Synthetic Cannabinoids Handbook

& Other Novel Psychoactive Substances

TD consultancy

Contents

Acknowledgements

This handbook was written by Tony D'Agostino. The manual would not have been possible without the invaluable assistance and guidance of Huseyin Djemil.

1. Introduction

This pack is intended as a guide for professionals working with synthetic cannabinoids users and includes a section that focuses on novel psychoactive substances (NPS), the chemical families these compounds belong to, and the appropriate treatment response that could be tailored for people who experience problems with these drugs.

Working with synthetic cannabinoids and other NPS users does not mean workers need to learn new skills or devise interventions for each and every new psychoactive drug. What is needed is that treatment and support is offered in a way that is relevant, specific and attractive to this using group.

Not all the material provided in this pack will be relevant to all workers or services. Much will depend on what your agency is offering, whether you work in prisons or the community, and the regional differences in patterns of use within your catchment area or target group.

2. A brief history of synthetic cannabinoids

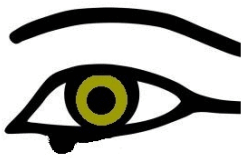
“It is likely that the future drugs of abuse will be synthetics rather than plant products. They will be synthesized from readily available chemicals, may be derivatives of pharmaceuticals, will be very potent, and often very selective in their action. In addition, they will be marketed very cleverly.”

Gary Henderson, Journal of Forensic Science 1988

In the 1940s, Roger Adams is accredited to be the first chemist to synthesised a number of synthetic cannabinoids. He isolated cannabidiol from natural Cannabis Sativa and further synthesised cannabinol analogues.

In 1964, tetrahydrocannabinol (THC), the psychoactive property in natural cannabis, was isolated by Professor Mechoulam at the Hebrew University. Early cannabinoid research concentrated on THC and the first generation of THC analogues were Synhexyl, Nabilone, Nabitan and Nantradol. Since 1981, Nabilone and synthetic THC, such as marinol and dronabinol, have been used in medicine.

By 1988 Professor Mechoulam and his team had synthesised countless synthetic cannabinoids including HU-210 which is reported to be 100 to 800 times more potent than the THC found in natural cannabis.



Between 1984 to 2011, with funding by the National Institute on Drug Abuse, John W. Huffman and his colleagues created over 400 synthetic cannabinoids. Huffman synthesised a variety of chemical compounds, JWH-018 (Spice) was one of these compounds. JWH-

018 was forgotten about by Huffman and his research team but was later rediscovered.

JWH-018 resurfaced in a number of countries as part of a smoking mixture and was named ‘Spice’. Nobody knew it was a lab chemical that was making them ‘stoned’. In 2002, the drug was often marketed as incense or sold as plant fertiliser not just to bypass the law but also to outwit PayPal or other companies that would not authorised online transactions for ‘research chemicals’.

The now-dormant company The Psyche Deli in London, began selling Spice when the sale of a certain type of ‘magic mushroom’ became illegal in the UK in 2005. Herbal products were marked ‘not for human consumption’ and were presented in attractive and colourful packaging. Brand names such as Spice, Black Mamba, Pandora’s Box, Exodus Damnation, Psyclone and Clockwork Orange started to appear. Laboratory analysis in 2008 showed that many of these products contain synthetic cannabinoids. They were added to plant material by soaking or spraying a solution of one or more synthetic cannabinoids in an organic solvent which was later evaporated.

The competing brands that started to appear from 2008 onwards were also dubbed Spice. Therefore, the term Spice referred to both the brand and all other herbal blends with synthetic cannabinoids added. Stimulant drugs were also branded and sold as ‘Spice’, suggesting that brand names had become meaningless. Within UK prisons, among the homeless and in the media, ‘Spice’ now refers to all forms of synthetic cannabinoids.

Since 2012, new synthetic cannabinoids which were outside the scope of UK controls have appeared. These compounds are referred to has third generation synthetic cannabinoids. The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) identified over 20 such compounds during 2013 and another 15 in the first nine months of 2014. These drugs were not developed out of laboratory research and deemed “designer drugs,” intended to bypass government laws. AKB-48, 5F-AKB-48, 5F-PB-22, AB- FUBINACA, AB-PINACA, ADB-PINACA have all been identified in the UK.

By 2015, synthetic cannabinoids were the largest group of novel psychoactive substances (NPS) reported globally. Over 200 have been detected on the global drug market, with an estimated 150–160 available to UK consumers.

The UK Psychoactive Substance Act 2016 gave police the power to close ‘headshops’ and UK-based on-line sellers. Since the PSA Act 2016, the use of these drugs appears to be more prevalent among prisoners and homeless populations in the UK.

3. Types of synthetic cannabinoids

Forms

Synthetic cannabinoids are a large group of drugs (see Appendix for chemical classification of synthetic cannabinoids) and generally start off as a crystalline white powder which might also be brownish or yellowish in colour. This would be a very potent form of the drug.

More commonly the cannabinoid powder is dissolved in a solvent and sprayed onto inert organic material, such as a herb, before being sold on. The resulting product will resemble natural herbal cannabis, generally greenish-brown in colour and is mainly mixed with tobacco and smoked in the same way as 'spliffs'.

Prisons have also reported synthetic cannabinoids being smuggled in by spraying the substance on to paper, which can then be smoked. Products resembling hashish in their appearance are not common in the UK at time of writing.

Routes of administration

Aside from smoking, there are a few reports of users eating herbal products containing synthetic cannabinoids, taken with food or prepared as a tea and snorting or injecting them in their powdered form seems to be rare in the UK. Only a few of these powders are water soluble so it is not known how effective they dissolve if used in this manner.

Synthetic cannabinoids are also used in pipes, bongs and have been sold in liquid form suitable for use in E-cigarettes. Due to their potency care is needed when using these drugs in pipes, bongs or vaporisers to avoid possible overdose.

Prior to the introduction of the Psychoactive Substances Act 2016 many synthetic cannabinoids were sold in colourful packages similar to NPS in general. Some of these brands contain more than one active compound, for example, Black Mamba was two synthetic cannabinoids mixed with a sleeping agent and sprayed onto a herb.

Brand names include: Spice, Black Mamba, Pandora's Box, Exodus Damnation, Cherry Bomb, Annihilation, Psyclone, Clockwork Orange, and many others. These products have also been referred to as incense, smoking mixture or Potpourri.

Tests have shown that the cannabinoid constituents and dosage can vary greatly between products and batches of the same brand. There may even be differences within the same packet because it has not been mixed properly.

The quality of these compounds in generally do not meet pharmaceutical standards and can be contaminated with by-products and derivatives from the manufacturing process itself.

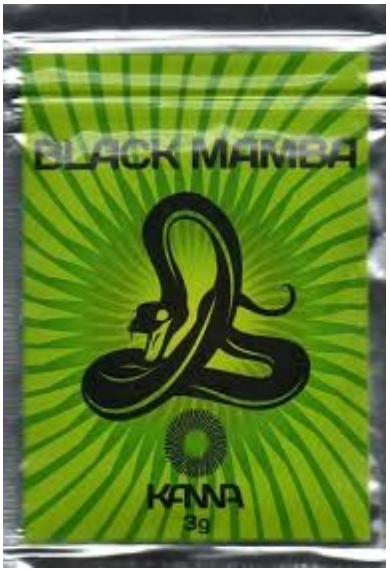
Spice

In the 1970s, after discovering the psychoactive chemical in natural cannabis tetrahydrocannabinol (THC), the pharmaceutical industry created numerous synthetic cannabis-like drugs. Many of the substance names started with the initials of the chemists who created them (JWH or AM) followed by a string of numbers. Several psychoactive artificial cannabinoid families exist (e.g. AM-xxx, HU-xxx, JWH-xxx, CP xxx). Years later this literature was rediscovered and a range of different synthetic cannabinoids were synthesised.

Spice (JWH-018) is a synthetic cannabinoid that was first synthesised in 1995 for experimental purposes, and then marketed by online vendors and head shops. It was the first synthetic cannabinoid to become popular in the UK. The product was attractively packaged in green, silver or gold foil sachets and priced at £10-20.

A German pharmaceutical company revealed the herbal mixture in the 'Spice' product had been laced with small quantities of synthetic chemicals that acted on the cannabinoid receptor in the brain.

Spice is now a blanket term that refers to a collection of herbs or plant material that have been sprayed with synthetic cannabinoids.



When Spice became illegal in the UK the compound was quickly followed by Black Mamba. Black Mamba is the brand name for the synthetic cannabinoid AM-2201.

According to user reports, the substance was much stronger than 'skunk', delivered more of a 'rush' and was likely to cause distortions in reality and adverse reactions.

Users were advised of the potency of the product and to use far less as they would do if using skunk. They were also made aware about the potential increased potency of the drug at the bottom of the bag where crystals had gathered.

In 2012, a UK based company sold a potent brand of synthetic cannabinoid smoking mixture called Annihilation. Annihilation was associated with a number of hospitalisations.

Annihilation contained the synthetic cannabinoids MAM-2201 and UR-144. Both of these compounds were banned by the amendment to the Misuse of Drugs Act introduced on February 26, 2013.

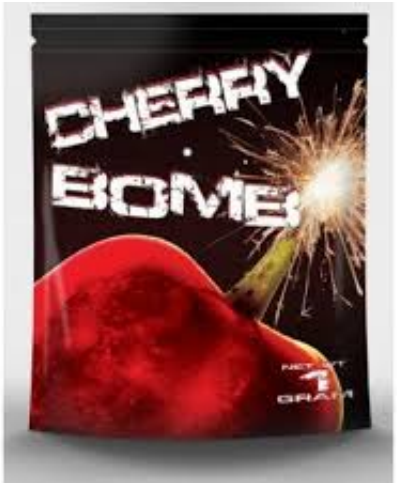
Oral, e-liquid and injectable synthetic cannabinoids formulations are also available. Batches of the same brand may possess highly variable concentrations or can be completely mislabelled. Adverse reactions from synthetic cannabinoids are numerous and have included agitation, anxiety and visual/auditory hallucinations, vomiting and seizures.

Potency

Many synthetic cannabinoids are more potent than natural cannabis, and some have long half-lives. Products containing synthetic cannabinoids can range from those with potency similar to natural cannabis to those that are up to 100–800 times more potent than natural cannabis.

COSTS:

Prices have fluctuated from £10 per gram to £15 for three grams. Spice Gold weighed three and a half grams when it originally went on sale and cost £20. Since the legal changes prices have reported to have gone up significantly.



The products are much more expensive in prison, around £50 a gram or more.
Since the Psychoactive Substances Act came into force there is less branded product around and more unlabelled mixtures.

4. How synthetic cannabinoids work

Synthetic cannabinoids have had different reported effects on users. There are wide differences between the various synthetic cannabinoids, including metabolism, potency, toxicity and duration of effects. They can produce hallucinations, numbness, adrenaline rushes, induce fitting, respiratory failure and there have been reports of compulsive use and severe withdrawal symptoms.

Synthetic cannabinoids have a strong effect on the endocannabinoid system similar to natural cannabis but have other biological actions, which may explain some of the differences to natural cannabis in severity and features of toxicity.

It is unknown whether some of these compounds are physically addictive, many of them have been deemed to have a psychological dependency potential. Some people find that these substances can be more unpredictable and harder to manage than natural cannabis.

Effects

The desired effects of synthetic cannabinoids include relaxation, altered consciousness, disinhibition and euphoria, and a state of 'being energised'. Reports describe sedative-like and hallucinogenic effects. However, a significant number of users don't report such symptoms and instead report anxiety, feelings of panic, disorientation and dysphoria – the opposite of the sought-after euphoric feelings.

While these negative effects could happen to anyone, it seems to be more prevalent amongst people using high doses, or redosing, or people mixing their synthetics with alcohol or cannabis.

There is some concern that they may also affect other brain chemicals such as serotonin, which may contribute to observed symptoms such as overheating and hallucinations. It has been suggested that at high doses some synthetic cannabinoid compounds may also possess monoamine oxidase and 5-HT reuptake inhibitory properties, which may increase the risk of serotonin syndrome.

Onset and duration of action

It has been reported that, in comparison with natural cannabis, synthetic cannabinoids are characterised by quicker onset of effects, significantly shorter duration of action, worse 'hangover' effects and more intense visual hallucinations, paranoid feelings and behavioural disturbances.

The onset of the action of synthetic cannabinoids is usually within minutes of smoking, but longer following oral consumption. The length of the effect varies. Although there are no controlled studies in humans, there are reports that the duration of action of synthetic cannabinoids can range from 1–2 hours for some compounds to up to 6–8 hours for others.

The reasons for continuing to use synthetic cannabinoids may include:

- **Pleasure**: wanting to repeat a pleasurable experience and developing a habit (linked to dopamine)
- **Craving:** strong craving has been associated to the drug
- **Depression:** (linked to serotonin) an imbalance in serotonin levels may also influence mood in a way that leads to depression. This can combine with a loss of job or relationship breakup, etc and in a few cases may lead to suicidal ideation. It may also contribute to users experiencing severe mood changes and aggressive outbursts
- **Stress:** (linked to adrenaline), the stress hormone cortisol is also probably released by some synthetic cannabinoids which can increase heart rate and blood pressure.

5. Health and psychiatric issues

Little is known about the metabolism and toxicology of synthetic cannabinoids in humans. It cannot be assumed that the risks associated with their use will be comparable with those of cannabis and there are concerns that they may have a greater potential to cause harm.

Synthetic cannabinoid products can also have unpredictable effects. There is emerging evidence that the risks of requiring emergency medical treatment as consequence of using synthetic cannabinoids are much greater than for natural cannabis. There is also evidence that some more recent formulations may be more potent than earlier ones and be associated with greater harms.

The following adverse effects linked to the use of synthetic cannabinoids have been reported.

Physical

• Neurological, cognitive and psychiatric effects • Anxiety, irritability and psychosis-like effects • Reduced levels of consciousness; coma • Numbness, tingling, light-headedness, dizziness, pallor, tinnitus, diaphoresis, tremor, somnolence, syncope, unresponsiveness, nystagmus and convulsions • Nausea	• Loss of basic functions • Convulsions • Elevated heart rate • Kidney problems • Tolerance • High body temperature • Sweating • Paralysis (rigid and flaccid) • Muscle tremors and spasms • Limb twitching • Respiratory distress

Cardiovascular effects

- Tachycardia, hypertension, hypotension, hypokalaemia, chest pain and palpitations, myocardial ischaemia, myocardial infarction, ischaemic strokes
- Neuromuscular and musculoskeletal effects
- Hypertonia, myoclonus, myalgia, rhabdomyolysis
- Renal effects
- Acute kidney injury
- Other effects
- Hyperglycaemia, hypoglycaemia, acidosis, respiratory acidosis, cold extremities, dry mouth, dyspnoea, mydriasis, vomiting, loss of sight and speech

Mental Health

Reported harms associated with synthetic cannabinoids include a range of psychiatric problems, the most prominent of which are anxiety (which can be

severe), irritability, agitation and psychosis-like effects. Other adverse effects include negative mood changes, hallucinosis and 'hangover' effects.

Psychological:

• Paranoia, panic, extreme fear reactions • Anxiety • Detachment, derealisation, depersonalisation • Auditory, visual, tactile hallucinations • Delusions, • Short lived or persistent psychosis • Fear-generated aggression • Impulsive behaviour • Loss of insight	• Amnesia • Inappropriate or uncontrolled laughter, anger, sadness, flat affect, depression and suicidal thoughts, excitability, agitation, combativeness, thought disorganisation • Short-term memory and cognitive deficits, confusion, sedation and somnolence,

Widely reported symptoms include seizures, hypertension, hyperthermia, agitation and aggression. They have also been associated with hypotension and linked to severe kidney injury and muscle damage.

Psychosis

Psychotic symptoms appear to occur relatively frequently following consumption and have been reported in otherwise healthy people. This may be linked to the high potency of the drugs and the fact that, unlike natural cannabis, they do not contain cannabidiol (CBD), a chemical which appears to possess antipsychotic properties. There is particular concern about the risk of synthetic cannabinoids precipitating psychosis in vulnerable individuals, including those with a current or previous history of psychosis.

Management of acute harms

- Users who have used synthetic cannabinoids and who do not present with symptoms of acute intoxication are unlikely to require any monitoring, investigation or treatment
- Even when the person is intoxication, these will symptoms will usually be self-limiting and resolve spontaneously
- Some people will, however, suffer synthetic cannabinoid-related adverse effects and these could be severe

Call 999 or 112 if any one of the following is present:

- Significant agitation (e.g. pacing around the room) or aggression, not settling within 15 minutes
- Seizures (e.g. a convulsion similar to an epileptic fit)
- Unconsciousness – if the patient does not respond to vocal commands, requires painful stimulus (e.g. pressure across the fingernails) to respond, or does not respond at all

- Breathing difficulties, such as fast breathing rate, not settling within 5 minutes
- Heart rate over 140 beats per minute, not settling within 5 minutes
- Temperature over 38.5°C, not settling after about 5 minutes of rest or, if no thermometer is available, if very flushed and feels very hot
- Blood pressure: Systolic ('upper pressure') over 180 mmHg, or diastolic ('lower pressure') over 110 mmHg on two repeated measurements
- If there are any other concerns (e.g. severe headache, chest pain)

Source: The Euro-DEN Project. See David M. Wood, Alison M. Dines, Fridtjof Heyerdahl, Christopher Yates, Isabelle Giraudon, Raido Paasma, Knut Erik Hovda, Paul I. Dargan (2016)

There is currently no antidote for synthetic cannabinoids so management of users should be primarily symptomatic.

- If the patient is lucid, explain what is happening and reassure them that they are safe.
- If the person is convulsing, the safe management of the convulsion should be the priority and the use of restraint avoided while the person is convulsing;
- In the event of overheating, measures may be required to reduce body temperature such as tepid water on the torso and exposure to moving cool air;
- If a person is very altered and presents a risk to themselves or others, they may need to be restrained if they are insufficiently lucid and can't be calmed via other methods;
- As the person exits the acute phase they are likely to be highly anxious, confused and lack memory of what has happened. Helping to explain what has happened and "contextualizing" their experience is essential.
- Medication may be required to manage acute symptoms such as anticonvulsants, anti-psychotics or to reduce heart rate.
- Synthetic cannabinoids have been implicated in a number of deaths, often where they have been used at high doses or in combination with other drugs. Deaths may have been the result of heart failure, convulsions, accidents when intoxicated or other causes.
- Identification and assessment of acute harms in acute care settings

Managing acute intoxication and toxicity

- For up-to-date information on the management of the harms of synthetic cannabinoids consult TOXBASE® (www.toxbase.org). Non-UK readers should consult their local or national guidelines.
- Hydration and monitoring may be enough for patients with mild to moderate intoxication.
- Supportive treatment is dependent on a patient's specific presentation (e.g. agitation, delirium, hypertension, convulsions).

There is some evidence that benzodiazepines are of benefit to patients with symptoms of anxiety, panic and agitation. The use of intravenous benzodiazepines has been reported for the management of seizures and in some cases of synthetic cannabinoid-related psychosis.

Synthetic cannabinoids withdrawal symptoms:

• Hypertension • Neural pain • Joint pain • Headaches • Craving • Physical pain on stopping • Serious stomach cramps • Nausea • Anger/irritability • Depression	• Tremor • Mood swings, intense irritability • Anxiety, panic attacks • Delusions and psychosis • Fluctuating body temperature • Sweating • Coughing • Insomnia/sleep disturbance • Impatience, difficulty concentrating

Tolerance and addiction:

There is increasing evidence that the chronic use of synthetic cannabinoids may be associated with tolerance and dependence. Tolerance may develop more quickly for synthetic cannabinoids than for natural cannabis. With regular, frequent use tolerance can develop, leading to escalating doses. While naïve users may use a fraction of a gram per dose, heavy users may be getting through 10-15g or more per day.

Management of the harms associated with long-term and frequent use

- No specific medications are indicated for synthetic cannabinoids harmful use or dependence and no substitute prescribing is currently available.
- Suggested psychological and social interventions include motivational approaches, relapse prevention and reintegration with non-using social networks.
- Underlying drivers of use can include misuse of other substances, mental health and physical health co-morbidity, issues associated with homelessness and deprivation, and involvement in the criminal justice system and incarceration.

6. Harm reduction

Harm reduction advice for synthetic cannabinoids users

There is no safe way to use synthetic cannabinoids. Synthetic cannabinoids are not the same thing as natural cannabis. Synthetic cannabinoids appear to be stronger than natural cannabis and more unpredictable.

Starting doses need to be much smaller. Many of the reported unpleasant experiences of synthetic cannabinoids relate to people putting amounts of synthetic material similar to a “normal” cannabis dose. At such levels people are more likely to experience unpleasant side effects.

This should be mixed in with smoking material but NOT herbal cannabis. If being smoked in a pipe or bong, even smaller quantities should be used. If the psychoactive material is not firmly bonded to the smoking mixture, it can lead to “bottom of the bag” syndrome, where active ingredients can shake off and become concentrated in the bottom of the bag and can be unexpectedly potent. Remember to keep shaking the bag to prevent this from happening.

Synthetic cannabinoids usually vary from batch to batch, so different packets can produce different effects, even if the packaging looks the same. Different synthetic cannabinoid compounds have different strengths and potency, with some significantly stronger than others.

- If you are going to use a synthetic cannabinoid, start with small doses. Consider a quantity no larger than a match head
- As very small quantities of synthetic material are required to achieve intoxication, smoking “straight spliffs” of smoking mixture alone without tobacco is not recommended, though users with a high tolerance will often be doing so
- Wait before the effects have gone before smoking some more
- Synthetic cannabinoids should not be taken on their own, but always with a ‘mixer’ (e.g. tobacco or dried herbs)
- Synthetic cannabinoids should not be used together with natural cannabis
- You should avoid smoking synthetic cannabinoid products through pipes or ‘bongs’, as it can increase the risk of an overdose or bad reaction
- Regular use of synthetic cannabinoids can lead to dependence (addiction) and withdrawal
- Synthetic cannabinoids can cause severe harms. If you experience a sustained period of fast heart rate or chest pains, call an ambulance
- Synthetic cannabinoids can increase anxiety or paranoia. Only use them in an environment where you feel safe and with people you trust. If you suffer from anxiety or mental health problems, avoid using them
- Avoid mixing synthetic cannabinoids with other drugs, medicines and alcohol
- Do not drive or operate machinery under the influence of synthetic cannabinoids

- Some people report blends containing a mix of different chemicals can have more unpleasant side effects and should only be used with great caution;
- Don't get into bouts of competitive use (e.g. in bucket bongs etc) as there is a high risk of overdosing;
- Don't use in conjunction with other drugs, especially other forms of cannabis, alcohol or stimulants;
- There may be a risk of heart problems: you are best off avoiding these compounds if you have an existing heart problem or are using alongside stimulants;
- As synthetic cannabinoids may exacerbate anxiety and paranoia only use in an environment in which you feel safe, with people who you trust. Avoid using if prone to anxiety or have existing mental health problems;
- In the event of panic or anxiety, often treating as for panic attack will help resolve symptoms – sitting down, head down, regular breathing and reassurance. However more serious symptoms, including delusional behaviour or respiratory distress may require medical assistance;
- If you experience a sustained period of fast heart rate, or experience chest pains call an ambulance;
- Use can cause a comedown, development of tolerance, dependence and withdrawal symptoms. If using these compounds, don't use constantly and take breaks from use;
- Don't drive or operate machinery when using these compounds.

7. Engagement and treatment

7.1 Engagement

Services need to be clear about the clients they are seeking to attract, are they recreational users who are likely to be in employment, or more chaotic users who have no job or fixed abode? In a community setting information should come from local needs assessments and service user consultations to build a picture of the local demographic. It is important that all services establish working relationships with other relevant agencies and advertise each other's services.

The following guidelines offer some advice on how to increase the likelihood of engaging synthetic cannabinoids users.

- Agencies should be prepared for clients to fail to attend appointments or to turn up late. A phone call or text (if permission has been given) the day before the assessment can increase attendance rates and also give the worker opportunity to assess the current situation

- Do not produce large amounts of paperwork on a client's first visit. Although it is important to gather information and keep good records, it is of more value to increase the likelihood of the client returning to the service. Clients who are using synthetic cannabinoids may be less informed about drug services than opiate users and can often be extremely anxious about their first visit. Keep initial screening forms to the bare minimum and devise a system to collate more detailed information during successive visits whilst a relationship of trust has been built up

- Ideally some form of outreach service should be offered to clients who are homeless, live itinerate lifestyles or are in crisis. A further bonus of delivering outreach services is that there is a structured mechanism that will allow for using patterns, changing trends and shifting health concerns to be quickly identified. Well delivered outreach services can enhance the treatment experience for individuals and will allow the drug treatment sector to develop meaningful relationships with other hidden communities

- In trying to attract users to services it is important that agencies talk to and consultant users, families and carers themselves. They can help build a service that is attractive and effective. They can also help spread the word about the service. User consultation should be a regular part of service evaluation so that agencies can respond quickly to changes in client group and drug trends

The initial contact with the client offers the opportunity to maximise engagement by:

- Asking a client about their drug use can provide the opportunity to discuss harm reduction interventions

- Asking about specific physical and mental health issues can help to identify problems that need immediate attention

- Dealing with practical issues, such as housing, benefits and money can result in a tangible change, which in turn can increase trust and help build an effective working relationship with the client

Some open access services have found that the best way to attract users into a service is by 'word of mouth'. If the service is good and it delivers, then this will be reflected in the agency's reputation. Make sure that the service delivers what it says it is going to deliver. Develop regular user consultation and listen to what is being said.

7.2 Stepped care model

There is a large body of evidence on the effectiveness of psychosocial interventions (PSIs) for the management of drug and alcohol problems in general and this could be widened and made more specific for users of novel psychoactive substances looking for help and support.

Psychosocial interventions for drug use are normally provided by following a stepped care model. It has been recommended that a two-step treatment process be in place to deal with the severity of issues and level of motivation of presenting synthetic cannabinoids and other NPS users (NEPTUNE Project 2015).

Lower-intensity

Lower-intensity PSIs can be divided into two main interventions:

- Provision of brief advice / information
- Delivery of brief interventions

Health professionals outside of drug and alcohol treatment may carry out lower-intensity PSIs.

Higher-intensity

Structured drug treatment is offered to clients with 'higher severity' problems relating to synthetic cannabinoids or NPS use. Structured drug treatment may be delivered as one-to-one or to groups. Treatment may also need to include complimentary therapies, life skills and wellbeing support and not specifically about drug use.

The main principles of a stepped care approach are as follows:

- The least intrusive intervention needed to achieve a required outcome is delivered first
- If an intervention does not achieve the desired outcome, service users should be offered the option of being 'stepped up' to a more intensive intervention
- Where a higher level of intensity of treatment is no longer required, 'stepping down' to a less intensive option should be offered
- Clients should have access to all levels of treatment within a treatment system

Source: NEPTUNE Project 2015

Clients should have access to the interventions likely to be required to achieve their outcomes, and not unnecessarily proceed through lower levels in a stepwise order.

7.3 Mapping

There is evidence that treatment outcomes can be further enhanced with the use of ITEP mapping tools. Mapping tools are not psychosocial interventions or a clinical tool but more a method that can improve the delivery of treatment.

Current approaches are based on strengths and needs, and a 'recovery capital' model. A recovery capital model looks at the strengths and needs a client has over a range of emotional and environmental domains.

There are four types of recovery capital:

- Human capital – skills, employment, mental and physical health
- Physical capital – housing, money
- Cultural capital – values, beliefs
- Social capital – relationships with others

The more recovery capital (resources) clients have across these domains the more the likelihood of achieving positive outcomes. Fewer resources might be an indication for more intensive interventions.

8. Treatment tools

8.1 Group / individual work

The following list gives a basic foundation on which you can build an individual or group work package for synthetic cannabinoids:

- **How it works:** Make users aware of how synthetic cannabinoids are working on their body and the impact this can have on their health and mental state.

- **Health:** Using synthetic cannabinoids may have had some effect upon the client's health. Begin to educate clients regarding the health risks associated with synthetic cannabinoid use. The knowledge of health issues amongst users is usually very poor. Keeping healthy through exercise, eating well, health / fitness apps, meditation etc, will help clients feel better and also counteract impaired immune system and general poor health

- **Identifying strengths:** Get clients to look at what their strengths are and what resources they have. Clients will need to draw on these strengths and resources when achieving a goal or desired outcome

- **Triggers:** It is important for a client to understand how triggers work and what their main triggers are. Users can often react to the same set of triggers over and over again unless awareness is gained

- **Cravings:** Triggers usually lead on to cravings, it is important for users to understand what they are and what to do when cravings start. Users often feel powerless when craving, and knowledge can change their perception

- **Euphoric recall:** Seeing former synthetic cannabinoid use through rose tinted glasses or just remembering the good times of using can ultimately lead to clients lapsing. Making clients aware of euphoric recall gives them understanding of how personal actions can lead to cravings and will also prepare the client for when this happens

- **Dealing with lapses:** It is important that lapses are worked with quickly and effectively so that a short using episode does not turn into a full relapse. Staff should be aware of the impact that feelings of guilt and a sense of failure can have on the client's response and be able to work with this

- **Relaxation:** The more relaxed clients become the less likely they are to crave synthetic cannabinoids. Relaxation techniques also provide practical solutions for coping with cravings or potential trigger situations

- **Social networks:** Support can come from various areas, such as college, religion, family, online support groups, mutual aid, non-using friends, hobbies and employment. The more clients are involved in meaningful social

relationships the more likely they are to recover from mephedrone use

- **Practical issues:** Clients may have built up debt, housing problems, feel isolated or have become involved with the criminal justice system. Practical help and support may need to be offered in dealing with these issues

- **Goal setting:** This gives clients focus and direction in their recovery. It will help clients plan their goals in an effective way and make them specific and time based

- **Successful and unsuccessful attempts:** If a client achieves a goal, get them to look at how they did it and how they made it successful. If it was an unsuccessful attempt, get them to look at what went wrong, what they can learn from the process and what they need to do next time

- **Therapeutic treatment:** Some users may have long-term issues that they wish to address. These issues may have been present before they started to use or were developed during their use

By the end of the sessions the client should have:

- Developed an understanding of synthetic cannabinoids and how they work on the body
- Developed a personal awareness of their own patterns of use
- Developed an understanding of the ways to counteract triggers, cravings etc
- Know what their strengths are and how to cope in difficult situations
- Developed an awareness of issues that need to be addressed
- Met certain goals, built recovery capital and progressed in their treatment

8.2 Treatment tools

The following treatment tools can be used to support synthetic cannabinoid users in their recovery and covers the range of domains clients can draw on to help them achieve their goals.

The following tools will help:

1. Track patterns of use and identify strategies for managing triggers and cravings
2. Set goals based on the client's strengths and skills

Awareness checklist

Answer the questions as truthfully as possible so that you can become more aware of when you are going to use synthetic cannabinoids or are building up to use. Tick all boxes that apply to you.

1. How do you physically feel before you use?

Shaking	_	Heart beating	_
Energised	_	Fast breathing	_
Sweating	_	Stomach churning	_

Other:

2. How do you feel emotionally before using?

Anxious	_	Depressed	_
Excited	_	Happy	_
Guilty	_	Angry	_

Other:

3. Is there a specific time of day, week, and month when you use?

Afternoon	_	Evening	_
Friday's	_	Weekends	_
Monthly	_	Anytime	_

Other:

4. What places do you use in?

Home	_	Partners/friends house	_
Street	_	Chem-sex party	_
Club	_	Pubs/bars	_
Cell	_		

Other:

5. What areas do you use in?

Home area	_	Work area	_
Social area	_	Dealing area	_
Where user friends live	_	Area changes	_

Other:

6. Who do you use with?

Alone	_	Partner	_
Friends	_	Other users	_
Using partner	_	Dealer	_

Other:

7. How do you get the money to use?

Benefits	_	Work	_
Dealing	_	Crime	_
Savings	_	Selling/borrowing	_

Other:

8. How much money gets you thinking about using?

£5 -£10	_	£15 - £20	_
£40 - £50	_	£90 - £100	_
£150 - £200	_	£200 - £300	_

Other:

9. What equipment do you use?

Cigarette papers	_	Vaporiser	_
Tobacco	_	Lighters	_
Small plastic bags / wraps	_	Bongs etc	_

Other:

10. What pattern of use do you have?

Daily use	_	Binge using	_
Whenever I can	_	When I get the money	_
When socialising	_	Depends on mood	_

Other:

Awareness action plan

Name:

1. How do you physically feel before using? Be aware of how you feel physically before you use synthetic cannabinoids and use this as an indicator. Anything that helps you relax and bring your breathing rate down will help. Try breathing exercises, meditation, have a bath, massage, acupuncture etc. Find out what works for you.
Personal plan:
2. How do you emotionally feel before using? Again use these as indicators, but also be aware of situations that may develop these feelings. For example, if you know a situation or person usually makes you feel angry or depressed. Look at ways of coping with this or avoid the situation.
Personal plan:
3. Is there a specific time of the day, week, and month when you use? This will depend upon your pattern of use, but once you are aware of your danger times you can develop strategies that make these times less of a problem. For example, if your using time usually begins every Friday then look for alternatives, try to be in a safe place with people that will support you and are not connected with your use.
Personal plan:
4. What places do you use in? In the community most places that you have used synthetic cannabinoids in can be avoided. Places have strong associations and will most probably be frequented by the people that you have used with. If you use at home try to change the environment, move furniture around, decorate or clean and get rid of particularly strong associations that remind you of using.
Personal plan:
5. What areas do you use in? Some of the areas that are associated with using can be difficult to avoid so you need to develop strong strategies. Streets can be avoided and you can change your route, it may be less convenient but it will help to keep you safe.

Personal plan:

6. Who do you use with?

Avoid people that you used synthetic cannabinoids with. Most of these will be drug-using acquaintances with the relationship based around using. If they are friends then they will understand why you cannot have contact with them. If you use alone then try to be with people at your danger times.

Personal plan:

7. How do you get the money to use?

Receiving money or knowing when you are going to get it, can be one of the biggest triggers to use. These times can be extremely difficult and you need to work out ways of coping with this.

Personal plan:

8. How much money gets you thinking about using?

You need to be aware of the amounts of money that spark you off. Whatever that amount try not to carry the money around with you as it could trigger you to use. Also be aware that when you stop using your pattern may change and the amount becomes less.

Personal plan:

9. What equipment do you use?

If you are serious about giving up you need to get rid of everything that you associate with using. Throw these things away and check your house for anything that may be lying around.

Personal plan:

10. What pattern of use do you have?

Awareness of your individual pattern of use is really important. Be aware of how money, moods, social contacts fit in as well as the frequency of your use. If you are a binge user, be especially aware that the periods of drug free time between each use can lull you into a false sense of security.

Personal plan:

Triggers chart

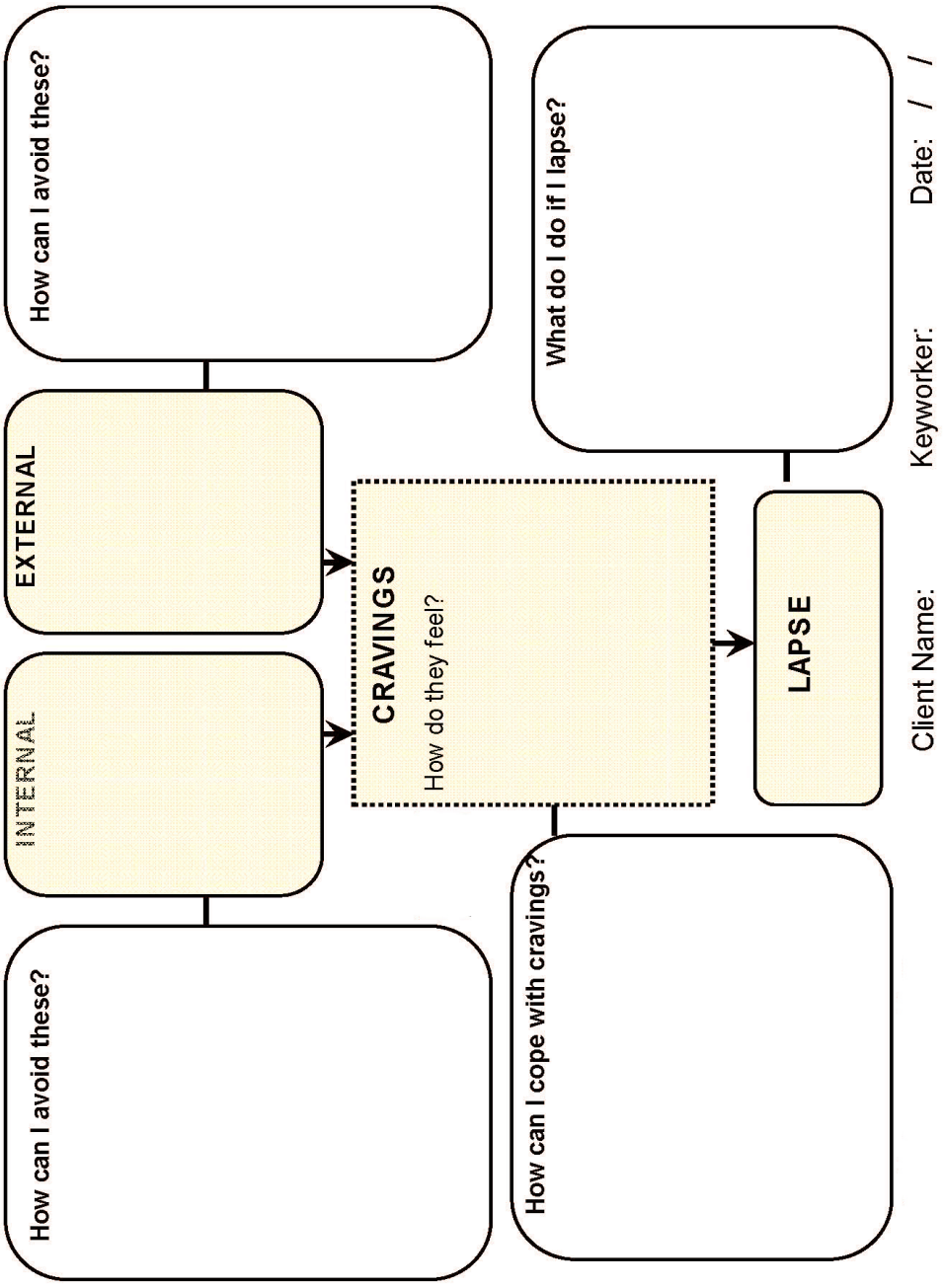
In order for you to increase your chances of getting off synthetic cannabinoids you need to understand what your main triggers are.

List your main triggers in the first column. Once this is done look at each individual trigger and think of ways that these can be avoided or coped with. Talking to other people about these triggers can sometimes help to develop new ideas.

Trigger	Action
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Coping with cravings

Cravings will be one of the biggest areas that you will have to deal with when coming off synthetic cannabinoids and a number of emotional or social factors may trigger you to crave. Think of how you can avoid these.



Dangerous situations

Developing awareness of dangerous situations that may lead to using can be difficult when you have only just stopped using synthetic cannabinoids. This is because situations that are now dangerous where once thought of as areas of opportunity. It is important that you start to anticipate these situations as much as possible and develop plans to cope with them if they do arise. Use the table below to help develop plans for dangerous situations:

Suggested plans	**Personal plans**
1. Anticipate dangerous situations	Situations that lead me to crave: 1. 2.
2. Leave or change the situation	Safe places I can go: 1. 2.
3. Distract yourself with things you like to do	Good distracters: 1. 2.
4. Have a list of emergency numbers	People I can call in an emergency: 1. 2.
5. Remind yourself of you success to date	My main successes to date are: 1. 2.
6. Change the thoughts of using to more positive thoughts	Positive thoughts: 1. 2.
7. I will put off the decision to use for 15 minutes	Techniques I can use to relax me during those 15 minutes: 1. 2.

Source: Adapted from All Purpose Coping Plan, Kathleen M. Carroll Ph.D, 1998

Euphoric recall

Euphoric recall is looking at something in your past through rose tinted glasses or just remembering the good bits of an event and forgetting the negative parts. Euphoric recall with synthetic cannabinoids can act in the same way in that only good memories are shown which help to build up your expectations and anticipation of drug use and can lead to craving.

You need to build up an awareness of how euphoric recall works with you and also how other people can spark this off. Once you are aware of how discussions about the 'good times' affects you try and avoid them. Also be aware of smells that could trigger memories of use.

The good and bad of using

Look at the reality of using. List both the good and bad elements of synthetic cannabinoid use and weigh the issues up. Be truthful and honest to yourself.

Good	Bad

Lapses

It is important that you start working with your lapse quickly. Begin by tracing the events that led to you using. You may need to go over things a few times, going one step further back to trace the initial set up. Look at whom you were with? How did you feel emotionally and physically before you lapsed? Remember a lapse is not failure; you should have learnt something from it.

What you need to understand is:

- What happened?
- How it happened?
- How can you stop it happening again?

Using event
What happened before that?
And before that?
And before that?
And before that?
And before that?

Now that you have a better understanding of what happened and how it happened, how can you stop it happening again?

1. 2. 3.

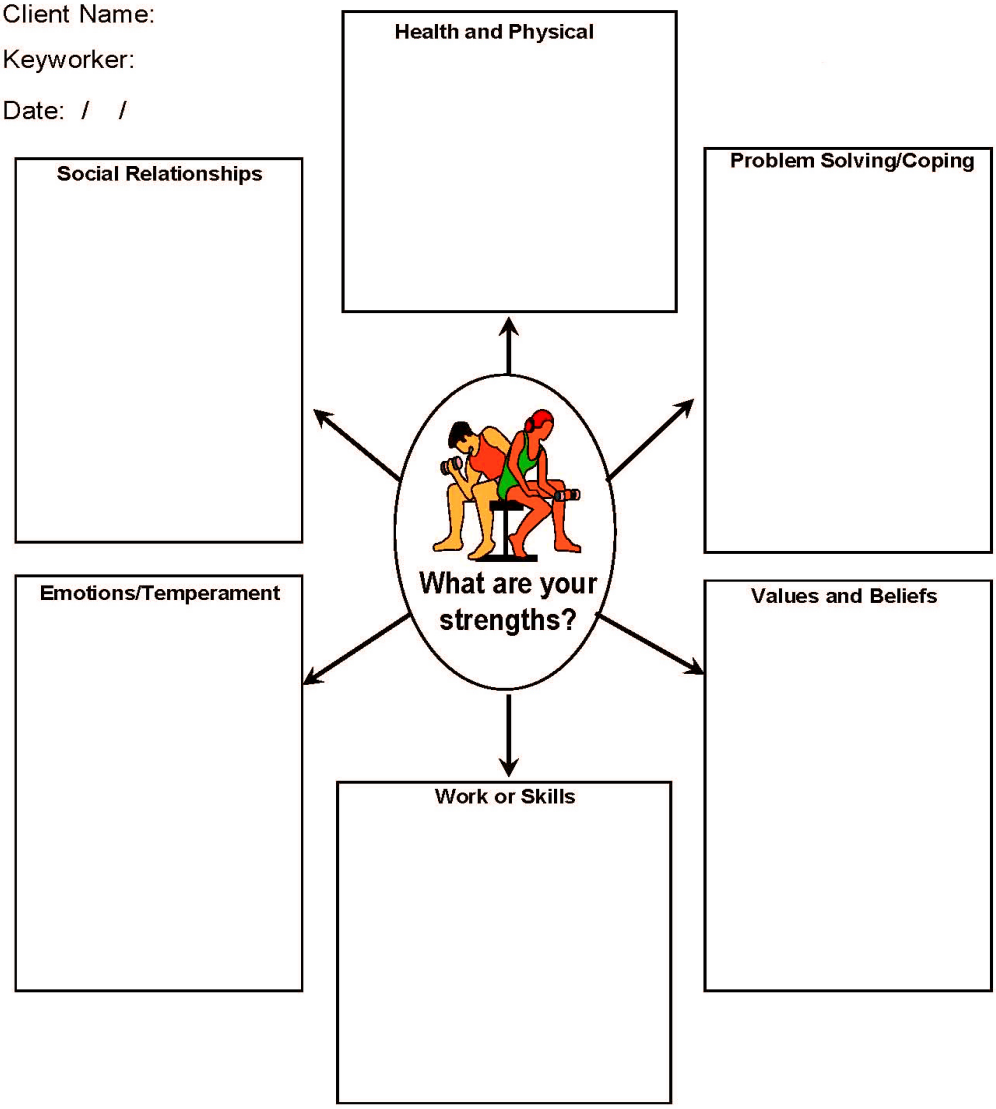
What are your strengths?

Try and think about personal strengths and resources that are available to help you. How will your strengths help you with the changes you want to make? Which of your personal strengths will serve you the most?

Client Name:

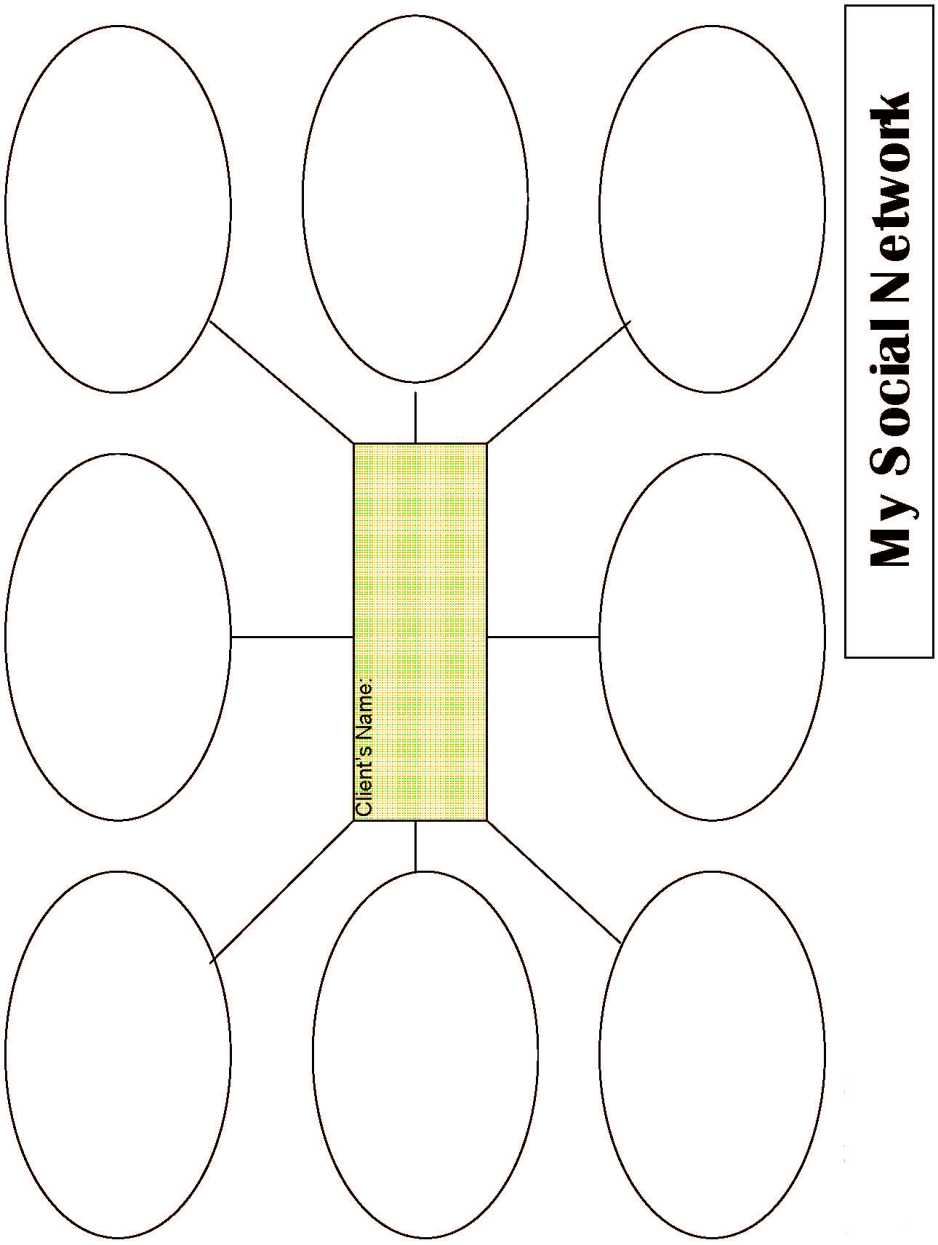
Keyworker:

Date: / /



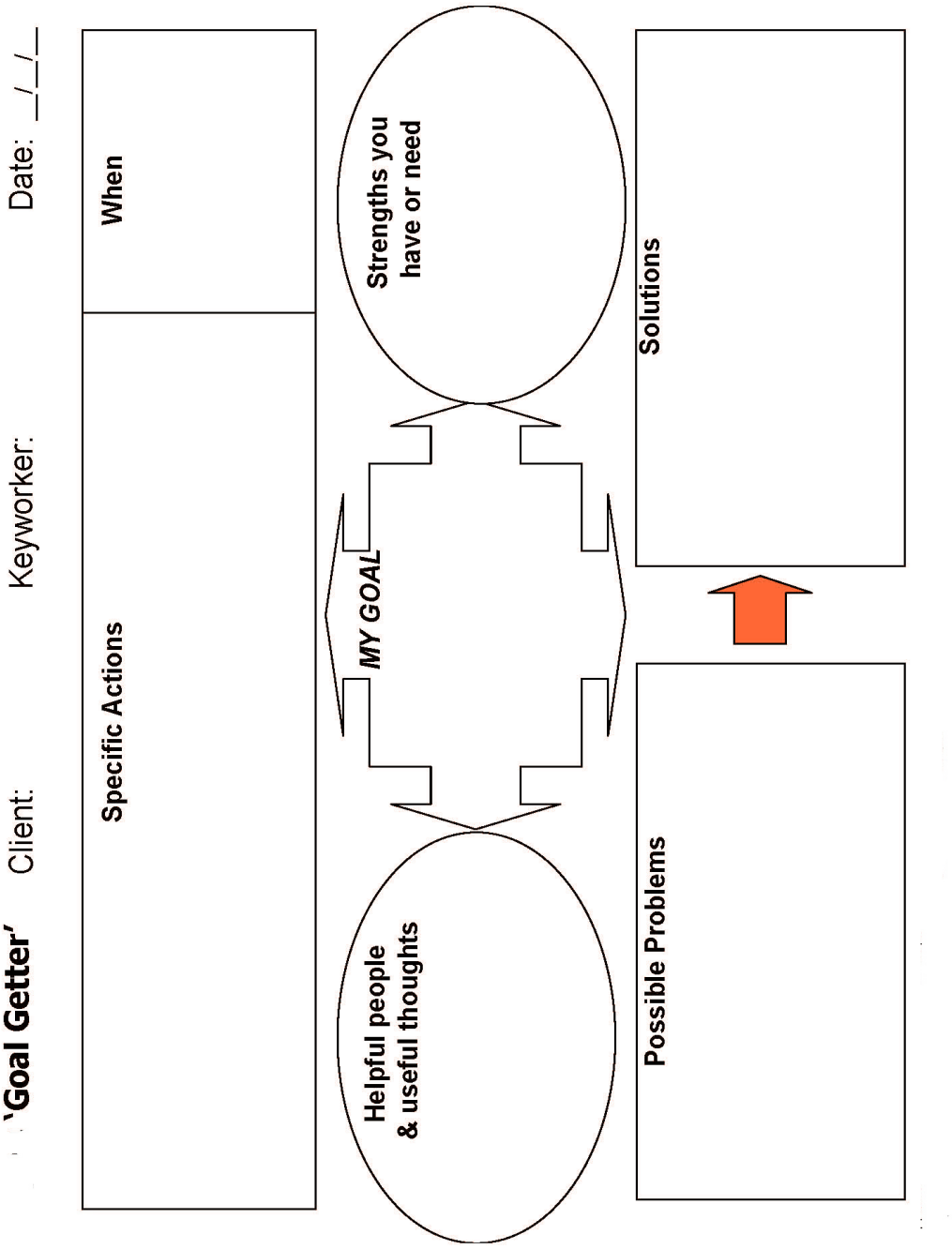
Social networks

What social networks do you have? Support can come from various areas, such as college, religion, family, online support groups, mutual aid, non-using friends, hobbies and employment.



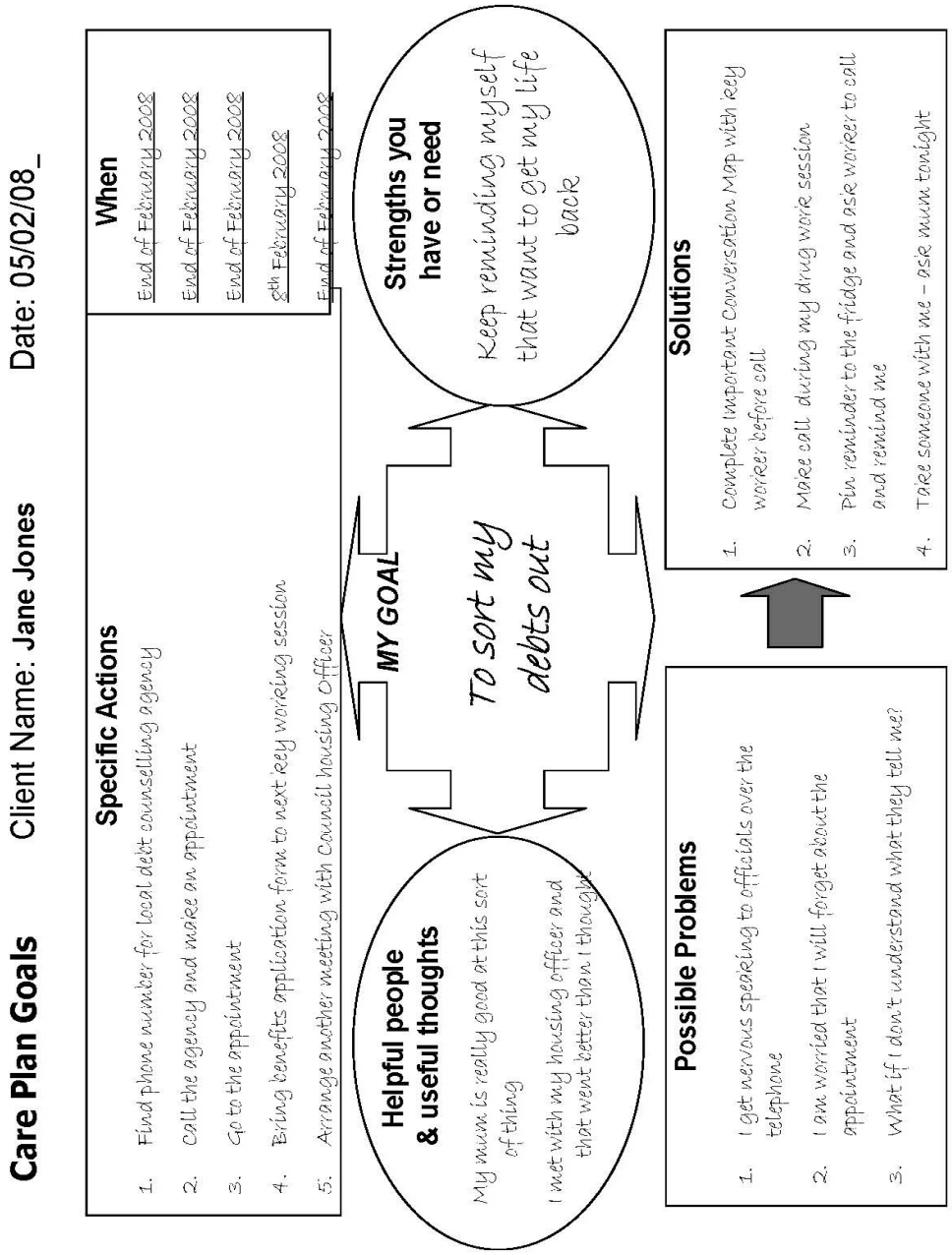
Goal getter

Think about a goal you need to achieve. Try not to set a difficult one at first, move on to more difficult ones as your confidence builds. Be realistic about what you're aiming for, set yourself specific actions and when you need to do this.



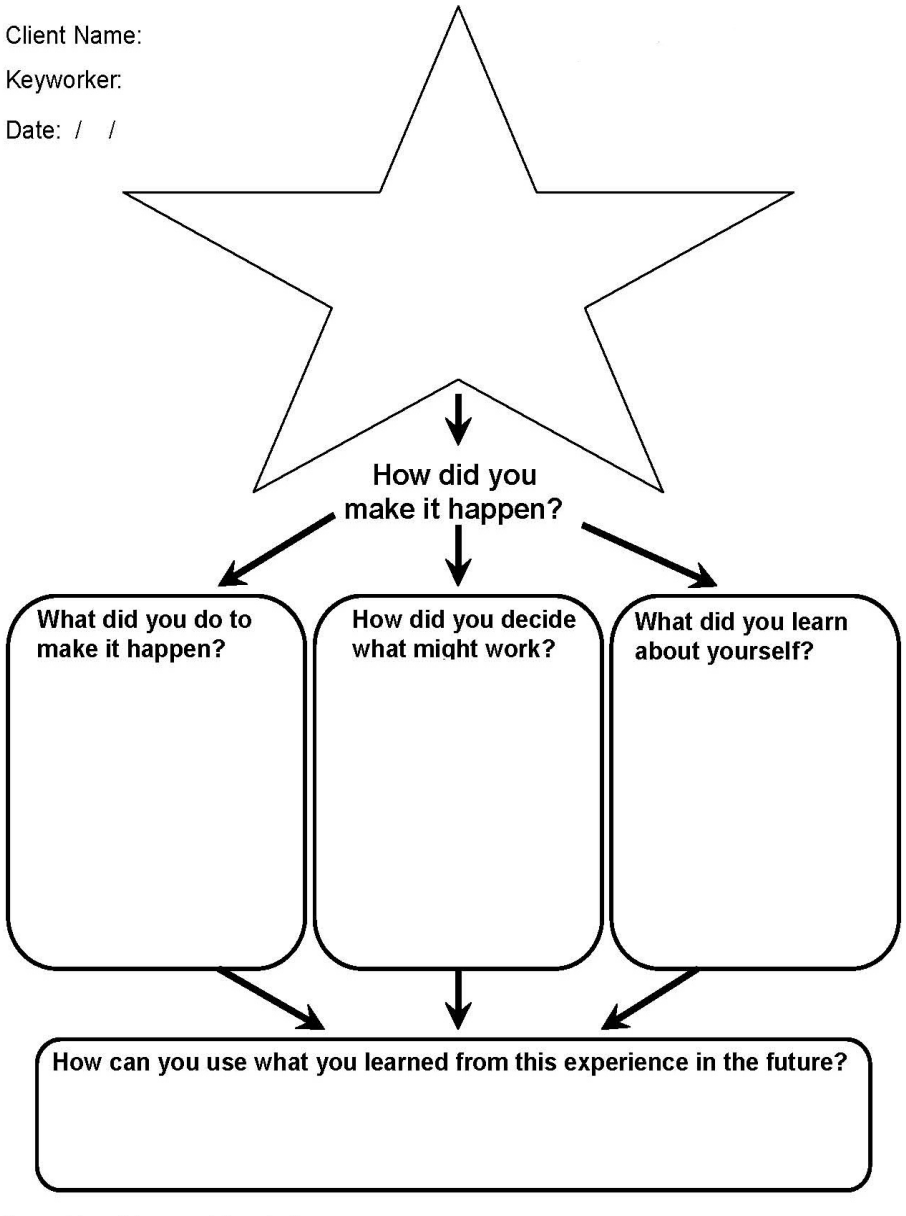
Goal getter sample

Below is an example of a client goal and how they set out to achieve that goal. The 'Goal Getter' is a SMART map (Specific, Measurable, Attainable, Realistic and Timely). A specific goal has a much greater chance of being accomplished than a general goal. The Goal Getter can be used in conjunction with recovery care plans.



What was your success?

What was your success? What did you do to make it happen and what did you learn about yourself? How can you use what you have learnt from this experience in the future?



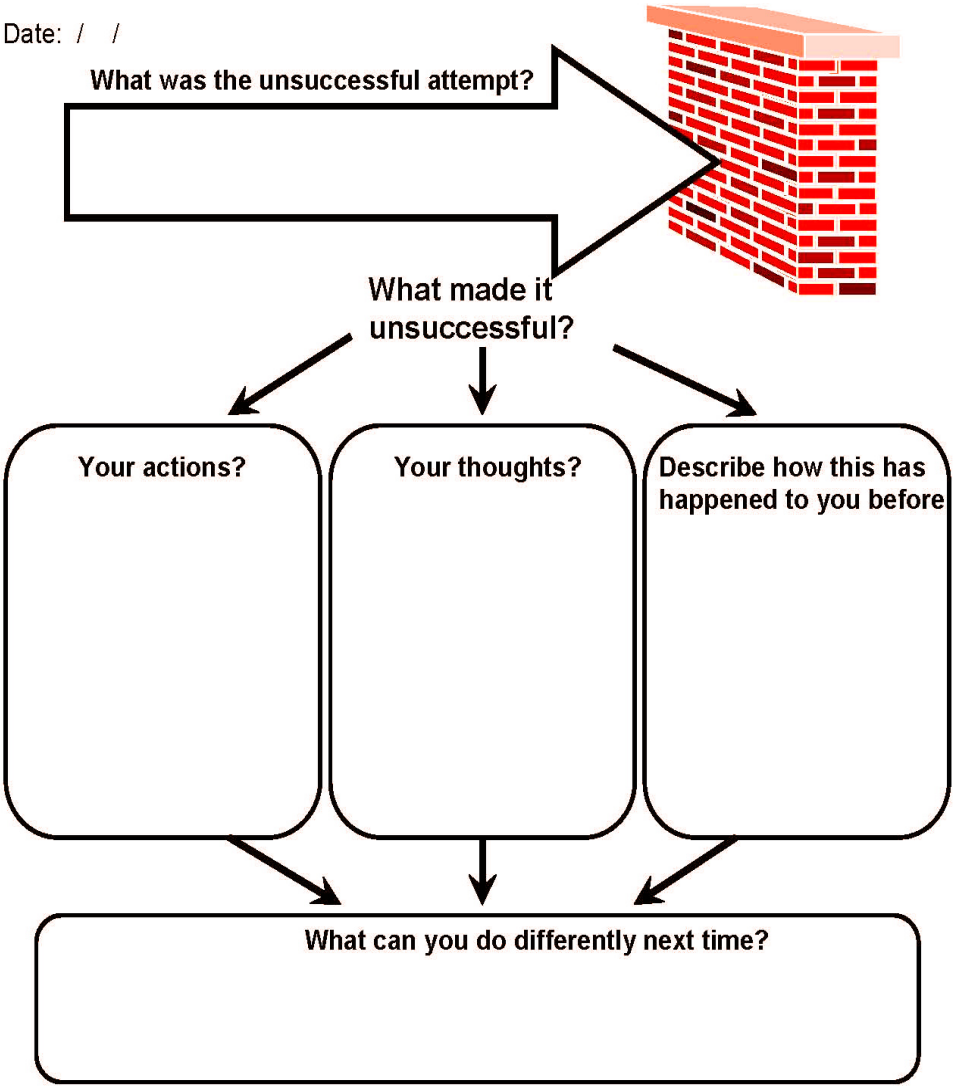
Running into a brick wall

Ok, you've had an unsuccessful attempt, remember you have not failed; it may take several attempts before you accomplish your goal. What made the attempt unsuccessful and what can you do differently next time?

Client Name:

Keyworker:

Date: / /



9. Types of NPS and treatment response

The term ‘novel psychoactive substances’ (NPS) refers to newly available drugs that mimic the effects of traditional illegal drugs. Commonly known as ‘legal highs’ most of these substances have been branded up into colourful packaging and it is difficult to know exactly which chemical is in each brand. For example, various chemicals have been sold under the brand names ‘Benzo Fury’ or ‘Ivory Wave’.

Sometimes the brand names themselves can be confusing, for instance ‘China White’ contains MPA, an analogue of methamphetamine, not an opiate as some might assume and ‘Benzo Fury’ is not a benzodiazepine (a downer), it takes it name from a group of chemicals called benzofurans, the majority of them being stimulants.

9.1 Types of NPS

There are a wide range of psychoactive drugs spanning several different chemical families, some are ‘organic’ such as mushrooms, ethno-botanicals (hallucinogenic flowers, seeds, cactus etc), natural gases (such as nitrous oxide) or they are synthetic man-made drugs like mephedrone.

Plants and fungi (Magic Mushrooms)

A number of natural plants and fungi contain psychoactive chemicals, and fresh or preserved plant and fungal materials have long been offered for sale online and via head shops.

This activity was largely terminated in the UK by the Drugs Act 2005, which controlled fungus that contained psilocin.

Phencyclidine (PCP) and ketamine-like agents

PCP and ketamine were both developed as anaesthetics for human use. PCP was discontinued because of side effects, including hallucinations and psychotic reactions. Both drugs are controlled, as are some of the analogues, including methoxetamine (an analogue of ketamine) and the 3 and 4-methoxy derivatives of PCP.

5-MeO-DALT

5-MeO-DALT is a hallucinogenic drug. 'Blast' is an example of a branded packet.

It comes as a white or tan/brown fluffy powder. Effects normally last 2-4 hours. It is often smoked, swallowed (bombed) or mixed with juice as it is reported to have an unpleasant taste.

People taking the drug can experience a rush, visual hallucinations as well as nausea, aching muscles and anxiety.

AMT

Alpha-Methyltryptamine also known as AMT was originally developed as an antidepressant in the 1960s but resurfaced as a recreational drug in the 1990s.

AMT is a long lasting (14-24 hours) hallucinogenic and stimulant drug similar to LSD and MDMA. It can make you feel energetic and it also increases your heart rate and breathing.

NBOMes

The most popular of the NBOMes are 25I-NBOMe (25I), 25C-NBOMe (25C) and 25B-NBOMe (25B). They are all N-Benzyl-Oxy-Methyl ("NBOMe") derivatives of known phenethylamines such as 2C-I and 2C-B. The chemicals first appeared on recreational markets in 2010.

25I-NBOMe has similar effects to LSD, though users report more negative effects while under the influence and more risk of harm as compared to LSD.

It is active at extremely low sub-milligram doses and is the most frequently used of the NBOMe series. It has been linked to several hospitalisations and deaths.

9.2 Cathinones

Mephedrone is from a family of related chemicals called cathinones, which include cathinone itself (the psychoactive property found in the shrub khat) and many other synthetically produced chemicals. The psychoactive cathinones are all categorised as stimulant drugs.

Mephedrone (Mcat)

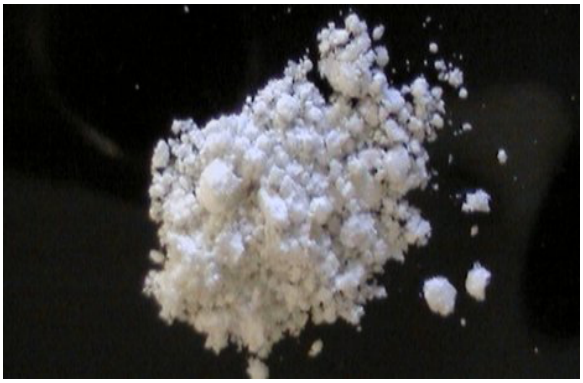
Mephedrone (4 methylmethcathinone) was the most commonly available cathinone sold on the UK recreational market in the period running up to 2010.

Mephedrone is more potent than cathinone, and unlike the other chemicals it is related to, the compound still has a UK presence as an illegal drug. Mephedrone was not the first internet drug but it was certainly the most popular stimulant sold online, having global reach within a few years.

Mephedrone can have a distinctive 'fishy' smell. This could be due to an added solvent or the product may not have been dried properly (there have been reports that mephedrone did not possess the odour before it was banned), as yet these reports are anecdotal and have not been confirmed.

Form: Mephedrone hydrochloride is a white or off-white yellowish powder. It can also be in crystal form or appear as a pill / capsule.

Routes of use: Mephedrone is water-soluble and is usually snorted, but it can be swallowed in bombs (wrapped in a cigarette paper) or dissolved in water and injected.



9.3 Effects

Many people who have used mephedrone report that their experiences are similar to taking amphetamines, ecstasy or cocaine, producing a sense of euphoria and wellbeing, with users feeling more confident, alert and talkative. The high may initially last up to an hour but with subsequent dosing may only last 10 to 15 minutes, making it a relatively short-acting drug.

9.4 Street names

There are many street names for mephedrone, the most common include: Mcat, Bubble(s), Miaow, Meow Meow, Meph, Drone and White Magic. Other local names also exist and in some areas in the UK other drugs have been sold as mephedrone and users have no idea what substance they are taking. The term 'bath salts' is mainly used in the US to refer to a number of synthetic cathinones and not just mephedrone specifically.

Naphyrone (NRG-1)

Despite the broad chemical generic ban on psychoactive cathinones in April 2010, suppliers were able to find loopholes, and within a few days a derivative, Naphthylpyrovalerone (brand name NRG-1) was offered for sale by online vendors and advertised as the first legal alternative to mephedrone.

Naphyrone is not strictly a cathinone as it is chemically related to pyrovalerone and tests revealed that the drug contained other banned cathinones and users were unknowingly breaking the law when taking it. However, NRG-1 did not reach the popularity of mephedrone in the UK and was made a Class B drug.

MPDV (Ivory Wave)

During 2010 a new product Ivory Wave began to be advertised on websites as a legal alternative to mephedrone. Analysis of test purchases initially revealed the active ingredient to be methylenedioxypyrovalerone (MPDV) – one of the banned cathinone derivatives.

MDAI

MDAI first became available online in 2009 as a legal alternative to MDMA. 'Sparkle' and 'Sparkle Gold' are examples of branded packaging. MDAI is similar to MDMA but not as strong and with less stimulant effects on the body.

People taking it report a mild high, relaxation and increased appreciation of music. Side effects have included stomach cramps, short-term memory loss and problems sleeping.

Benzofurans (Benzo Fury)

Benzofurans have MDMA-like and stimulant effects on the body. 6-APB and 5-APB have been commonly used. 6-APB is an analogue of the Class A drug MDA and has similar effects to ecstasy.

Benzofurans include a group also known as the 'fly' drugs (for example, bromo-dragon fly, 2C-B-fly). These drugs are far more hallucinogenic with bromo-dragon fly being active at very low doses and implicated in a number of deaths.

Pipradrols and pipradrol

Pipradrols and pipradrol derivatives are a group of amphetamine-type substances structurally related to methamphetamine.

In recent years, 2-DPMP (desoxypipradrol, also known as 2-diphenylmethylpiperadine) and D2PM (diphenylprolinol) had appeared.

2-DPMP was first sold as 'Ivory Wave', but D2PM had since replaced 2-DPMP in Ivory Wave products. 2-DPMP and related compounds are Class B under the Misuse of Drugs Act.

Ethylphenidate

Ethylphenidate was one of the most commonly used stimulants on the NPS market in 2011. Ethylphenidate is closely related to methylphenidate (Ritalin).

It comes as a white powder that is usually snorted or swallowed (bombed). Effects include increased energy, alertness and rapid heart rate.

Snorting can cause a more intense rush although effects tend to last longer when the drug is used orally. Snorting can also cause damage to nasal mucus membranes.

MPA Methiopropamine (China White)

Methiopropamine, also known as MPA, is found in many branded products such as 'China White' and is an analogue of methamphetamine. It appeared on the NPS market in 2010.

Methiopropamine is a stimulant drug. People taking it can experience a mild high, sexual arousal and loss of appetite. Adverse effects have included chest pains, breathing problems and an urge to re-dose. It comes in a fine white powder that is usually snorted or swallowed (bombed).

1-Benzylpiperazine (BZP)

1-Benzylperazine (BZP) is a synthetic drug prepared from piperazine, a medicine that has been used to control intestinal roundworms.

Piperazine itself has no psychoactive properties, but BZP acts as an amphetamine-like drug and was sold online in the UK before mephedrone appeared. Effects include increased energy and alertness.

Etizolam

Etizolam is a strong benzodiazepine that has sedative effects and can cause long periods of sleep and drowsiness. It also slows down your heart rate and breathing. People taking it can feel calm and relaxed with reduced feelings of anxiety. Side effects include short-term memory loss, reduced cognitive ability and double vision.

Further research

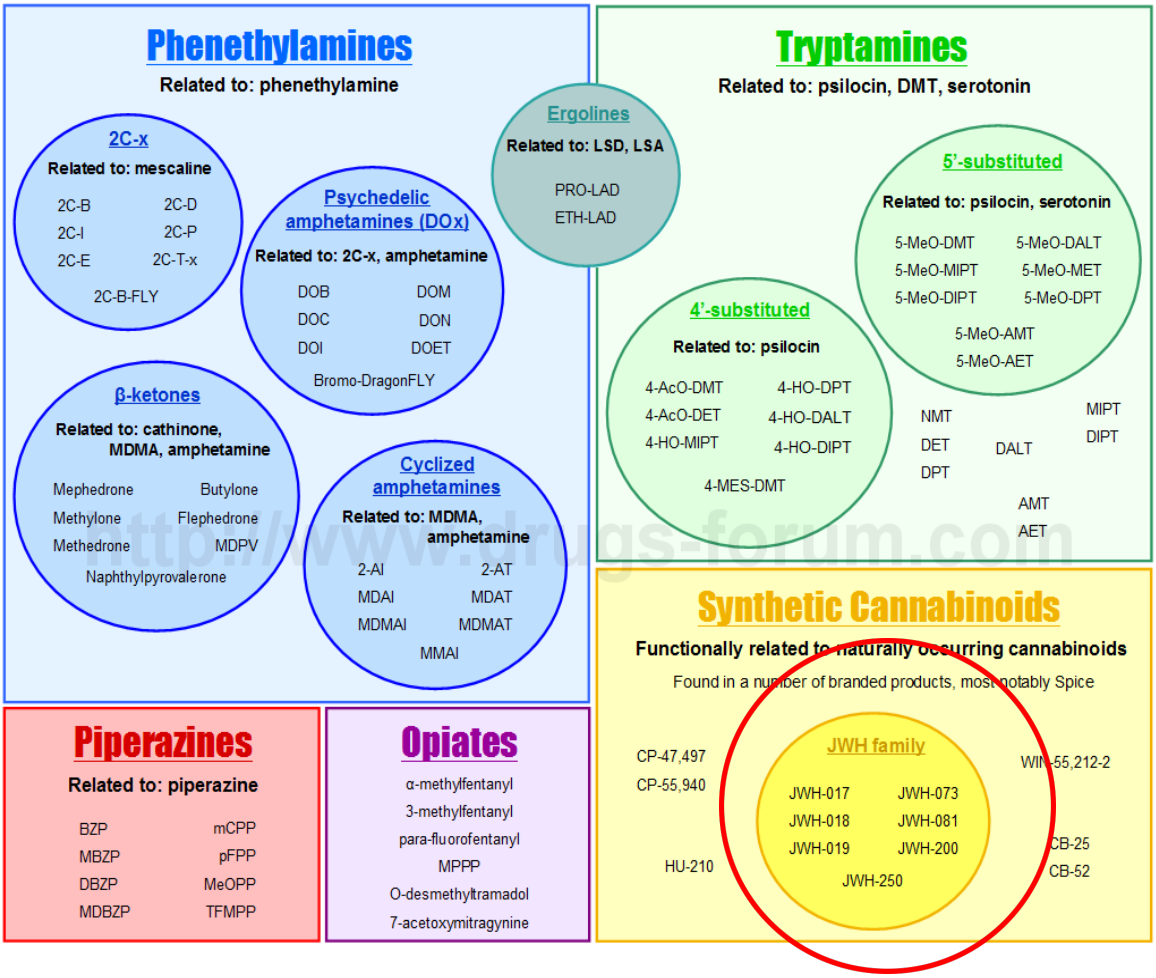
As a rough guide to working with NPS, there are things that workers can do once you know either the street or chemical name of the substance:

1. Check the National Poisons Information Service (NPIS) for support in managing patients with acute recreational drug toxicity and to identify individual drug toxicity. http://www.npis.org/
2. Check Drugscope (DrugSearch Encyclopedia) http://drugscope.org.uk/drugsearch/

3. Search Wikipedia or Tictac to help identify chemistry and possible neurological actions
4. Search online discussion forums on legal highs or research chemicals. This will give you some information on experiences, potential side effects and any health problems being experienced
5. Go to Google Trends to identify how popular a new drug is online, type in your keyword (name of the chemical) and Google will give you search data on that drug
6. Go to YouTube for observable behaviours. Sometime users will post videos while intoxicated on the new drugs they are taking
7. Check Erowid https://www.erowid.org for general information on drugs and on users subjective experiences
8. Check Drugwatch fact files. http://michaellinnell.org.uk/drugwatch.html
9. Check Bluelight (US) http://www.bluelight.org/vb/content/ and Urban 75 (UK) http://www.urban75.com website boards for user generated content on NPS

10.2 Tailoring interventions

To have a deeper understanding of novel psychoactive substances and to tailor effective interventions, it is important to look beyond the brand names that are assigned to new drugs and identify the chemical and chemical families (such as phenethylamines and tryptamines) that they belong to.



Source: www.drugs-forum.com

The diagram above does not cover every psychoactive drug, substituted ring, functional group or chemical class. For example, the arylcyclohexylamines are missing (PCP, ketamine and methoxetamine), and the new benzodiazepines are not listed. There are also many more synthetic cannabinoids omitted, and within this group alone there are several additional chemical classes. Noting this, the chart still captures many of the NPS that were, or are, commonly used. More importantly, it demonstrates how novel psychoactive substances are closely related to traditional drugs such as amphetamine, MDMA or LSD.

Most stimulant and hallucinogenic drugs span the two chemical families known as phenethylamines and tryptamines. Mephedrone and the other cathinones are from the B-ketone functional group (circled in red), a substituted ring from the phenethylamine structure and they are closely related to amphetamine and MDMA.

The phenethylamine class of drugs are generally viewed as having stimulant properties and tryptamines are categorised as hallucinogens. However, hallucinogens span both chemical families, for example, DOM (a powerful synthetic hallucinogen), and mescaline (a natural one), are phenethylamines and not tryptamines.

There is further considerable overlap between the pharmacology of drugs between these two families. Amphetamine-like compounds affect certain serotonin receptors in the brain in the same way that LSD does (such as bromo-dragonfly, 25i-NBOMe or 2C-B-FLY) and hallucinogens in turn may increase adrenaline and have stimulant effects on a user (such as AMT).

The sheer number of psychoactive drugs and their effects can be initially daunting but despite this we can still divide NPS into the five following categories.

Synthetic cannabinoids - traded under such names as Spice, Clockwork Orange, Black Mamba, Cherry Bomb, Annihilation and Exodus Damnation. These chemicals are only similar to natural cannabis in the way they act on the brain.

Stimulant-type drugs - such as BZP, mephedrone, MPDV, NRG-1, Benzo Fury, MDAI, ethylphenidate and MPA. The effects of these drugs replicate those of amphetamine and MDMA.

Hallucinogens - hallucinogenic drugs can be roughly divided into tryptamines, phenethylamines and lysergamides (LSD-like structures) such as 25i-NBOMe, PRO-LAD and bromo-dragonfly. Dissociative drugs such as salvia, methoxetamine, ketamine and nitrous oxide work on different receptors in the brain and belong to different chemical classes.

Opiates - such as kratom, MPPP, synthetic morphine AH-79217, o-desmethyl tramadol, W 15 7 and W 19 are opioid agonists and with a few exceptions work on the brain in the same way as other opiates / opioids.

Depressants - these drugs are similar to benzodiazepines such as diazepam. Etizolam, flubromazolam, diclazepam, pyrazolam, nifoxipam, flubromzepam and clonazolam are all examples of new synthetic benzodiazepines.

When more information is gathered about the nature of the NPS in question then tailored interventions and harm reduction strategies can be developed. Many of the treatment tools can be used ‘across the board’, however, harm minimisation strategies may have to be tailored in certain cases. For example, some harm reduction advice for synthetic cannabinoids can be different than the ones given for natural cannabis (vaporising natural cannabis might be seen as a harm reduction strategy but this should not be advised for synthetic cannabinoids due to the potency of some of these chemicals).

10.3 Treatment response

The general response from drug services has been to provide brief interventions, advice and treatment that fit the main NPS groups. For instance, if someone is using predominantly stimulant psychoactive substances, the treatment approach will be similar to that for cocaine or amphetamine problems; if it is a synthetic cannabinoid, the approach will be similar to that for cannabis. Due to the extreme potency, toxic potential or unknown complexity of some NPS this approach should only be used as a starting point, as it is important to deal with the symptoms and presenting issues first.

Synthetic cannabinoids

Synthetic cannabinoids have had different reported effects on users. They can produce hallucinations, numbness, adrenaline rushes, induce fitting, respiratory failure and there have been reports of compulsive use and severe withdrawal symptoms. It is unknown whether some of these compounds are physically addictive, many of them have been deemed to have a psychological dependency potential.

Many synthetic cannabinoids are short acting and tolerance can build rapidly. They may also stop natural cannabis having an effect for a few days after use, possibly demonstrating the strong affinity theses substance can have on the brain. They do not possess CBD (cannabidiol, a possible anti-psychotic chemical that is found in natural cannabis) and there have been reports from mental heath teams that some users are behaving more psychotically on these drugs.

With regards to treatment, an integrated practitioner response (between medical / pharmacological and psychosocial interventions) may be effective in dealing with the acute and chronic conditions that can be caused by synthetic cannabinoids.

There have also been reports that some users are feeling ‘wired’ and the drugs are having ‘stimulant-type’ effects on their body. This could be attributed to another chemical that they are unknowingly consuming or it might be the effects of a particular class of synthetic cannabinoid. There may be possible links to adrenaline and the fight or flight response that can be drawn out with users. Triggers, cravings and coping strategies could be explored and worked through in the same way as other stimulants, further research is needed in this area.

Stimulant-type drugs

Interventions and programmes for cocaine can be adapted and used for stimulant NPS (particularly the B-ketones, the functional group mephedrone and other cathinones belong to) and as such mephedrone has been covered in this manual.

The piperazines stimulate the central nervous system and have less empathic effects than MDMA. This family of drugs are closer to classic stimulants such as amphetamine and problems could be treated in the same way.

Adapted stimulant responses could also be explored for hallucinogens that stimulate the central nervous system (psychedelic stimulants such as AMT or 2C-B-FLY). In some respects hallucinations are themselves caused by a stimulation of the senses and many of the issues related to panic attacks and 'flashbacks' have links to adrenaline.

Hallucinogens

The use of LSD has not been associated with dependence or any recognised withdrawal syndrome. LSD does not appear to show classic patterns of tolerance but rather tachyphylaxis, this means it loses its desired effect if taken two days in a row.

DMT, ketamine and possibly methoxetamine appear to be an exception to this rule. Though these drugs are potent hallucinogens they have a brief duration of action and a brief duration of tachyphylaxis. This enables users to have the desired effects multiple times a day.

Ketamine has a psychological dependency potential and many other short-acting hallucinogens may also possess this quality. Ketamine has been more widely used than DMT or methoxetamine in the UK, it has caused serious damage to bladders and a number of deaths through accident. With long-term use of ketamine, hallucinations (the 'k hole') become harder to experience and the drug starts to affect the body as if it were a stimulant. Long-term use can lead to anxiety, agitation, panic attacks and users feeling 'wired'. Many of the stimulant treatment tools in this handbook could possibly be adapted for ketamine in these cases, again further research is needed in this area.

Opiates and benzodiazepines

Currently the prevalence of new synthetic opiates are limited in the UK, however, the use of new benzodiazepines have reportedly increased over the past few years. Opiates and benzodiazepines already have an established treatment response and many of these drugs would fall into current clinical management.

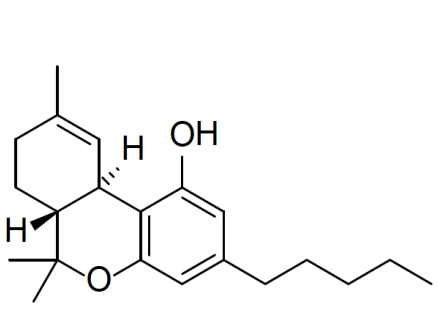
10. Appendix

Chemical classification

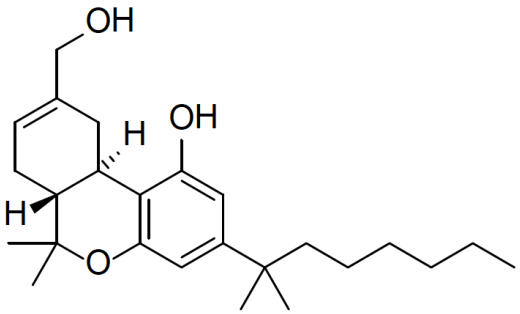
Synthetic cannabinoids can be classified into the following main groups:

1. Classical cannabinoids

Tetrahydrocannabinol, other chemical constituents of cannabis and structurally related synthetic analogues, e.g. HU-210, O-1184, AM-411, AM-906



THC

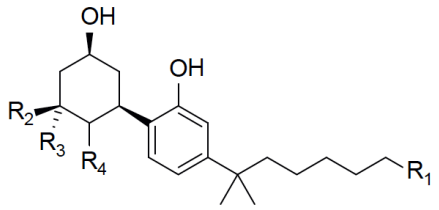


HU-210

Name	*Chemical name*	*CAS No*	*Molecular formula*
THC *Synonym:* Δ9-Tetrahydrocannabinol	(6a*R*,10a*R*)-6a,7,8,10a-tetrahydro-6,6,9-trimethyl-3-pentyl-6*H*-dibenzo[*b*,*d*]pyran-1-ol	1972-08-3	$C_{21}H_{30}O_2$
HU-210 *Synonym:* 11-Hydroxy-Δ8-THC-DMH	(6a*R*,10a*R*)-6a,7,10,10a-tetrahydro-6,6-dimethyl-9-(hydroxymethyl)-3-(2-methyloctan-2-yl)-6*H*-dibenzo[*b*,*d*]pyran-1-ol	112830-95-2	$C_{25}H_{38}O_3$

2. Non-classical cannabinoids

Cyclohexylphenols or 3-arylcyclohexanols, e.g. CP-55,244, CP-55,940, CP-47,497 (and C6-9 homologues)



CP-47,497 (R_2=R_3=R_4=H, R_1=methyl)

CP-47,497-C6 (R_1=R_2=R_3=R_4=H)

CP-47,497-C8 (R_2=R_3=R_4=H, R_1=ethyl)

CP-47,497-C9 (R_2=R_3=R_4=H, R_1=propyl)

CP-55,940 (R_2=R_3=H, R_1=CH_3, R_4=3-hydroxypropyl)

Dimethyl CP-47,497-C8 (R_2=R_3=CH_3, R_4=H, R_1=ethyl)

Name	*Chemical name*	*CAS No*	*Molecular formula*
CP-47,497	*rel*-2[(1*S*,3*R*)-3-hydroxycyclohexyl]-5-(2-methyloctan-2-yl)phenol	70434-82-1	$C_{21}H_{34}O_2$
CP-47,497-C6	*rel*-2[(1*S*,3*R*)-3-hydroxycyclohexyl]-5-(2-methylheptan-2-yl)phenol	not available	$C_{20}H_{32}O_2$
CP-47,497-C8 *Synonym:* Cannabicyclohexanol	*rel*-2-[(1*S*,3*R*)-3-hydroxycyclohexyl]-5-(2-methylnonan-2-yl)phenol	70434-92-3	$C_{22}H_{36}O_2$
CP-47,497-C9	*rel*-2[(1*S*,3*R*)-3-hydroxycyclohexyl]-5-(2-methyldecan-2-yl)phenol	not available	$C_{23}H_{38}O_2$
CP-55,940	*rel*-2-[(1*R*,2*R*,5*R*)-5-hydroxy-2-(3-hydroxypropyl)cyclohexyl]-5-(2-methyloctan-2-yl)phenol	83003-12-7	$C_{24}H_{40}O_3$
Dimethyl CP-47,497-C8	*rel*-2-[(1*S*,3*R*)-3-hydroxy-5,5-dimethylcyclohexyl]-5-(2-methylnonan-2-yl)phenol	not available	$C_{24}H_{40}O_2$

3. Hybrid cannabinoids

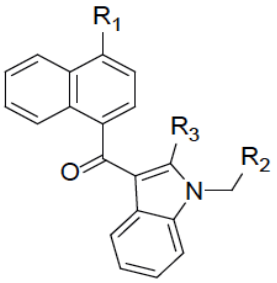
Combinations of structural features of classical and non-classical cannabinoids, e.g. AM-4030

4. Aminoalkylindoles

The aminoalkylindoles are by far the most prevalent class of synthetic cannabinoids found in herbal products as they are easier to make, compared to the other compounds.

(a) Naphthoylindoles (e.g. JWH-015, JWH-018, JWH-073, JWH-081, JWH-122, JWH-200, JWH-210, JWH-398)

(a) Naphthoylindoles



R_2=butyl, R_3=H
JWH-081 (R_1=methoxy)
JWH-122 (R_1=methyl)
JWH-210 (R_1=ethyl)
JWH-387 (R_1=Br)
JWH-398 (R_1=Cl)
JWH-412 (R_1=F)

R_1=R_3=H
AM-1220 (R_2=1-methylpiperidin-2-yl)
AM-2201 (R_2=4-fluorobutyl)
AM-2232 (R_2=butanenitrile)
JWH-018 (R_2=butyl)
JWH-019 (R_2=pentyl)
JWH-020 (R_2=hexyl)
JWH-022 (R_2=3-buten-1-yl)
JWH-072 (R_2=ethyl)
JWH-073 (R_2=propyl)
JWH-200 (R_2=4-morpholinylmethyl)

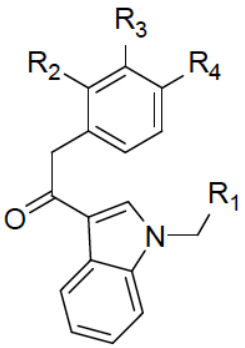
JWH-007 (R_1=H, R_2=butyl, R_3=methyl)
JWH-015 (R_1=H, R_2=ethyl, R_3=methyl)
JWH-073 4-methylnaphthyl (R_1=methyl, R_2=propyl, R_3=H)
MAM-2201 (R_1=methyl, R_2=4-fluorobutyl, R_3=H)

Name	*Chemical name*	*CAS No*	*Molecular formula*
AM-1220	(naphthalen-1-yl)[1-[(1-methylpiperidin-2-yl)methyl]-1*H*-indol-3-yl]methanone	137642-54-7	$C_{26}H_{26}N_2O$
AM-1220 azepane isomer	(naphthalen-1-yl)[1-(1-methylazepan-3-yl)-1*H*-indol-3-yl]methanone	not available	$C_{26}H_{26}N_2O$
AM-2201	(naphthalen-1-yl)[1-(5-fluoropentyl)-1*H*-indol-3-yl]methanone	335161-24-5	$C_{24}H_{22}FNO$
AM-2232	5-(3-(1-naphthoyl)-1*H*-indol-1-yl) pentanenitrile	335161-19-8	$C_{24}H_{20}N_2O$
JWH-007	(naphthalen-1-yl)(2-methyl-1-pentyl-1*H*-indol-3-yl)methanone	155471-10-6	$C_{25}H_{25}NO$
JWH-015	(naphthalen-1-yl)(2-methyl-1-propyl-1*H*-indol-3-yl)methanone	155471-08-2	$C_{23}H_{21}NO$
JWH-018 *Synonym:* AM678	(naphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	209414-07-3	$C_{24}H_{23}NO$
JWH-019	(naphthalen-1-yl)(1-hexyl-1*H*-indol-3-yl) methanone	209414-08-4	$C_{25}H_{25}NO$
JWH-020	(naphthalen-1-yl)(1-heptyl-1*H*-indol-3-yl)methanone	209414-09-5	$C_{26}H_{27}NO$
JWH-022	(naphthalen-1-yl)[1-(pent-4-en-1-yl)-1*H*-indol-3-yl]methanone	209414-16-4	$C_{24}H_{21}NO$

JWH-072	(naphthalen-1-yl)(1-propyl-1*H*-indol-3-yl)methanone	209414-06-2	$C_{22}H_{19}NO$
JWH-073	(naphthalen-1-yl)(1-butyl-1*H*-indol-3-yl) methanone	208987-48-8	$C_{23}H_{21}NO$
JWH-073 (4-methylnaphthyl) *Synonym:* JWH 122 N-butyl analogue	(4-methylnaphthalen-1-yl)(1-butyl-1*H*-indol-3-yl)methanone	1354631-21-2	$C_{24}H_{23}NO$
JWH-081	(4-methoxynaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	210179-46-7	$C_{25}H_{25}NO_2$
JWH-122 [5]	(4-methylnaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	619294-47-2	$C_{25}H_{25}NO$
JWH-200 *Synonym:* WIN 55,225	(naphthalen-1-yl)[1-[2-(morpholin-4-yl) ethyl]-1*H*-indol-3-yl]methanone	103610-04-4	$C_{25}H_{24}N_2O_2$
JWH-210	(4-ethylnaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	824959-81-1	$C_{26}H_{27}NO$
JWH-387	(4-bromonaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	207227-49-4	$C_{24}H_{22}BrNO$
JWH-398	(4-chloronaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	1292765-18-4	$C_{24}H_{22}ClNO$
JWH-412	(4-fluoronaphthalen-1-yl)(1-pentyl-1*H*-indol-3-yl)methanone	1364933-59-4	$C_{24}H_{22}FNO$
MAM-2201 *Synonyms:* JWH-122 (5-fluoropentyl); AM-2201 4-methylnaphthyl analogue	(4-methylnaphthalen-1-yl)[1-(5-fluoropentyl)-1*H*-indol-3-yl]methanone	1354631-24-5	$C_{25}H_{24}FNO$

(b) Phenylacetylindoles (e.g. JWH-250, JWH-251)

(b) Phenylacetylindoles



R_3=R_4=H

Cannabipiperidiethanone (R_1=1-methylpiperidin-2-yl, R_2=methoxy)

JWH-203 (R_1=butyl, R_2=Cl)

JWH-250 (R_1=butyl, R_2=methoxy)

JWH-251 (R_1=butyl, R_2=methyl)

RCS-8 (R_1=cyclohexylmethyl, R_2=methoxy)

R_1=butyl, R_2=H

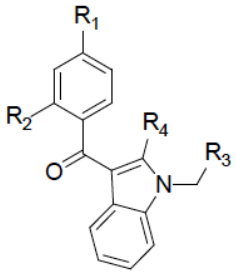
JWH-201 (R_3=H, R_4=methoxy)

JWH-302 (R_3=methoxy, R_4=H)

Name	*Chemical name*	*CAS No*	*Molecular formula*
Cannabipiperidiethanone *Synonym:* JWH-250 1-(2-methylene-*N*-methyl-piperidyl) derivative	2-(2-methoxyphenyl)-1-[1-[(1-methylpiperidin-2-yl) methyl]-1*H*-indol-3-yl] ethanone	1345970-43-5	$C_{24}H_{28}N_2O_2$
JWH-201 *Synonym:* para-JWH-250	2-(4-methoxyphenyl)-1-(1-pentyl-1*H*-indol-3-yl) ethanone	864445-47-6	$C_{22}H_{25}NO_2$
JWH-203	2-(2-chlorophenyl)-1-(1-pentyl-1*H*-indol-3-yl) ethanone	864445-54-5	$C_{21}H_{22}ClNO$
JWH-250	2-(2-methoxyphenyl)-1-(1-pentyl-1*H*-indol-3-yl) ethanone	864445-43-2	$C_{22}H_{25}NO_2$
JWH-251	2-(2-methylphenyl)-1-(1-pentyl-1*H*-indol-3-yl) ethanone	864445-39-6	$C_{22}H_{25}NO$
JWH-302 *Synonym:* meta-JWH-250	2-(3-methoxyphenyl)-1-(1-pentyl-1*H*-indol-3-yl) ethanone	864445-45-4	$C_{22}H_{25}NO_2$
RCS-8 *Synonyms:* SR-18; BTM-8	2-(2-methoxyphenyl)-1-(1-(2-cyclohexylethyl)-1*H*-indol-3-yl)ethanone	1345970-42-4	$C_{25}H_{29}NO_2$

(c) Benzoylindoles (e.g. pravadoline, AM-694, RSC-4)

(c) Benzoylindoles



AM-694 (R_1=R_4=H, R_2=I, R_3=4-fluorobutyl)
AM-694 chloro derivative (R_1=R_4=H, R_2=I, R_3=4-chlorobutyl)
AM-2233 (R_1=R_4=H, R_2=I, R_3=1-methylpiperidin-2-yl)
RCS-4 (R_1=methoxy, R_2=R_4=H, R_3=butyl)
RCS-4-ortho isomer (R_1=R_4=H, R_2=methoxy, R_3=butyl)
RCS-4 butyl homolog (R_1=methoxy, R_2=R_4=H, R_3=propyl)
WIN 48,098 (R_1=methoxy, R_2=H, R_3=4-morpholinylmethyl, R_4=methyl)

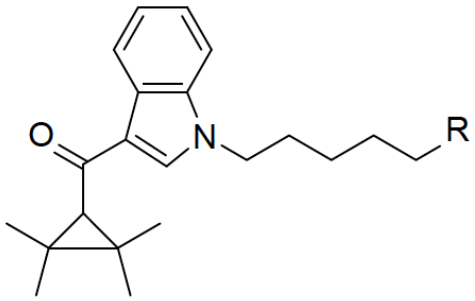
Name	*Chemical name*	*CAS No*	*Molecular formula*
AM-694	(2-iodophenyl)[1-(5-fluoropentyl)-1*H*-indol-3-yl]methanone	335161-03-0	$C_{20}H_{19}FINO$
AM-694 (chloro derivative)	(2-iodophenyl)[1-(5-chloropentyl)-1*H*-indol-3-yl]methanone	not available	$C_{20}H_{19}ClINO$
AM-2233	(2-iodophenyl)[1-[(1-methylpiperidin-2-yl)methyl]-1*H*-indol-3-yl]methanone	444912-75-8	$C_{22}H_{23}IN_2O$
RCS-4 *Synonyms:* SR-19; OBT-199; BTM-4; E-4	(4-methoxyphenyl)(1-pentyl-1*H*-indol-3-yl)methanone	1345966-78-0	$C_{21}H_{23}NO_2$
RCS-4 ortho isomer *Synonym:* RCS-4 2-methoxy isomer	(2-methoxyphenyl)(1-pentyl-1*H*-indol-3-yl)methanone	not available	$C_{21}H_{23}NO_2$
RCS-4 butyl homologue	(4-methoxyphenyl)(1-butyl-1*H*-indol-3-yl)methanone	not available	$C_{20}H_{21}NO_2$
WIN 48,098 *Synonym:* Pravadoline	(4-methoxyphenyl)[(2-methyl)-1-[2-(morpholin-4-yl)ethyl]-1*H*-indol-3-yl]methanone	92623-83-1	$C_{23}H_{26}N_2O_3$

(d) Naphthylmethylindoles (e.g. JWH-175)

No compounds have been seized yet in this category.

(e) Cyclopropoylindoles (e.g. UR-144, XLR-11)

(e) Cyclopropoylindoles



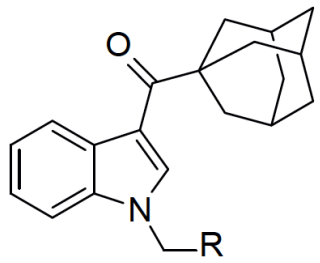
R=H
UR-144

R=F
XLR-11

Name	*Chemical name*	*CAS No*	*Molecular formula*
UR-144 *Synonym:* KM-X1	(2,2,3,3-tetramethylcyclopropyl)(1-pentyl-1*H*-indol-3-yl)methanone	1199943-44-6	$C_{21}H_{29}NO$
XLR-11 *Synonyms:* 5-FUR-144, 5-fluoro UR-144	(2,2,3,3-tetramethylcyclopropyl)(1-(5-fluoropentyl)-1*H*-indol-3-yl)methanone	1364933-54-9	$C_{21}H_{28}FNO$

(f) Adamantoylindoles (e.g. AB-001, AM-1248)

(f) Adamantoylindoles



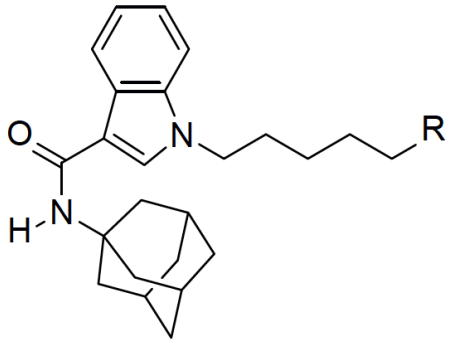
R=butyl
AB-001

R=1-methylpiperidin-2-yl
AM-1248

Name	*Chemical name*	*CAS No*	*Molecular formula*
AB-001 *Synonym:* JWH-018 (adamantyl)	(1-adamantyl)(1-pentyl-1*H*-indol-3-yl)methanone	1345973-49-0	$C_{24}H_{31}NO$
AM-1248	(1-adamantyl)[1-[(1-methylpiperidin-2-yl)methyl]-1*H*-indol-3-yl]methanone	335160-66-2	$C_{26}H_{34}N_2O$

(g) Indole carboxamides (e.g. APICA, STS-135)

(g) Indole carboxamides

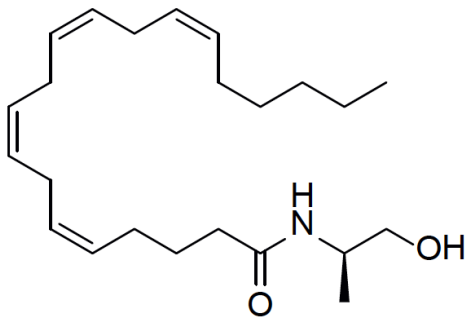


R=H
APICA

R=F
STS-135

Name	*Chemical name*	*CAS No*	*Molecular formula*
APICA *Synonyms:* 2NE1; JWH 018 adamantyl carboxamide	*N*-(1-adamantyl)-1-pentyl-1*H*-indol-3-carboxamide	1345973-50-3	$C_{24}H_{32}N_2O$
STS-135 *Synonym:* 5-fluoro APICA	*N*-(1-adamantyl)-1-(5-fluoropentyl)-1*H*-indol-3-carboxamide	1354631-26-7	$C_{24}H_{31}FN_2O$

5. Eicosanoids (e.g. methanandamide AM-356)

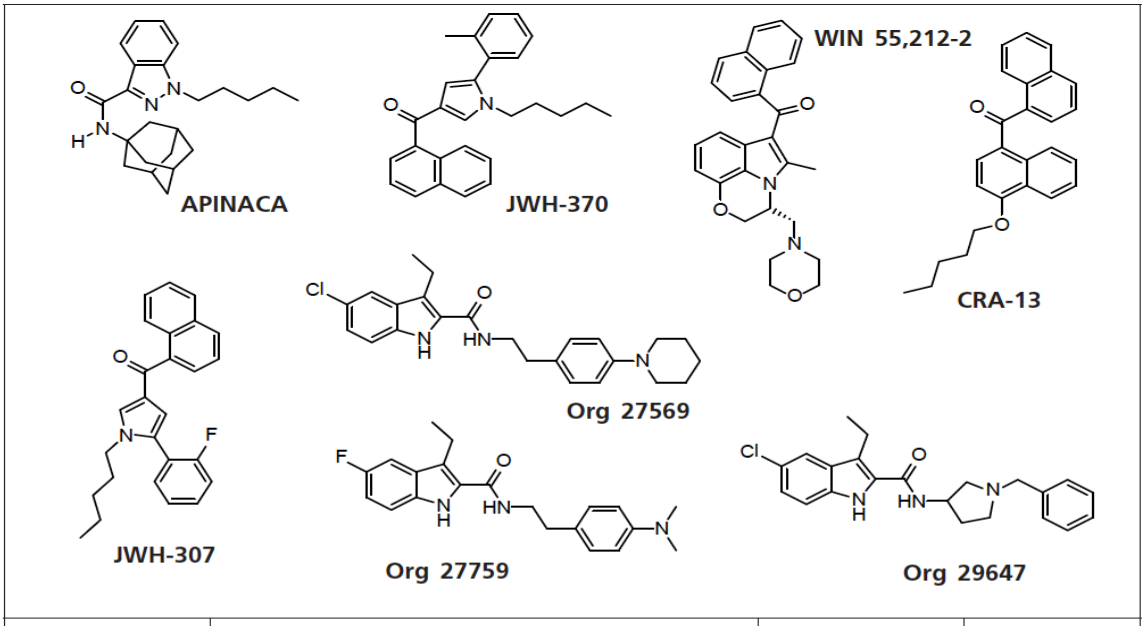


AM-356

Name	*Chemical name*	*CAS No*	*Molecular formula*
AM-356 *Synonym:* Methanandamide	*N*-(2-hydroxy-1*R*-methylethyl)-5*Z*,8*Z*,11*Z*,14*Z*-eicosatetraenamide	157182-49-5	$C_{23}H_{39}NO_2$

6. Others

Diarylpyrazoles (e.g. Rimonabant®), naphthoylpyrroles (e.g. JWH-307, [21, 22]), naphthylmethylindenes (e.g. JWH-176) and indazole carboxamides (e.g. APINACA)



Name	*Chemical name*	*CAS No*	*Molecular formula*
APINACA *Synonym:* AKB48	*N*-(1-adamantyl)-1-pentyl-1*H*-indazole-3-carboxamide	1345973-53-6	$C_{23}H_{31}N_3O$
CRA-13 *Synonyms:* CB-13; SAB-378	(naphthalen-1-yl)(4-pentyloxynaphthalen-1-yl)methanone	432047-72-8	$C_{26}H_{24}O_2$
JWH-307	(naphthalen-1-yl)(5-(2-fluorophenyl)-1-pentyl-1*H*-pyrrol-3-yl)methanone	914458-26-7	$C_{26}H_{24}FNO$
JWH-370	(naphthalen-1-yl)[5-(2-methylphenyl)-1-pentyl-1*H*-pyrrol-3-yl]methanone	914458-22-3	$C_{27}H_{27}NO$
Org 27569	5-chloro-3-ethyl-1*H*-indol-2-carboxylic acid [2-(4-piperidin-1-ylphenyl)ethyl] amide	868273-06-7	$C_{24}H_{28}ClN_3O$
Org 27759	5-fluoro-3-ethyl-1*H*-indol-2-carboxylic acid [2-(4-dimethylaminophenyl)ethyl] amide	868273-09-0	$C_{21}H_{24}FN_3O$
Org 29647	5-chloro-3-ethyl-1*H*-indol-2-carboxylic acid (1-benzylpyrrolidin-3-yl)amide	not available	$C_{22}H_{24}ClN_3O$
WIN-55,212-2	(naphthalen-1-yl)[(3*R*)-2,3-dihydro-5-methyl-3-(4-morpholinylmethyl)pyrrolo[1,2,3-de]-1,4-benzoxazin-6-yl]methanone	131543-23-2	$C_{27}H_{26}N_2O_3$

Source: “Recommended methods for the Identification and Analysis of Synthetic Cannabinoid Receptor Agonists in Seized Materials” United Nations Office on Drugs and Crime, Vienna 2013

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The information in this pack was taken from a variety of sources and written from a drug workers perspective. It is not meant to be a definitive document and the author would advise that information be constantly checked as it can become out of date very quickly.

12. Contact details

Please contact Tony D'Agostino on the following:

Website: www.tonydagostino.co.uk

Email: tonydaguk@gmail.com

@tonydaguk

https://www.linkedin.com/company/td-consultancy

https://www.facebook.com/tdconsultancy

https://plus.google.com/+drugtraining-UK/