoea; cardiovascular problems of arrhythmias and blackouts[10]; and severe ulcerative cystitis and renal damage.[54]

Psychedelics

These agents typically do not produce true hallucinations, but are associated with a range of "psychedelic" effects, including perceptual alterations and quasi-mystical experiences sometimes categorised under the headings of "oceanic boundlessness" and "anxious ego dissolution."[55 56]

These exert their effects primarily as an agonist at the 5-HT_{2A} receptor. There is some evidence they may also act on 5-HT_{1A} and heteromer receptor complexes.[56] Traditional agents include LSD and psilocybin; most NPS psychedelics, such as 5-MeO-DALT and the NBOMe- or 2C-series, also have stimulant effects.[10-58]

Risks

Psychedelics generally have a low risk-profile compared with both other established recreational drugs and NPS. Consumers seldom present acutely to clinical services, though acute intoxication may contribute to adverse mood reactions.[56] Unlike established recreational psychedelics, some NPS hallucinogens also have stimulant properties, and these have increased risk of acute toxicity, including agitation, hallucinations, tachycardia, hypertension, hyperthermia, rhabdomyolysis, serotonin syndrome, and seizures.[57-61] There is currently little evidence of longer term health risks or addiction.[56]

PRACTICE POINTER

CPD READING LEARNING MODULE
0.5 HOURS

Novel psychoactive substances: acute and chronic use

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Identifying and managing acute drug related harms and problematic substance misuse cuts across medical specialties. Data suggest that clinicians are seeking readily accessible information on novel psychoactive substances (NPS), incorrectly known as "legal highs."

Clinicians may encounter acutely disturbed or unwell patients, individuals with harm or dependency related to chronic NPS use, and those reporting incidental consumption that might require psychoeducation and monitoring. Such assessments will have more successful and meaningful outcomes if clinicians are aware of the spectrum of NPS available and how they might affect their patient.

This article provides practical advice to the non-specialist on how to approach an assessment of individuals using NPS, including examples of acute and chronic use.

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

An individual receiving residential care for mental health issues related to chronic "spice" use was interviewed in the preparation of this paper. The proposal and plan of the papers were discussed with him, and he wished to remain anonymous in the production of this work. His input particularly helped highlight the need to emphasise individuals' strengths and supports in any assessment of substance misuse.

WHAT YOU NEED TO KNOW

- Most standard urinary drug tests have limited sensitivity and specificity to novel psychoactive substances (NPS)
- Discuss risks and encourage reduction in the frequency and quantity of harmful NPS use, but be cautious with benzodiazepines or opioids where sudden discontinuation can lead to physical withdrawal
- Offer referral to drug and alcohol treatment services or other professionals, such as psychiatry, sexual health, or social services when appropriate

Exploring NPS use

A sensitive, non-judgmental approach is essential. Boxes 1 and 2 cover specific issues relevant to emergency and longer term presentations. Patients may be concerned about being criticised for using drugs, and they might be uncertain of, but worried about, the potential harms and available services for those using NPS. Individuals can also be fearful of legal consequences of disclosure, and the principle and limits of confidentiality should be discussed. Adopt an empathic line of questioning, such as "I can imagine it might be difficult or worrying to talk about drug/NPS use. My role is to try understand any problems you are having, and to see how I can help."

Include a history, mental state, and physical examination (particularly blood pressure, heart rate, temperature, and level of consciousness) in the initial assessment. Explore the type of drug or NPS used and the method and frequency of consumption, and ask about acute and chronic harms associated with use (box 3). Unlike for established recreational drugs such as cannabis, heroin, or cocaine, most standard urinary drug tests have limited sensitivity and specificity to NPS. Nevertheless, a urinary drug test can prove useful in helping to establish whether other drugs are being used.

Consider whether there are relevant social and environmental issues that might precipitate or perpetuate substance misuse. The National Drug Treatment Monitoring System identified specific factors associated with longer term, harmful use in those under 18 years old[16]: early onset (<15 years old) and poly-drug use, antisocial behaviour, being affected by others' drug use or domestic violence, and being a child in need of or on a protection plan.

Evaluating motivation to change

There are no well evidenced screening tools for identifying problematic NPS use. Not everyone who uses NPS, or any other established recreational drug, necessarily needs or wants professional help. However, if a patient discloses use of NPS, view this as an opportunity to provide information and discuss potential risks in a non-judgmental manner. Also consider whether to signpost the patient to relevant specialist healthcare services such as substance misuse, sexual health, and mental health teams.

Motivational interviewing is a goal-oriented technique to engage individuals and reduce their ambivalence to change behaviour. Rather than tackle drug use "head on" with (at least perceived) messages of just stopping, which can be challenging and may provoke disengagement, motivational interviewing encourages individuals to focus

Box 1 | Case scenario 1: emergency presentation

A 29 year old man is bought into the emergency department by ambulance after acting erratically with staff at a nightclub. On arrival, he is pacing, agitated, and mildly aggressive. On examination, his heart rate is 130 bpm, blood pressure 160/95 mm Hg, temperature 38.5°C, and he has dilated pupils, increased tone and hyper-reflexia in his lower limbs, and 5-6 beats of inducible ankle clonus. His friends told paramedics he had taken a "white powder" that he bought as a legal high on the internet.

Spotting acute use

A direct line of questioning is required in acute presentations. The clinical presentation in this example is consistent with use of a serotonergic drug (either an established recreational drug or NPS variant) and serotonin syndrome (toxicity)[2]—characterised as a triad of mental status changes, autonomic hyperactivity, and neuromuscular abnormalities, although clinical features are not always consistent.

In terms of NPS, mephedrone is commonly implicated given its high reported prevalence of use and availability.[3-5] From a treating clinician's perspective, although knowing the precise drug(s) used helps provide better informed patient advice before discharge, management of acute stimulant toxicity is similar regardless of whether an individual has taken an NPS or an established recreational drug. Accidental or intentional overdose of selective serotonin reuptake inhibitors (SSRIs) causes a similar picture, so it is important to ask about prescribed medications and other medical and psychiatric problems. Finally, certain conditions may present with similar clinical features (such as severe sepsis or encephalitis).

Assessment and management of mephedrone toxicity

Although broadly similar to that for established recreational stimulants, the full clinical picture associated with acute toxicity of mephedrone remains incompletely understood.[6 7]

The most commonly reported clinical features of mephedrone toxity are agitation or aggression, tachycardia, and hypertension

However, signs and symptoms associated with use have been described in user self reports, surveys, and cases confirmed by toxicology. The most commonly reported clinical features are agitation or aggression, tachycardia, and hypertension (>25% of users). Others include (in 10-25% of cases) palpitations, insomnia, hallucinations, paranoia, nausea, vomiting, chest pain, paraesthesia, confusion, and anxiety; and in <10% of cases, seizures, headache, hyperpyrexia, cold or blue extremities, tremor, and reduced level of consciousness.[3-13] Some case series report concomitant use of other drugs, and thus some of the symptoms reported may relate to these rather than to mephedrone.[11]

Some reports indicate that the acute toxicity of mephedrone and other NPS stimulants is more prolonged than that seen with established recreational stimulants. For example, the UK National Poisons Information Service reported 45% of patients had symptoms for more than 24 hours after use of mephedrone, and 30% had symptoms for more than 48 hours.[14]

Management includes preventing further exposure to serotonergic drugs (including prescribed medications) and treating the stimulant clinical features.

Box 2 | Case scenario 2: chronic use

A 24 year old woman presents to her GP with low mood and feeling "up and down." She admits she is concerned about her use of "spice," which she has been smoking regularly for several years, but she is not sure she wants professional help with this at the moment. She says that most of her friends use similar drugs, and she does not think she would discontinue use completely.

Exploring harmful use and dependency

This case presents a pattern of chronic novel psychoactive substance (NPS) use.

Diagnostically, "harmful use" typically involves an intermittent binge pattern of use that can be damaging to an individual's physical or mental health. Dependency is a more complex syndrome of behavioural, cognitive, and physiological symptoms that can accompany repeated use. Three of the following six criteria are required for a diagnosis of dependency on any drug: (*a*) desiring the substance; (*b*) difficulty controlling the amount consumed; (*c*) tolerance to its effects; (*d*) withdrawal effects; (*e*) giving primacy to use of the substance and neglecting alternatives; and (*f*) persisting use despite these difficulties.[15]

Avoid the use of pejorative terms or labels such as "addict" and ensure a supportive approach to discussions. In instances of both harmful use and dependency, agreeable individuals can be referred to substance misuse services, though the management of dependency can be more complex. In the case of benzodiazepine and opioid dependency, this will usually involve stabilisation on suitable replacement therapy, followed by detoxification ("detox") on a staggered reduction regimen.

Care may be provided in community or inpatient settings, depending upon individuals' requirements and available services, and is sometimes followed by a period of psychosocial rehabilitation ("rehab").

Various specialist psychosocial interventions are available for patients with dependency or harmful use who wish to modify their behaviour.

Avoid the use of perjorative terms or labels such as "addict" and ensure a supportive approach to discussions

Box 3 | Areas to explore and document in a history of novel psychoactive substance (NPS) use

Drug class(es) Stimulant, cannabinoid, hallucinogen (dissociatives and psychedelics), depressant (opioids and benzodiazepines)

Method(s) of use Oral ingestion, nasal insufflation ("snorting"), intravenous injection, rectal insertion

Drug consumption patterns Quantity, frequency; concomitant consumption of prescribed or over-the-counter medication or alcohol or other recreational drugs. Use of cigarettes

Acute and chronic harmful effects Physical and psychological sequelae, risks from impulsive behaviour, including sexual health. Impact on mental health and social functioning. Identification of individual vulnerabilities, risk of exploitation by others, and potential safeguarding issues towards others

Box 4 | The FRAMES motivational interviewing model for encouraging engagement and self responsibility with drug use

F*eedback* Discuss the potential adverse outcomes of drug use, individualised to the person's pattern of use, and listen to their responses

R*esponsibility* Emphasise that it is up to the individual to decide if they wish to change their behaviour

A*dvice* Straightforward advice on how drug use can be changed

M*enu* Provide the individual with their therapeutic options, and facilitate their decision making

E*mpathy* Have a non-judgmental and warm clinical approach

S*elf efficacy* Project optimism that they have the ability to positively change their life if they so wish

on their own goals and how they might plan for them. For example, "It sounds as if things have been difficult for a while. Have you thought about aspects of life that might be holding you back from where you would like to be, or what you would like to achieve?" The FRAMES approach[17] is a well established model used in many substance misuse services and can be a useful strategy in this regard (box 4).

Harm minimisation

Harm reduction begins with encouraging decreasing the frequency and quantity of NPS use, but care must be taken in the case of novel benzodiazepines or opioids because sudden discontinuation can lead to physical withdrawal. Where relevant, discuss risks associated with injecting drugs, signpost to a needle exchange or injecting service, and offer referral for HIV and hepatitis testing. Anecdotally, there have been reports of an increase in intravenous NPS use in "chem sex" parties and that some new drug users have poor injection technique, with associated increased risk of thrombosis and abscesses and other infections.

When to refer

Consider harm in a wider social context. Assessment and support from social services may be required for individuals, or their families, who may be vulnerable or at risk of harm from or towards others.

Offer interventions within the limits of expertise and clinical setting, and recommend referral to drug and alcohol treatment services or other healthcare professionals, such as psychiatry, when appropriate.

A "strengths based approach" should help highlight positive environmental factors and aspects of personal resilience that will help individuals through recovery. For example, inquire into, and highlight back to the patient, relevant social factors such as good family and relationship support, and individuals' desire and motivation to change their life.

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The FRAMES approach is a well established model used in many substance misuse services and can be a useful strategy

RESOURCES FOR HEALTHCARE PROFESSIONALS

- **UK National Poisons Information Service and its clinical toxicology database TOXBASE** If you need advice or information that is not available on TOXBASE then call NPIS for clinical support (www.npis.org; www.toxbase.org)
- **NEPTUNE** (novel psychoactive treatment: UK network) Comprehensive clinical guidance on party drugs (http://neptune-clinical-guidance.co.uk)
- **Wood DM, Dargan PI.** Understanding how data triangulation identifies acute toxicity of novel psychoactive drugs. *J Med Toxicol* 2012;8:300-3
- **Baumeister D, Tojo LM, Tracy DK.** Legal highs: staying on top of the flood of novel psychoactive substances. *Ther Adv Psychopharmacol* 2015;5:97-132—Review of the neurobiology of NPS
- **New Psychoactive Substances (NPS) resource pack** UK Home Office NPS resource pack for "informal educators and frontline practitioners" (www.gov.uk/government/publications/new-psychoactive-substances-nps-resource-pack)
- **EMCDDA.** Guide to the European illicit drugs' market (www.emcdda.europa.eu/start/2016/drug-markets)

RESOURCES FOR DRUG CONSUMERS AND THE PUBLIC

- **FRANK** UK based general information guide offering friendly, confidential advice to patients and the lay public (www.talktofrank.com)
- **EROWID** Non-profit, international, drug-consumer-led website providing non-judgmental advice and guidance (www.erowid.org)
- **Rise Above** Website by NHS England for children and adolescents about substance misuse, mental health, and other social issues (http://riseabove.org.uk/tag/drinking-smoking-drugs/)
- **Bowden-Jones O.** *The Drug Conversation: How to talk to your child about drugs*. Royal College of Psychiatrists, 2016
- **Global Drug Survey** Information for, and international survey of, NPS consumers (www.globaldrugsurvey.com)
- **Sumnall H, Atkinson A.** The new Psychoactive Substances Bill–a quick introduction. (www.cph.org.uk/blog/the-new-psychoactive-substances-bill-a-quick-introduction/)—Guide to legislative changes in the UK