Terminology and Information on Drugs

Third edition
ACKNOWLEDGEMENTS

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PREFACE

The UNODC publication *Terminology and Information on Drugs* introduces basic concepts and materials on substances under international control, which are most frequently manufactured or processed and/or abused, as well as definitions of scientific terms used in this context. The current revision of this publication is being prepared as a response to changes in drug markets and scheduling decisions of the Commission on Narcotic Drugs in recent years.

The publication is neither exhaustive, nor meant to replace more comprehensive textbooks on drugs of abuse. It seeks to collate basic concepts and information on drugs of abuse, their corresponding abuse patterns, pharmacological effects and potential medical use, and act as an accessible and user-friendly resource. The format of this publication is kept simple to allow for brevity. Comments and suggestions for improving content and/or format of this publication by readers are welcome.

**Explanatory note**

1. Lists of common substances, illicit forms and street names are not extensive listings, but selections. Street names can be ambiguous, and should not be relied upon to characterize a given drug.
2. Sections on chemical constituents of cannabis plant, coca bush and opium poppy are not comprehensive listings, but focus on those substances which are of interest from a drug control point of view. For more detailed chemical information on the substances, the reader is directed to the information mentioned in the monographs of the *Multilingual Dictionaries*¹ and the *Clandestine Manufacture of Substances under International Control* (ST/NAR/10/REV.3) manual.
3. The mechanism of action and resulting effects listed are a summary of the most widely recognized desired effects, undesired acute effects and effects due to chronic use of a given substance or group of substances.
4. In order to make the publication more accessible, related information has been displayed in similar tabular forms across each chapter. The following sample shows the format of these tables.

¹ *Multilingual Dictionary of Narcotic Drugs and Psychotropic Substances under International Control*, United Nations publication, 2006 (Sales No. M.06.XI.16).
² *Multilingual Dictionary of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances under International Control*, United Nations publication, 2015 (ST/NAR/1A*/Rev.1).
Sample formats of tables

### Common street names

<table>
<thead>
<tr>
<th>Bazooka</th>
<th>Coco</th>
<th>Mister Coffee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big C</td>
<td>Coke</td>
<td>Nose candy</td>
</tr>
<tr>
<td>Blanche</td>
<td>Crack</td>
<td>Shake</td>
</tr>
<tr>
<td>Blow</td>
<td>Dust</td>
<td>Snow</td>
</tr>
<tr>
<td>Cake</td>
<td>Flake</td>
<td>Star dust</td>
</tr>
<tr>
<td>Cane</td>
<td>Koks</td>
<td>Toot</td>
</tr>
<tr>
<td>Charlie</td>
<td>Lady</td>
<td>White lady</td>
</tr>
</tbody>
</table>

### Commonly used forms of substances and their route of administration

<table>
<thead>
<tr>
<th>Cocaine base</th>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine base</td>
<td>White or off-white crystalline powder with a characteristic odour</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Crack</td>
<td>Hard white rocks</td>
<td>Inhalation</td>
</tr>
</tbody>
</table>

### Mechanism of action and resulting effects

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of physical and mental well-being, exhilaration, euphoria</td>
<td>Increased heart rate and blood pressure, faster breathing</td>
<td>Strong psychological dependence</td>
</tr>
<tr>
<td>Increased alertness and energy</td>
<td>Increased body temperature, sweating</td>
<td>Development of tolerance</td>
</tr>
<tr>
<td>Suppression of hunger</td>
<td>Vasoconstriction, local anaesthesia</td>
<td>Destruction of tissues in nose if insufflated</td>
</tr>
</tbody>
</table>

| | | Chronic bronchitis if smoked |
SCHEDULING OF SUBSTANCES

The schedules in the international drug control treaties were established to classify internationally applicable control measures that would ensure the availability of certain substances for medical and scientific purposes, while preventing their diversion into illicit channels.

In the Single Convention on Narcotic Drugs of 1961, as amended by the 1972 Protocol, narcotic drugs and their preparations are essentially listed in four schedules according to their dependence potential, abuse liability and therapeutic usefulness (figure 1) [1].

Figure 1. Single Convention on Narcotic Drugs of 1961

---

SCHEDULE I
Substances that are highly addictive and liable to abuse, or are convertible into drugs that are similarly addictive and liable to abuse
(e.g. cannabis, heroin, methadone, opium)

SCHEDULE II
Substances that are less addictive and liable to abuse than those in Schedule I
(e.g. codeine and its derivatives)

SCHEDULE III
Preparations containing narcotic drugs that are intended for medical use and are unlikely to be abused
(e.g. preparations of codeine, dihydrocodeine, propriam)

SCHEDULE IV
Certain drugs listed in Schedule I that are highly addictive and liable to abuse and rarely used in medical practice
(e.g. cannabis, heroin)

---

1 See E/CN.7/2014/10
In the Convention on Psychotropic Substances of 1971, control measures are categorized in four schedules, depending on the relationship between the therapeutic usefulness and the public health risk of the substances. The four schedules use a sliding scale of those two variables: inclusion in Schedule I implies high public health risk and low therapeutic utility, and therefore the strictest control measures, whereas inclusion in Schedule IV implies the opposite: lower public health risk and higher therapeutic utility (see figure 2).

**Figure 2. Convention on Psychotropic Substances of 1971**

<table>
<thead>
<tr>
<th>SCHEDULE I</th>
<th>SCHEDULE II</th>
<th>SCHEDULE III</th>
<th>SCHEDULE IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Substances presenting a high risk of abuse, posing a particularly serious threat to public health, which are of very little or no therapeutic value</strong></td>
<td><strong>Substances presenting a risk of abuse, posing a serious threat to public health, which are of low or moderate therapeutic value</strong> (e.g. amphetamine and amphetamine-type stimulants)</td>
<td><strong>Substances presenting a risk of abuse, posing a serious threat to public health, which are of moderate or high therapeutic value</strong> (e.g. barbiturates, including amobarbital, buprenorphine)</td>
<td><strong>Substances presenting a risk of abuse, posing a minor threat to public health, with a high therapeutic value</strong> (e.g. sedatives/hypnotics and stimulants, including allobarbital, diazepam, aminorex, pyrovalerone)</td>
</tr>
</tbody>
</table>

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“Cannabis” means the flowering or fruiting tops of the cannabis plant (excluding the seeds and leaves when not accompanied by the tops) from which the resin has not been extracted, by whatever name they may be designated [2].

Cannabis contains a number of chemical substances, however the most predominant and only psychoactive substance is (-)-trans-\(\delta\)-9-tetrahydrocannabinol (\(\delta\)-9-THC or THC).

**MAJOR CANNABINOIDS**

- Tetrahydrocannabinol (THC)
- Cannabidiol (CBD)
- Cannabinol (CBN)
1.1 CANABIS PRODUCTS

Cannabis plant

“Cannabis plant” means any plant of the genus Cannabis [2]. The cannabis plant, Cannabis sativa L. is a single species but is divided into several subspecies; sativa, indica and ruderalis. The cannabis plant, however, exists in many different biological, chemical or morphological varieties.

As a “dioecious” species, the plant can be staminate (male) or pistillate (female). However, there are individual cases of “monoecious” plants or hermaphrodites, where both sexes coexist on one plant. The term “cannabis” is also generally used to describe different products obtained from the cannabis plant.

Cannabis (herb)

Cannabis (herb) is a green or brown dried material, which is listed in Schedule I and IV of the Single Convention on Narcotic Drugs of 1961.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose material (in a small roll wrapped in paper or onto sticks)</td>
<td>Inhalation (smoking, vaporization)</td>
</tr>
<tr>
<td>Ground material (melted in butter, producing “cannabutter” for “hash brownies”, or “space-cake”; or infused with hot water as a drink)</td>
<td>Oral consumption</td>
</tr>
</tbody>
</table>

Cannabis resin

“Cannabis resin” means the separated resin, whether crude or purified, obtained from the cannabis plant [2]. Characteristically, cannabis resin is the dried brown or black resinous secretion of the flowering tops of the cannabis plant. Cannabis resin is placed under Schedule I and IV of the Single Convention on Narcotic Drugs of 1961.
**Production**

There are a variety of processes and procedures used in different parts of the world to extract and concentrate cannabis resin. For example, in South and South-West Asia, the following techniques are traditionally used:

- The fruiting and flowering tops are rubbed between the palms of the hand, and resin is transferred to the palm.
- Alternatively, the sticky parts of the plant are brushed against rubber sheets, where the resin accumulates.
- The dried herbal material can also be crushed into a powder, exposed to the sun for the resin to melt and later kneaded with wooden rods.
- Another technique is to immerse the plant material in boiling water and remove resin from the surface.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine powder (also compressed into slabs)</td>
<td>Inhalation—either alone, or mixed with tobacco</td>
</tr>
<tr>
<td>Loose or pressed sticky powder</td>
<td>Oral consumption (in the form of food and tea)</td>
</tr>
<tr>
<td>Resin pressed or rolled into slabs, rods, balls or other shapes</td>
<td></td>
</tr>
</tbody>
</table>

**Cannabis oil**

Cannabis oil is obtained by extraction of the crude plant material, cannabis, or cannabis resin with an organic solvent. The extract is then filtered and evaporated to give an oil of required consistency. It is tar-like reddish to brown or green viscous liquid with high levels of THC.
Commonly used forms

<table>
<thead>
<tr>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscous liquid</td>
</tr>
</tbody>
</table>

- Inhalation—where 1-2 drops are put on tobacco, or used within a vaporizer
- Oral consumption

Production of cannabis, cannabis resin and oil

- **Cannabis plant**
  - **Harvesting or drying**
- **Cannabis**
  - “flowering or fruiting tops of the cannabis plant”
  - **Threshing or rubbing**
- **Cannabis resin**
  - “sticky brown substance from flowering tops”
  - **Extract with solvent**
- **Cannabis oil**
  - **Extract with solvent**

**POTENCY**

- **THC content (%)**
  - 0.5-5
  - 2-20
  - 10-30

**Common street names**

- Butane hash oil
- Honey oil
- Red oil

Cannabis resin and oil
The THC content of cannabis varies according to the part of the plant and a number of external factors in particular the cultivation conditions and techniques used. In recent years, as a result of advances in plant selection and cultivation, which includes the use of cloning and indoor hydroponic cultivation (growing plants without soil in water or sand in an artificial environment), the content of THC in cannabis has been reported to be as high as 20 per cent by weight in certain countries [3, 4]. The average percentage of THC in cannabis grown under these conditions is generally lower. Cannabis grown using traditional methods or less advanced techniques produces even lower percentages of THC [3, 4].

**Medical use**

Products that are currently medically approved for therapeutic use include:

- Nabiximol (Sativex®), a liquid cannabis extract of THC and cannabidiol, which is indicated for the treatment of pain and spasticity in multiple sclerosis.

- Dronabinol (Marinol®), a specific synthetic isomer of THC (under Schedule II of the Convention on Psychotropic Substances of 1971) [2], is indicated for the treatment of loss of appetite in patients with AIDS and for severe nausea and vomiting associated with cancer chemotherapy.

There are a variety of ongoing studies on other cannabinoid products for possible therapeutic uses.

**Mechanism of action and resulting effects**

The psychoactive effects of cannabis are mainly mediated through the activation of the cannabinoid type 1 receptors (CB1). Activation of these receptors regulates the release of multiple neurotransmitters. Different species of the cannabis plant can have different relative effects due to varying THC levels. Nonetheless, further research is needed to elucidate the full scope of the pharmacological effects and receptors involved.
<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sense of well-being, euphoria—a “high” feeling</td>
<td>• Increased heart rate</td>
<td>• Potential development of psychological dependence</td>
</tr>
<tr>
<td>• Merriment</td>
<td>• Impairment of cognitive development (learning), including associative processes, short-term memory, concentration and logical thinking</td>
<td>• Development of tolerance</td>
</tr>
<tr>
<td>• Relaxation</td>
<td>• Impairment of psychomotor performance (i.e. motor coordination, complex tasks)</td>
<td>• Possible mental health problems</td>
</tr>
<tr>
<td>• Enhancement of sensory experiences, i.e. more vivid sense of sight, smell, taste and hearing</td>
<td>• Potential anxiety, panic, paranoia, or acute psychosis</td>
<td>• Loss of drive and interest</td>
</tr>
<tr>
<td></td>
<td>• As effects subside, may lead to quietness, reflectiveness, depression or sleepiness</td>
<td>• May pose a risk of lung cancer, acute and chronic bronchitis, lung inflammation, impaired pulmonary defence, and other lung diseases</td>
</tr>
<tr>
<td></td>
<td>• Reddening of eyes</td>
<td>• Exacerbation of psychosis or schizophrenia in vulnerable individuals</td>
</tr>
<tr>
<td></td>
<td>• Perceptions of sound, colour, and other sensations may be distorted, thinking becomes slow and confused</td>
<td>• Severe risks during use in pregnancy, e.g. impaired foetal development (a reduction in birth weight) or postnatal issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Potential development of cannabinoid hyperemesis syndrome*</td>
</tr>
</tbody>
</table>

*Cannabinoid Hyperemesis Syndrome (CHS) is a clinical condition of cyclic episodes of nausea, vomiting and abdominal pain, which is caused by long-term or chronic use of cannabinoids*
Early analyses of the main psychoactive component of cannabis, delta-9-THC, led to the discovery of endogenous cannabinoid receptors in 1988. The cannabinoid receptor type 1 (CB₁) was first cloned in 1990, whereas CB₂ was cloned in 1993. Presently, it is known that cannabinoids bind to and activate the CB₁ and CB₂ receptors and pharmacological effects are mediated through them. CB1 is mainly located in the central nervous system (CNS), the brain and thalamus, while CB₂ is found outside of the CNS, more peripherally, in the spleen and cells of the immune system.

The comprehensive role of receptors in this context in producing pharmacological effects is not yet known. However, the activation of these receptors possibly results in a number of overlapping effects, as shown in the figure below.
2. Synthetic Cannabinoid Receptor Agonists

Synthetic cannabinoid receptor agonists (SCRAs) are substances with structural features, which allow binding to one of the known cannabinoid receptors. Many of the substances in this structurally diverse group were initially designed for pharmacological research as potential pharmaceuticals to mimic the effects of cannabis. However, none are currently licensed for medical use.
In the mid 2000s products containing SCRAs appeared in which the substances were added to plant material to mimic the herbal nature of cannabis. These products are sold as smokable “herbal blends” and “legal highs” under a variety of brand names such as “Spice”, “K2”, “Kronic” and are labelled as “not for human consumption”.

SCRAs pose a considerable risk to health for a number of reasons. Many of the substances that appear in these products can be much more potent than THC. Also the content of products can vary both in terms of the actual substance or mixture of substances present and their concentration(s). As of October 2015, over 200 different SCRAs have been reported to UNODC.

Two SCRAs, namely JWH-018 (Naphthalen-1-yl(1-pentyl-1H-indol-3-yl)methanone) and AM-2201 ([1-(5-fluoropentyl)-1H-indol-3-yl](naphthalen-1-yl)methanone), were placed under international control, following scheduling decisions of the 58th Commission on Narcotic Drugs (CND) in 2015 [2].

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbal mixture, i.e. liquid solution of substance, dissolved in organic solvent and sprayed onto plant material</td>
<td>Inhalation (including vaporization)</td>
</tr>
<tr>
<td>White crystalline solid</td>
<td>Oral consumption</td>
</tr>
<tr>
<td>Powder</td>
<td>• Nasal insufflation</td>
</tr>
<tr>
<td></td>
<td>• Oral consumption</td>
</tr>
<tr>
<td>Tablet</td>
<td>Oral consumption</td>
</tr>
</tbody>
</table>
2.1 MECHANISM OF ACTION AND RESULTING EFFECTS

JWH-018 and AM-2201 are both full agonists of the CB\textsubscript{1} cannabinoid receptor. However, a lot of the pharmacological information, including the long-term effects of these substances is still unknown. Studies of potency in humans do not exist and users do not know what they are consuming, often leading to wrong doses and severe side effects due to overdose.

While the pharmacological effects are similar to those caused by THC, a number of additional effects, which are specific to SCRAs, are also listed below.

**Undesired acute effects**

- Seizures (convulsions), loss of consciousness
- Vomiting, drowsiness, chest pain
- Agitation, hot flushes
- Dilation of pupils, dry mouth

---

**Common street names**

**JWH-018**
- Atomic Bomb
- Chillin XXX
- Dragon
- K2
- Monkees Go Bananas
- Rockstar
- Spice Head
- Spike 99
- Ultra
- Wasted

**AM-2201**
- Agent Orange
- Atomic Bomb
- Green
- Jamaican Gold Extreme
- Manga Xtreme
- New Bonzai
- XoXo

*Note: Brand named products of SCRAs can differ from packet to packet, often contain substances other than those advertised, and can include multiple substances.*
“Opium” means the coagulated juice of the opium poppy, where “opium poppy” means the plant of the species *Papaver somniferum* L. [2]. *Papaver somniferum* L. is a plant that grows in many countries around the world with moderate climates. It has white to red flowers and round to elongated capsules containing seeds which can range in colour from white to dark violet.
There are a number of psychoactive substances that can be extracted from opium, with morphine and codeine being the most predominant.

**MAJOR ALKALOIDS**

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>3.1 – 19.2</td>
</tr>
<tr>
<td>Codeine</td>
<td>0.7 – 6.6</td>
</tr>
<tr>
<td>Thebaine</td>
<td>0.2 – 10.6</td>
</tr>
<tr>
<td>Papaverine</td>
<td>&lt;0.1 – 9.0</td>
</tr>
<tr>
<td>Noscapine</td>
<td>1.4 – 15.8</td>
</tr>
</tbody>
</table>

*Opium seeds*

*Morphine*

*Codeine*
3.1 OPIUM PRODUCTS

Raw opium

Raw opium is a non-homogeneous material containing poppy capsule fragments. It is sticky, tar-like and dark brown when fresh, and becomes brittle and hard as it ages. Raw opium is produced by the air drying of opium.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticky or hard, dark brown material in any form or shape</td>
<td>• Oral consumption (chewed)</td>
</tr>
<tr>
<td></td>
<td>• Inhalation</td>
</tr>
<tr>
<td>Blocks wrapped in vegetable leaves followed by plastic wrapping</td>
<td>Oral consumption (chewed)</td>
</tr>
</tbody>
</table>

Production

Raw opium is harvested from the seed capsule of the poppy, while the capsule is still in the green stage. The opium latex is obtained by making a series of shallow incisions into the capsule, which allows the latex to run onto its surface and be collected.

Prepared opium

Prepared opium is a sticky dark product obtained as a result of various treatments of raw opium, e.g. water extraction, in order to make it suitable for smoking.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticky or hard, dark brown material in any form or shape</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Sticks in the form of cigarettes</td>
<td>Inhalation</td>
</tr>
</tbody>
</table>

Common street names

Ah-pen-yen  Noir(e)
Black Stuff O
Hop Tar
Mud
Medicinal opium

“Medicinal opium” means opium which has undergone the processes necessary to adapt it for medicinal use [2].

Common forms
Light yellowish-brown powder consisting of yellowish or reddish-brown particles.

Approved medical preparations of opium
Tincture
Fine brown powder
Pastilles
Syrup

Poppy straw

“Poppy straw” means all parts (except the seeds) of the opium poppy, after mowing [2], which includes the dried upper part of the stem and the capsules of the poppy plant.

Concentrate of poppy straw
The material arising when poppy straw has entered into a process for the concentration of its alkaloids, when such material is made available in trade [2].
3.2 OPIATES

Opiates are naturally occurring alkaloids of the opium poppy (*Papaver somniferum* L.), such as morphine, codeine, thebaine, etc. The term is often used interchangeably with opioids. However, opioids are synthetic compounds, which are derived from opiates but are not opiates themselves (see section 4). Opium, concentrate of poppy straw, morphine and heroin are under Schedule I of the Single Convention on Narcotic Drugs of 1961.

**Morphine**

Morphine is the most prevalent alkaloid extracted from opium or poppy straw. Its colour ranges from off-white to dark brown. Morphine can be found compressed into blocks with a variety of trademarks or names.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finely ground powder</td>
<td>Injection</td>
</tr>
<tr>
<td>Tablets</td>
<td>Oral consumption</td>
</tr>
</tbody>
</table>

**Heroin**

Heroin (diamorphine or diacetylmorphine) is a semi-synthetic opiate synthesized from morphine. There are two main types, namely the water soluble diacetylmorphine hydrochloride salt and the relatively water insoluble diacetylmorphine base and both can appear in a range of colours from white to brown.

Following injection, heroin is rapidly broken down in the blood to the pharmacologically active 6-monoacetylmorphine and then to morphine, the major active metabolite.

Compared to morphine, heroin is more fat-soluble (due to its two acetyl groups), and crosses the blood-brain barrier more rapidly, usually in 15-20 seconds, and achieves relatively higher levels in the brain following intravenous injection, with almost 70 per cent of the dose absorbed into the brain. Oral administration of heroin results in
extensive breakdown to morphine [8]. Heroin is approximately twice as potent as morphine and has a high potential for abuse.

There are four regions in the world that have reported the production of heroin, namely South-West Asia, South-East Asia, Central America and South America. As such there are a variety of names that are used to designate the heroin in its various stages of refinement/purification which depend on the complexity of the processes used. These can include, for example, brown heroin and black tar heroin. In South-East Asia for example, heroin can be distinguished into several classes and the following terms are used:

Commonly used forms

<table>
<thead>
<tr>
<th>Common street names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black tar</td>
</tr>
<tr>
<td>Boy</td>
</tr>
<tr>
<td>Chiva</td>
</tr>
<tr>
<td>Dope</td>
</tr>
<tr>
<td>Dragon</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>Hairy</td>
</tr>
<tr>
<td>Harry</td>
</tr>
<tr>
<td>Horse</td>
</tr>
<tr>
<td>Joy powder</td>
</tr>
<tr>
<td>Junk</td>
</tr>
<tr>
<td>Smack</td>
</tr>
<tr>
<td>Snow</td>
</tr>
<tr>
<td>White lady</td>
</tr>
<tr>
<td>White stuff</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heroin No. 2</th>
<th>Heroin base prior to its conversion to the hydrochloric salt: white to off-white, pale grey or dark brown, solid or powdered.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heroin No. 3</td>
<td>Smokable form of heroin. Hard granular material ranging from light brown to dark grey, red or pink at times. Heroin No. 3 can be 20-40 per cent pure, although it is often lower e.g. less than 10 per cent and containing adulterants such as caffeine.</td>
</tr>
<tr>
<td>Heroin No. 4</td>
<td>Injectable form of heroin. It is a white powder, with little odour. Purity is high and may reach up to 99 per cent heroin hydrochloride (however, street purity is variable depending on adulterants added).</td>
</tr>
</tbody>
</table>

The main methods for the use of heroin are injection, nasal insufflation and inhalation by smoking.
Medical use

Opium and opiates are still widely used in medicine to relieve symptoms of a variety of ailments. Morphine, for example, is used as an analgesic in cases of chronic pain management and for post-operative pain, while codeine is also used to treat a cough and mild to moderate pain. In some countries, heroin is also prescribed for pain management [9].

Mechanism of action and resulting effects (opium, morphine, heroin)

The pharmacological effects of morphine, heroin and other opiates are mediated through their interaction with opioid receptors and inhibitory neurotransmitters. Opioid receptors are responsible for triggering brain reward systems and producing analgesia (pain relief) by decreasing pain transmission. Different types of opioid receptors exist, among them are mu (µ) receptors, which mediate analgesic and behavioural effects.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sense of well-being and euphoria</td>
<td>• Drowsiness, inability to concentrate, apathy, lessened physical activity</td>
<td>• Rapid development of tolerance and physical and psychological dependence</td>
</tr>
<tr>
<td>• Warmth, contentment, relaxed detachment from emotional and physical distress</td>
<td>• Potential nausea and vomiting</td>
<td>• Damage of structures in nose if sniffed or snorted</td>
</tr>
<tr>
<td>• Analgesia (pain relief)</td>
<td>• Possible respiratory depression, which may lead to death</td>
<td>• Respiratory problems if smoked</td>
</tr>
<tr>
<td></td>
<td>• Potential stimulatory effects</td>
<td>• Malnutrition, weight loss</td>
</tr>
<tr>
<td></td>
<td>• Constriction of pupils</td>
<td>• Chronic sedation, apathy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Constipation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Menstrual irregularity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Withdrawal syndrome (cramps, diarrhoea, runny nose, tremors, panic, fever, chills, uncontrollable shaking and sweating, etc.)</td>
</tr>
</tbody>
</table>

Production of morphine and heroin*

*Poppy straw can be used as a source of crude morphine and codeine can be used to derive morphine base.
4. Opioids

Opioid is a generic term applied to opiates and their synthetic analogues, which can be semi- or fully synthetic, with actions similar to those of morphine. Therefore, opioids are commonly used as painkillers, for the treatment of acute and chronic pain, and as an anaesthetic during surgery. Synthetic opioids are structurally diverse, can be extremely potent, and include a variety of substances including a number of fentanyl derivatives, methadone, buprenorphine and AH-7921.
4.1 FENTANYLS

Fentanyl is a group of short-acting, highly potent synthetic opioids with narcotic analgesic properties. Thirteen fentanyl compounds (acetyl-alpha-methylfentanyl, alfentanil, alpha-methylfentanyl, alpha-methylthiofentanyl, beta-hydroxyfentanyl, beta-hydroxy-3-methylfentanyl, fentanyl, 3-methylfentanyl, 3-methylthiofentanyl, para-fluorofentanyl, remifentanil, sufentanil and thiofentanyl) are under Schedule I of the Single Convention on Narcotic Drugs of 1961. Of these, four (alfentanil, fentanyl, remifentanil and sufentanil) are currently approved for medical use. There are however a range of fentanyls that are produced clandestinely. They are often sold mixed with heroin, and can have severe repercussions for users as a result of their high potency.

4.2 METHADONE AND BUPRENORPHINE

Methadone and buprenorphine are long-acting, commonly used synthetic opioid therapeutic drugs for detoxification or maintenance therapy in opioid dependence. Both methadone and buprenorphine are on the WHO Model Lists of Essential Medicines [10], and are used to treat dependence [11], for example, opioid substitution treatment or HIV prevention in people who inject drugs.

4.3 AH-7921

AH-7921 is a synthetic opioid with analgesic opioid-like properties generally equipotent to morphine. Originally designed and investigated as a pharmaceutical opioid analgesic medicine, AH-7921 has not shown therapeutic applications and is not a licensed product.
4.4 MECHANISM OF ACTION AND RESULTING EFFECTS

The effects of synthetic opioids are mediated through their interaction with inhibitory neurotransmitters and opioid receptors, as is the case for opium and opiates (see section 3.2).

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Euphoria</td>
<td>• Respiratory depression, sedation</td>
<td></td>
</tr>
<tr>
<td>• Relaxation</td>
<td>• Nausea, vomiting</td>
<td></td>
</tr>
<tr>
<td>• Analgesia (pain relief)</td>
<td>• Dizziness, fatigue, headache</td>
<td></td>
</tr>
<tr>
<td>• Alertness</td>
<td>• Drowsiness, constipation, sweating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Anaemia, peripheral oedema</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Muscle rigidity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Development of dependence and tolerance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Potential cardiac arrest or severe anaphylactic reaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Withdrawal symptoms (sweating, anxiety, diarrhoea, bone pain, abdominal cramps, shivers or “goose flesh”)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Constipation</td>
<td></td>
</tr>
</tbody>
</table>

Common street names

**Fentanyls**
- Apache
- China white
- Drop dead
- Synthetic heroin

**Methadone**
- Chocolate-Chip Cookies
- Dollies
- Meth
- Wafers

**AH-7921**
- Doxylam
- Doxylan

**Buprenorphine**
- Bupe
- Subs
- Tems
5. Coca and Cocaine

5.1 COCA PRODUCTS

Coca bush

“Coca bush” means the plant of any species of the genus *Erythroxylon* [2].

The coca plant (e.g. *Erythroxylon coca, Erythroxylon novogranatense*) grows in tropical climates (500-2,500 metres above sea level) as a bush or tree. Its leaves can be harvested for about 20 years.

Coca leaf

“Coca leaf” means the leaf of the coca bush except leaf from which all ecgonine, cocaine and any other ecgonine alkaloids have been removed [2]. This definition is specific to the Single Convention on Narcotic Drugs of 1961.
Chemical constituents of coca

**MAIN ALKALOIDS**

- Cocaine (benzoylmethylecgonine)
- Cinnamoylcocaine
- Benzoylecgonine
- Methylecgonine
- Ecgonine

The amounts of the different alkaloids present in coca leaves depend on a number of factors, including the species, altitude at which the plant is grown, and age. The main psychoactive substance present in coca leaves is cocaine (benzoylmethylecgonine), which is generally present in the range of 0.3-1 per cent.

Coca paste

Coca paste is a crude extraction of the leaves of the coca bush. It contains coca alkaloids, 50-85 per cent cocaine and toxic impurities, such as sulphuric acid. Coca paste often contains aggregates, is damp and has a characteristic odour.
Street names for coca paste vary depending on the country of production and the form. A particular street name for coca paste can also refer to different products in different countries.

**Cocaine**

Cocaine is the main psychoactive alkaloid obtained from coca leaves. It is generally encountered in two forms which differ in their route of administration. Cocaine hydrochloride, which is insufflated or injected, and cocaine base, which is a smokable form.

Crack and freebase are terms used for different forms of cocaine base generated from purified cocaine hydrochloride through specific conversion processes to make them suitable for smoking. Inhalation of the heated vapours of cocaine base results in a quick onset of effects due to the rapid absorption of the substances in the lungs. However, inhalation of cocaine pyrolysis products can be toxic and cause respiratory problems.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cocaine base</strong></td>
<td></td>
</tr>
<tr>
<td>White or off-white</td>
<td>Inhalation</td>
</tr>
<tr>
<td>crystalline powder</td>
<td></td>
</tr>
<tr>
<td>with a characteristic odour</td>
<td></td>
</tr>
<tr>
<td><strong>Crack</strong></td>
<td></td>
</tr>
<tr>
<td>Hard white rocks</td>
<td>Inhalation</td>
</tr>
<tr>
<td><strong>Cocaine hydrochloride</strong></td>
<td></td>
</tr>
<tr>
<td>White or off-white</td>
<td></td>
</tr>
<tr>
<td>crystalline powder</td>
<td>• Nasal insufflation</td>
</tr>
<tr>
<td></td>
<td>• Injection (intravenous or subcutaneous, “skin popping”, however, this is rare)</td>
</tr>
</tbody>
</table>
from one laboratory to another; there are at least five reported methods for obtaining coca paste, cocaine base or cocaine hydrochloride. Illicit supplies of cocaine are often heavily adulterated with a variety of “cutting agents” and may contain as little as 10 per cent cocaine.

Production of cocaine

*Note: Street purity can be much lower

**Medical use**

Cocaine hydrochloride solutions offer limited use as a local anaesthetic, except in certain cases of ear, nasal or throat surgery [12]. More effective and less harmful alternatives, such as benzocaine, lidocaine, prilocaine or combinations of these substances, are more commonly used in medical practice [13].
**Mechanism of action and resulting effects**

The stimulatory properties of cocaine use are a result of its action on the dopamine, norepinephrine and serotonin neurotransmitter systems. To a certain extent, the effects of cocaine are similar to those of amphetamine and methamphetamine. However, cocaine has a more pronounced effect on the levels of dopamine than amphetamine or methamphetamine.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sense of physical and mental well-being, exhilaration, euphoria</td>
<td>• Increased heart rate and blood pressure, faster breathing</td>
<td>• Strong psychological dependence</td>
</tr>
<tr>
<td>• Increased alertness and energy</td>
<td>• Increased body temperature, sweating</td>
<td>• Development of tolerance</td>
</tr>
<tr>
<td>• Suppression of hunger</td>
<td>• Vasoconstriction, local anaesthesia</td>
<td>• Destruction of tissues in nose if insufflated</td>
</tr>
<tr>
<td></td>
<td>• Hyper-excitability, insomnia, restlessness, panic, erratic, sometimes violent behaviour.</td>
<td>• Chronic bronchitis if smoked</td>
</tr>
<tr>
<td></td>
<td>• May lead to convulsions, seizures, hallucinations, stroke, cerebral haemorrhage or heart failure</td>
<td>• Malnutrition, weight loss</td>
</tr>
<tr>
<td></td>
<td>• Dysphoria, tiredness, irritability and depression</td>
<td>• Disorientation, apathy, confusion, exhaustion due to lack of sleep</td>
</tr>
<tr>
<td></td>
<td>• Serotonergic syndrome</td>
<td>• Paranoïd psychosis</td>
</tr>
<tr>
<td></td>
<td>• Dilation of pupils</td>
<td>• During withdrawal there may be a long period of sleep and depression</td>
</tr>
</tbody>
</table>
Amphetamine-type stimulants (ATS) refer to a group of drugs, mostly synthetic in origin, whose principal members include amphetamine, methamphetamine and MDMA (ecstasy). Use of these substances has a stimulatory effect on the central nervous system and influences the levels and action of the important neurotransmitters: dopamine, norepinephrine and serotonin. The action of these neurotransmitters induces a range of excitatory responses in the central nervous system.

---

The term “amphetamine-type stimulants” (ATS) was coined during the WHO Meeting on Amphetamines, MDMA and other Psychostimulants in Geneva, 1996 [14]. This term was adopted by the meeting participants for the purpose of grouping a number of drugs that were prominent at the time, namely amphetamine, methamphetamine and MDMA (ecstasy), among others. Moreover, it excluded cocaine, nicotine and certain herbal stimulants. A pragmatic justification was established to simplify the overarching class to a group of substances that are similar in their pharmacological effect and chemical structure. This grouping therefore incorporated substances, which were more or less structurally alike.
system. The differing degrees to which a substance affects these neurotransmitters contributes to the psychostimulant properties of individual ATS. There are also a number of synthetic stimulants that bear little structural similarity to ATS but have comparable mechanisms of action.

EXCITATORY NEUROTRANSMITTER SYSTEMS

The three monoamine neurotransmitters—dopamine, norepinephrine and serotonin—are critical components of neurotransmission. These neurotransmitters are released into neuronal synapses and their concentrations are modulated by membrane proteins.

The presence and/or levels of these three neurotransmitters produce a variety of effects as displayed in the table below.

<table>
<thead>
<tr>
<th>Dopamine (DA)</th>
<th>Norepinephrine (NE)</th>
<th>Serotonin (5-HT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls the reward and pleasure centre of the brain</td>
<td>Affects parts of the brain where attention and responding actions are controlled</td>
<td>Affects a variety of physiological processes, ranging from mood to appetite and memory</td>
</tr>
</tbody>
</table>

There are a number of overlapping effects, and the complexity of their relationship is illustrated below.
6.1 AMPHETAMINE AND METHAMPHETAMINE

Amphetamine and methamphetamine produce predominantly stimulant effects as a result of their influence on the levels of dopamine and norepinephrine, and, to a lesser extent, on serotonin. Both substances are under Schedule II of the Convention on Psychotropic Substances of 1971.

Amphetamine and methamphetamine found in illicit markets are predominantly produced in clandestine laboratories. This is primarily related to the ease of synthesis and the availability of a variety of precursors and methods that can be used for their manufacture.

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
</table>
| White to light brown powder | • Nasal insufflation  
• Smoking |
| Solution of powder dissolved in distilled or saline water | Injection |
| Tablets and capsules (in different shapes and colours) | Oral consumption |
| Crystals (commonly methamphetamine) | • Nasal insufflation  
• Smoking |

The different methods by which these forms can be administered impacts the onset and duration of action. For instance, insufflation causes quick absorption into the bloodstream through the mucosa and so enables a more rapid onset of effects than oral consumption. In general, only methamphetamine is commonly found in the crystal form.
Medical use

There are a number of products containing amphetamine or methamphetamine, which are approved for medical use and predominantly prescribed to treat attention deficit hyperactivity disorder (ADHD), for example, Adderall® (a mixture of the chiral $d$- and $l$- salts of amphetamine) or Desoxyn® ($d$-methamphetamine). Amphetamine is also used in the treatment of narcolepsy and as an appetite suppressant [15].

Mechanism of action and resulting effects

Amphetamine and methamphetamine affect neurotransmitters through a number of mechanisms, namely by inducing the release and preventing the reuptake of dopamine, norepinephrine and, to a lesser extent, serotonin. They also inhibit the metabolism of dopamine and norepinephrine. The combination of these processes produces the stimulant effects, such as increased energy, heart rate and blood pressure.

### Desired effects

- Sense of physical and mental well-being, exhilaration
- Mental and physical stimulation
- Increased and prolonged alertness and energy
- Improved performance at manual or intellectual tasks
- Suppression of hunger

### Undesired acute effects

- Increased heart rate and blood pressure, faster breathing
- Increased body temperature, sweating
- Erratic, sometimes violent behaviour
- Hyper-excitability, insomnia, talkativeness, restlessness, irritability, hallucinations
- Convulsions, seizures, arrhythmia and/or heart failure, cerebral haemorrhage
- Serotonergic syndrome
- Dilation of pupils

### Effects of chronic use

- Strong psychological dependence
- Development of tolerance
- Malnutrition, weight loss
- Disorientation, apathy, confused exhaustion due to lack of sleep
- With continued use, a state similar to paranoid psychosis may develop (known as “amphetamine psychosis”)
- During withdrawal there may be a long period of sleep and depression

---

**Common street names**

<table>
<thead>
<tr>
<th>Amphetamine</th>
<th>Methamphetamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amp</td>
<td>Black beauties</td>
</tr>
<tr>
<td>Base</td>
<td>Chalk</td>
</tr>
<tr>
<td>Bennies</td>
<td>Crank</td>
</tr>
<tr>
<td>Crystal</td>
<td>Crystal meth</td>
</tr>
<tr>
<td>Dexies</td>
<td>Crystal meth</td>
</tr>
<tr>
<td>Speed</td>
<td>Glass</td>
</tr>
<tr>
<td>Sulph</td>
<td>Go-ey</td>
</tr>
<tr>
<td>Uppers</td>
<td>Ice</td>
</tr>
<tr>
<td>Whizz</td>
<td>Meth</td>
</tr>
<tr>
<td></td>
<td>Shabu</td>
</tr>
<tr>
<td></td>
<td>Speed</td>
</tr>
<tr>
<td></td>
<td>Yaba</td>
</tr>
</tbody>
</table>

---

**SEROTONERGIC OR SEROTONIN SYNDROME**

Serotonergic syndrome is an extreme adverse drug reaction, which is caused by excessive use of serotonergic drugs (drugs which influence the serotonin system) and is potentially fatal. It results from serotonin toxicity, i.e. extremely high levels of serotonin in the central nervous system induced by serotonergic drugs. Serotonergic syndrome may induce psychosis, high blood pressure (hypertension), high body temperature (hyperthermia), uncontrollable muscle spasms (myoclonic crisis), tremors, seizures, release of myoglobin from muscles and blood clotting in vessels. If not treated immediately, it may lead to severe illness and potential death.
6.2 “ECSTASY” GROUP SUBSTANCES

This group comprises synthetic substances such as MDMA (3,4-methylene-dioxymethamphetamine) MDA (3,4-methylenedioxyamphetamine) and MDEA (3,4-methylenedioxyethylamphetamine).

Similarly to amphetamine and methamphetamine, these substances have stimulant properties and affect, to varying degrees, the levels of the three neurotransmitters dopamine, norepinephrine and serotonin. However, the more pronounced effect on the serotonin neurotransmitter system leads to some differences in their overall pharmacological effects and is likely to be responsible for the empathogenic/entactogenic effects of “ecstasy” group substances [16, 17].

The aforementioned “ecstasy” group substances are produced in clandestine laboratories, have no approved medical use, and are under Schedule I of the Convention on Psychotropic Substances of 1971.

**Commonly used forms**

| White to off-white powders | • Occasionally insufflation  
|                           | • Injection (rarely)       |
| Tables and capsules       | Oral consumption           |

**Mechanism of action and resulting effects**

In addition to producing stimulant effects similar to those of amphetamine and methamphetamine, “ecstasy” group substances, to varying degrees, have more pronounced effects on inhibition of serotonin reuptake and can also exhibit binding affinity for serotonin receptors, which is likely to be responsible for its empathogenic/entactogenic effects and potentially related to hallucinogenic effects at higher doses.
<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Feelings of emotional closeness to others (empathy)</td>
<td>• Rise in blood pressure and heart rate, heat stroke</td>
<td>• Development of tolerance</td>
</tr>
<tr>
<td>• Facilitation of communication</td>
<td>• Fatigue and potential depression</td>
<td>• Possibility of neurotoxicity, psychiatric and physical problems and brain damage as well as liver damage</td>
</tr>
<tr>
<td>• Increased sociability (use at so-called “rave” dance parties)</td>
<td>• Restlessness, anxiety and pronounced visual and auditory hallucinations at high doses</td>
<td>• Potential depression, anxiety, fatigue, and difficulty in concentrating</td>
</tr>
<tr>
<td>• Increased physical and emotional energy</td>
<td>• Nausea and vomiting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Hyperthermia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Serotonergic syndrome</td>
<td></td>
</tr>
</tbody>
</table>
6.3 SYNTHETIC CATHINONES

Synthetic cathinones are beta-keto phenethylamines that are similar to amphetamine, methamphetamine and MDMA in structure and mechanism of action. A number of synthetic cathinones are under international control including mephedrone, methylenedioxyphenylprovalerone (MDPV) and methylone. None of these substances are currently approved for medical use.

### Commonly used forms

<table>
<thead>
<tr>
<th>Substance</th>
<th>Form(s)</th>
<th>Mechanism of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDPV</td>
<td>Powder, Tablet</td>
<td>Similar to amphetamine and methamphetamine, Stimulant properties</td>
</tr>
<tr>
<td>Mephedrone</td>
<td>Powder, Tablet, Liquid</td>
<td>Similar to amphetamine and methamphetamine, Stimulant properties</td>
</tr>
<tr>
<td>Methylone</td>
<td>Powder, Tablet, Liquid</td>
<td>Similar to MDMA, Stimulant and entactogenic properties</td>
</tr>
</tbody>
</table>

### Common street names

- Bath salt: Mdmcat
- Bk-MDMA: Mef
- Cristal bath: Meow
- Ease: Neocor
- Explosion: New Ivory Wave
- Flower Power: Plant food
- M1: Special
- Magic: Super coke
- MP:
### 6.4 OTHER SYNTHETIC CNS STIMULANTS

There are a range of synthetic stimulants that can produce comparable effects to amphetamine, methamphetamine or "ecstasy" group substances but are not necessarily structurally similar. Some examples of substances in this category include 1-benzylpiperazine (BZP), aminorex, para-methoxyamfetamine (PMA) and 3,4,5-trimethoxyamfetamine (TMA).
Central nervous system (CNS) depressants are primarily used as medicines that suppress, inhibit or decrease brain activity. The main classes of CNS depressants are sedatives, hypnotics, opioids and neuroleptics [18]. CNS depressants include benzodiazepines, barbiturates, methaqualone and GHB (gamma-hydroxybutyric acid).

7. Central Nervous System Depressants

Central nervous system (CNS) depressants are primarily used as medicines that suppress, inhibit or decrease brain activity. The main classes of CNS depressants are sedatives, hypnotics, opioids and neuroleptics [18]. CNS depressants include benzodiazepines, barbiturates, methaqualone and GHB (gamma-hydroxybutyric acid).
7.1 BENZODIAZEPINES

Benzodiazepines are a structural group of CNS depressants that are widely used in medicine as anticonvulsants, anxiolytics, hypnotics, sedatives, skeletal muscle relaxants and tranquilizers. Numerous benzodiazepines have been synthesized for use as pharmaceuticals and they can vary considerably in their potency and in the onset and/or duration of action. In total, 35 benzodiazepines are currently subject to international control under the Convention on Psychotropic Substances of 1971. Benzodiazepines encountered on the illicit market are primarily diverted from legitimate trade rather than synthesized in clandestine laboratories.

### COMMON PHARMACEUTICAL BENZODIAZEPINES DURATION OF ACTION*

<table>
<thead>
<tr>
<th>Common pharmaceutical benzodiazepines</th>
<th>Duration of Action*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alprazolam (Xanax®)</td>
<td>Short (half-life &lt;10 hours)</td>
</tr>
<tr>
<td>Diazepam (Valium®)</td>
<td>Long (&gt;24 hours)</td>
</tr>
<tr>
<td>Chlordiazepoxide (Librium®)</td>
<td>Long (&gt;24 hours)</td>
</tr>
<tr>
<td>Flunitrazepam (Rohypnol®)</td>
<td>Intermediate (10-24 hours)</td>
</tr>
<tr>
<td>Temazepam (Restoril®)</td>
<td>Short (&lt;10 hours)</td>
</tr>
</tbody>
</table>

### Mechanism of action and resulting effects

The depressant properties of benzodiazepines are derived from their effects on a combination of receptors in the GABA<sub>α</sub> receptor complex in the brain. Primarily, the benzodiazepines enhance the action of the neurotransmitter gamma(γ)-aminobutyric acid (GABA) which is critical in mediating sedative and therapeutic effects. GABA is located in the brain and spinal cord and helps regulate brain activity by reducing neurotransmission, which slows down normal functions of the body and culminates in depressant effects.

Depressant effects can also result from blocking the action of excitatory neurotransmitters (e.g. glutamate that acts on glutamate receptors [AMPA or NMDA]), which interrupts their main functionality of producing stimulatory effects and thus contributes to the depressant effects.

### Common street names
- Benzos
- Blue bomb
- Downers
- Nerve pills
- Canasson rouge
acid (GABA) at the GABA<sub>A</sub> receptor to produce their sedative, hypnotic, anxiolytic, anticonvulsant and muscle relaxant effects.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relief of tension, mental stress and anxiety</td>
<td>• Reduced mental activity and alertness, drowsiness, lethargy and impairment of clarity of thought and judgement may occur</td>
<td>• Development of tolerance, psychological and physical dependence</td>
</tr>
<tr>
<td>• Positive feelings of calmness, relaxation and well-being in anxious individuals</td>
<td>• Potential impairment of muscle coordination, dizziness, low blood pressure, or fainting</td>
<td>• Headache, irritability, confusion, memory impairment, depression, insomnia and tremor</td>
</tr>
<tr>
<td>• Improved coping with situational pressures or psychological problems</td>
<td>• Diminished emotional responses to external stimuli, e.g. pain</td>
<td>• Abrupt cessation may lead to withdrawal syndrome which can include insomnia, anxiety, perceptual hypersensitivity, tremors, irritability, nausea and vomiting, and even mental confusion and life-threatening convulsions</td>
</tr>
<tr>
<td>• Relief of side effects associated with over-stimulation or withdrawal of other drugs (i.e. as part of a pattern of multiple drug use)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7.2 BARBITURATES

The barbiturates represent another group of synthetic CNS depressant drugs that were once widely used medically as hypnotics and sedatives. Their medical use today is limited to anti-epileptics or adjuncts to anaesthesia in surgical procedures and less commonly as anti-anxiety drugs. As with benzodiazepines, individual barbiturate drugs differ in the onset and duration of action and potency. Barbiturates have a low therapeutic index (a comparison of the amount which produces the therapeutic effect and that which results in toxicity) and overdosing can therefore be fatal. As a result, they have been largely replaced on both the licit and illicit market by the benzodiazepines.
Currently, twelve barbiturates are subject to international control under different schedules of the Convention on Psychotropic Substances of 1971. Secobarbital is under Schedule II, amobarbital, butalbital, cyclobarbital and pentobarbital are under Schedule III, and the remaining barbiturates (e.g. allobarbital, barbital, butobarbital, methylphenobarbital, phenobarbital, secbutabarbitral and vinylbital) are under Schedule IV.

<table>
<thead>
<tr>
<th>COMMON PHARMACEUTICAL BARBITURATES</th>
<th>DURATION OF ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amobarbital (Amytal®)</td>
<td>Intermediate (10-24 hours)</td>
</tr>
<tr>
<td>Pentobarbital (Nembutal®)</td>
<td>Short (&lt;10 hours)</td>
</tr>
<tr>
<td>Phenobarbital (Luminal®)</td>
<td>Long (&gt;24 hours)</td>
</tr>
<tr>
<td>Secobarbital (Seconal®)</td>
<td>Short (&lt;10 hours)</td>
</tr>
</tbody>
</table>

### Commonly used forms

<table>
<thead>
<tr>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral consumption</td>
</tr>
<tr>
<td>Injection</td>
</tr>
<tr>
<td>Rectal</td>
</tr>
</tbody>
</table>

### Mechanism of action and resulting effects

The depressant properties of barbiturates, from mild sedation to general anaesthesia, are derived from their activation of receptors in the GABA$_A$ receptor complex in the brain. Similarly to benzodiazepines, barbiturates enhance the action of GABA to produce their therapeutic effects.
<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relief of tension, mental stress and anxiety</td>
<td>• Respiratory depression, weak and rapid heart rate, suppression of cough reflex</td>
<td>• Development of tolerance, strong physical and psychological dependence</td>
</tr>
<tr>
<td>• Positive feelings of pleasure, calmness, relaxation and sociability</td>
<td>• Drowsiness, potential stupor, unconsciousness, coma</td>
<td>• Severe depression and amnesia</td>
</tr>
<tr>
<td>• Improved coping with situational pressures or psychological problems</td>
<td>• Extreme, unpredictable emotional reactions and mental confusion, disorientation</td>
<td>• Bronchitis, pneumonia</td>
</tr>
<tr>
<td></td>
<td>• Slurred speech, poor control of speech, impaired judgement</td>
<td>• Withdrawal may lead to irritability, nervousness, progressive restlessness, temporary sleep disturbances, faintness and nausea, anxiety, tremors, possible delirium and convulsions</td>
</tr>
<tr>
<td></td>
<td>• Loss of motor coordination, clumsiness, decreased self-control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dilation of pupils</td>
<td></td>
</tr>
</tbody>
</table>
7.3 OTHER CNS DEPRESSANTS

Methaqualone

Methaqualone is a synthetic central nervous system (CNS) depressant with sedative-hypnotic, anticonvulsant, antispasmodic and local anaesthetic properties. It was withdrawn from the pharmaceutical market in many countries as a result of problems of abuse.

Methaqualone is under Schedule II of the Convention on Psychotropic Substances of 1971.

**Commonly used forms**

| Brown, grey or black tacky powder | Nasal insufflation |
| Tablets or capsules | Oral consumption |

**Mechanism of action and resulting effects**

The sedative and hypnotic properties of methaqualone are mediated through its effect on GABA receptors in a similar manner to other CNS depressants.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects and effects of chronic use</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Relief of tension, mental stress and anxiety</td>
<td>Similar to those of other CNS depressants, including reduction of mental activity, cardiac and respiratory depression as well as the development of tolerance, and psychological and physical dependence</td>
</tr>
<tr>
<td>• Relief of side effects associated with over-stimulation or withdrawal of other drugs (i.e. as part of a pattern of multiple drug use)</td>
<td></td>
</tr>
</tbody>
</table>
**gamma (γ)-hydroxybutyric acid (GHB)**

GHB is a CNS depressant, which produces sedation and anaesthesia and is associated with drug-facilitated sexual assault. It is under Schedule II of the Convention on Psychotropic Substances of 1971.

GHB can be manufactured clandestinely from inexpensive ingredients and methods found on the Internet. It is also generated in the body after ingestion of the solvents gamma-butyrolactone (GBL) or 1,4-butanediol.

**Medical use**

Medically, GHB has been used as an adjunct in anaesthesia and as an aid to alcohol or opiate withdrawal. In addition, GHB (e.g. Xyrem®) has been used to treat insomnia and clinical depression [19].

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
</table>
| Clear liquid (substance dissolved in water) | • Oral consumption  
• Injection |
| • White powder (as a salt)  
• Tablets or capsules | Oral consumption |

**Mechanism of action and resulting effects**

The effects of GHB are mediated through its activation of a specific GHB receptor, which is excitatory, and its activation of the GABA<sub>b</sub> receptor, which has inhibitory properties. GHB has also been shown to affect the dopamine neurotransmitter system.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects and effects of chronic use</th>
</tr>
</thead>
</table>
| • Similar to other CNS depressants: relaxation, reduced inhibition, euphoria and mild hallucinations  
• Promotes growth hormone effects of alleged stimulation of muscle growth | • Similar to those of other CNS depressants, including the development of psychological and physical dependence, and a withdrawal syndrome after discontinuation of prolonged use of large doses  
• Potential blackouts  
• In conjunction with other CNS depressants, adverse effects are exacerbated |

**Common street names**

- Cherry meth
- GHB
- Cloud-9
- Liquid E
- Fantasy
- Liquid Ecstasy
- G
- Liquid X
- Goop
- Sleep
- Georgia Home Boy
- Scoop
Hallucinogens are a diverse group of naturally occurring and synthetic drugs that induce distorted states of consciousness, perception, thinking and feeling, accompanied by different degrees of auditory or visual hallucinations. They are also referred to as “psychedelics”, which ultimately produce synaesthesia⁶ [20] and altered perceptions of reality.

Hallucinogens fall into several chemically related groups, including tryptamines (e.g., (+)-lysergide [LSD] and psilocin), and phenethylamines (e.g., mescaline and 25B-NBOMe).

---

⁶Synaesthesia is an extraordinary condition in which senses that are usually experienced separately are combined, so that a person hearing a sound may see a colour as a result (e.g. hearing colours).
8.1 (+)-LYSERGIDE (LSD)

LSD is a semi-synthetic drug derived from lysergic acid, an alkaloid found in a fungus, *Claviceps purpurea*, which grows on rye and other grains. LSD is one of the most potent hallucinogenic substances known and is listed in Schedule I of the Convention on Psychotropic Substances of 1971.

**Commonly used forms**

- Impregnated on paper (blotter papers)
- Mini tablets (“microdots”) and capsules
- Thin gelatine sheets (“window panes”)

**Route of administration**

- Oral consumption

**Mechanism of action and resulting effects**

LSD has a complex pharmacology and its mechanism of action is not completely understood. It has affinity for a number of serotonin receptors and its hallucinogenic effects have been linked to its agonist activity at the 5-HT₂A receptor. LSD can have a duration of action as long as 10-12 hours [21].

The effects of LSD are extremely variable and strongly depend on the mental state of the user and the setting, i.e. the same dose in the same user may produce good and bad “trips”, depending on circumstances of use. Thus, the type of effects produced are subject to different confounding factors.
### 8.2 TRYPTAMINES

Hallucinogenic tryptamines are a group of substances, which are related to both LSD and psilocybin in their structure and action. Several tryptamines occur naturally in a variety of plants, fungi or animals, and have a history of use as hallucinogenic snuffs or drinks, for example, in the Amazon forest and the Caribbean. They can also be manufactured through chemical synthesis.

There are three tryptamines under international control: diethyltryptamine (DET), dimethyltryptamine (DMT) and etryptamine, which are in Schedule I of the Convention on Psychotropic Substances of 1971. Currently, no tryptamines are approved for medical use.
Commonly used forms

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark brown solid material (crude plant preparation)</td>
<td>Inhalation</td>
</tr>
<tr>
<td>Powder</td>
<td>Nasal insufflation</td>
</tr>
<tr>
<td>Oily liquid</td>
<td>Injection</td>
</tr>
<tr>
<td>Tablets, capsules</td>
<td>Oral consumption—if tryptamines are in tablet or capsule form. However, they are rarely consumed orally</td>
</tr>
</tbody>
</table>

**Mechanism of action and resulting effects**

Tryptamines share a similar mode of action to LSD and act as non-selective serotonin receptor agonists. The impairment of coordination following their use is frequently more pronounced than that produced by LSD. Their effects are very dose dependent, and their duration of action can be extremely short (a few minutes), particularly when smoked.

### 8.3 PLANT-BASED HALLUCINOGENS

**Peyote cactus and mescaline**

Mescaline is the main psychoactive component of the peyote cactus (*Lophophora williamsii*). The mescaline content in peyote varies depending on environmental factors (temperature, rainfall, altitude) and soil conditions and can range from 0.7–3.5 per cent of the dried weight. Mescaline can also be synthesized clandestinely and is under Schedule I of the Convention on Psychotropic Substances of 1971.
Commonly used forms

| Commonstreet names
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mescaline</td>
</tr>
<tr>
<td>Big chief</td>
</tr>
<tr>
<td>Mesc</td>
</tr>
<tr>
<td>Moon</td>
</tr>
</tbody>
</table>

Route of administration

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dried, sliced and chopped in the form of a button (mescal button)</td>
<td>Oral consumption (chewed, or soaked in water to produce an intoxicating liquid)</td>
</tr>
<tr>
<td>Ground button of the cactus, in capsules</td>
<td>Oral consumption</td>
</tr>
<tr>
<td>Powder, in capsules or tablets</td>
<td>Inhalation</td>
</tr>
</tbody>
</table>

Mechanism of action and resulting effects

The mechanism of action of mescaline is similar to other hallucinogens and its effects are mediated through its interaction with serotonin receptors (e.g. 5-HT$_{2A}$). Mescaline is less potent than LSD but its effects can last up to 10-12 hours.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
</tr>
</thead>
</table>
| Alterations in thought, mood and sensory perception | • Unlike LSD, the effects of mescaline include euphoria, hilarity and prominent signs of physiological arousal, such as increased heart rate and blood pressure, dilation of pupils, nausea, vomiting and stomach pains.  
• Euphoria and detachment from surroundings  
• Visual distortions progress to vivid hallucinations of colour and movement |
Psilocybe mushrooms and psilocybin

Psilocybin is the naturally occurring, hallucinogenic substance primarily found in the *Psilocybe mexicana* mushroom although there are more than 75 species of mushrooms from the genera *Psilocybe*, *Panaeolus* and *Conocybe* that can contain psilocybin. The psilocybin content of *Psilocybe* mushrooms can vary from between 0.2–2 per cent [22].

<table>
<thead>
<tr>
<th>Commonly used forms</th>
<th>Route of administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact dried brown mushrooms</td>
<td>• Oral consumption (swallowed raw, cooked, or brewed into a beverage)</td>
</tr>
<tr>
<td>Crude mushroom preparation</td>
<td>• Intravenous injection (of extracts, occurs rarely)</td>
</tr>
<tr>
<td>Powdered material in capsules</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanism of action and resulting effects**

Following ingestion of mushrooms containing psilocybin, the psilocybin is converted into its more active metabolite psilocin, and the hallucinogenic effects are mediated through its action as a serotonin receptor agonist similar to other hallucinogens. The duration of action is typically 4–6 hours.

<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alterations in thought, mood and sensory perception</td>
<td>• Physical effects include muscle weakness, drowsiness and lack of coordination</td>
</tr>
<tr>
<td></td>
<td>• Fatal poisoning may occur due to mistaken identity of mushrooms</td>
</tr>
<tr>
<td></td>
<td>• Tolerance may develop</td>
</tr>
</tbody>
</table>
8.4 SYNTHETIC HALLUCINOGENS

There are a number of synthetic substances which act in a similar way to the plant-based hallucinogens. These substances are in general structurally similar to mescaline (a phenethylamine) and amphetamine/methamphetamine. Their predominant effects are hallucinatory, but some of the substances can also have stimulatory effects [23]. This group includes substances such as DOB (brolamfetamine), 2C-B and 25I-NBOMe. None of the substances in this group are approved for medical use.

Common substances

25I-NBOMe (2-(4-iodo-2,5-dimethoxyphenyl)-N-(2-methoxybenzyl)ethanamine)
2C-B (4-bromo-2,5-dimethoxyphenethylamine)
DOB (Brolamfetamine)
STP/DOM (2,5-dimethoxy-4-methylamphetamine)
TMA (3,4,5-trimethoxyamphetamine)

2C-B is a phenethylamine with hallucinogenic properties [24] that became popular during the mid-1980s. 2C-B is in Schedule II of the Convention on Psychotropic Substances of 1971.

DOB is a highly potent phenethylamine with hallucinogenic effects. It was a popular drug of abuse in the 1980s with effects lasting longer than those of 2C-B. DOB is in Schedule I of the Convention on Psychotropic Substances of 1971.

The NBOMe series are a group of synthetic hallucinogens that are derivatives of the “2C series” of substances and are often sold as LSD. These substances vary in potency, pharmacological effects and toxicity, and as such errors in dosage may have fatal consequences [25]. As with LSD, NBOMe substances are commonly sold on blotter paper, yet in contrast to LSD, they are accompanied by a bitter taste. 25B-NBOMe, 25C-NBOMe, and 25I-NBOMe, are in Schedule II of the Convention on Psychotropic Substances of 1971.
### Common street names

**DOB**
- STP: Serenity, Tranquility, Peace

**2C-B**
- Venus
- Bromo
- Erox
- Bees
- Nexus

**25I-NBOMe**
- 25I
- BOM-25
- BOMCI
- Cimbi-5
- Dots
- Legal acid
- N-boom
- NBomb
- NE-BOME
- Smiles
- Smiley paper
- Solaris

### Commonly used forms

<table>
<thead>
<tr>
<th><strong>DOB</strong></th>
<th><strong>Route of administration</strong></th>
</tr>
</thead>
</table>
| White to off-white powders | • Nasal insufflation (occasionally)  
• Injection (rarely) |
| Tablets and capsules | Oral consumption |
| Impregnated on paper | Oral consumption |

<table>
<thead>
<tr>
<th><strong>2C-B</strong></th>
<th>Oral consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder</td>
<td>Nasal insufflation</td>
</tr>
<tr>
<td>Tablet</td>
<td>Oral consumption</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>25B-NBOMe, 25C-NBOMe, and 25I-NBOMe</strong></th>
<th>Oral consumption</th>
</tr>
</thead>
</table>
| Finely ground powder                  | • Nasal insufflation  
• Inhalation (vaporizer) |
| Tablet                                | Oral consumption |
| Liquid                                 | • Intravenous and intramuscular injection  
• Nasal insufflation (of liquid) |
| Blotter paper                         | Oral consumption |
| Blotter into gel capsule or suppository| Rectal |

### Mechanism of action and resulting effects

Synthetic hallucinogens have a similar pharmacological profile to that of LSD and other plant-based hallucinogenic substances. They act, to varying extents, at the 5-HT₂ₐ receptor (e.g., 2C-B acts as a partial agonist, while 25I-NBOMe is a potent full agonist). The potency and duration of action of the individual substances depends on a number of factors including the chemical substituents present.
<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
</table>
| • Alterations in thought, mood and sensory perception Mental and physical stimulation | • Changes in body temperature (sweating or chills)  
• Nausea, vomiting  
• Muscle twitching, tension  
• Confusion and difficulty focusing  
• Insomnia  
• Paranoia, fear and panic  
• Unpleasant visions, unwanted and overwhelming feelings  
• Visual and auditory hallucinations  
• Dilation of pupils  
• General change in consciousness  
• Unusual body sensations (facial flushing, chills, goose bumps, body energy)  
• Slight increase in heart rate  
• Vasoconstriction, peripheral numbness, swelling of feet, hands or face  
• Change in perception of time, time dilation  
• Looping, recursive out of control thinking  
• Scrambled communication  
• Unwanted life-changing spiritual experiences | • Risk of neurological damage, such as progressive encephalopathy and muscle weakness in the limbs (“quadriparesis”)  
• Increased heart rate, high blood pressure, exceptionally high fever  
• Excessive acid in blood  
• Seizures, involuntary, muscular contractions and relaxations in rapid succession  
• Rapid destruction of muscle tissue  
• Acute kidney injury  
• Potential violent, erratic behaviour, agitation and aggression  
• Further effects are not yet known, but are potentially similar to those of LSD |
8.5 PHENCYCLIDINE (PCP)

Phencyclidine is a synthetic drug with anaesthetic and hallucinogenic properties. PCP was investigated in the 1950s for its anaesthetic potential, but was withdrawn from the pharmaceutical market due to its severe side effects. PCP is under Schedule II of the Convention on Psychotropic Substances of 1971.

Commonly
used forms

<table>
<thead>
<tr>
<th>White to grey or brown crystalline powder or gummy mass</th>
<th>Nasal insufflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablets or capsules</td>
<td>Oral consumption</td>
</tr>
<tr>
<td>Liquid</td>
<td>Inhalation—often applied to leafy material</td>
</tr>
</tbody>
</table>

Route of administration

Common street names

- Angel dust
- DOA (dead on arrival)
- Hoy
- Killer weed
- Magic dust
- Peace pills
- Rocket fuel
- Space basing (PCP with crack)

Mechanism of action and resulting effects

PCP is a dissociative anaesthetic with hallucinogenic properties. In contrast to LSD, the hallucinogenic properties of PCP are a result of its action as an NMDA (N-methyl-D-aspartate) receptor antagonist. In addition, PCP has stimulant properties as it inhibits the reuptake of dopamine, norepinephrine and serotonin, thus intensifying the effect of these neurotransmitters.
<table>
<thead>
<tr>
<th>Desired effects</th>
<th>Undesired acute effects</th>
<th>Effects of chronic use</th>
</tr>
</thead>
</table>
| • Alterations in thought, mood and sensory perception  
• Out-of-body experiences  
• Changes in body awareness, feelings of detachment and distance | • Loss of comprehension of the immediate environment, often accompanied by a sense of strength and invulnerability  
• Hallucinations, image distortion, severe mood disorders, mental confusion, amnesia  
• Potential acute anxiety, paranoia and violent hostility, or schizophrenia-like psychoses  
• Numbness of the extremities, slurred speech and loss of coordination  
• Shallow respiration, increased rate of breathing, blood pressure and heart rate, flushing and profuse sweating, blank stare, rapid and involuntary eye movements, watering of eyes  
• Potential convulsions, coma | • Development of tolerance and strong psychological dependence  
• “Flashbacks” (i.e. short-lived, vivid re-experiences of part of a previous trip) can occur days or even months after taking the last dose, leading to disorientation, anxiety and distress  
• Impaired memory  
• Speech difficulties (e.g. stuttering or the inability to speak) |
Glossary of Terms

Most definitions are based on those given in the *Lexicon of Alcohol and Drug Terms* (Geneva, 1994) of the World Health Organization (WHO). These terms have been adapted where necessary and cross-references are provided in *italics*. 
### ABUSE

Due to the ambiguity of the term “abuse”, the WHO Lexicon has replaced this term with “harmful use” and “hazardous use”, which is defined as follows:

**Harmful use** is a pattern of psychoactive substance use that is causing damage to health, physical (e.g. hepatitis following injection of drugs) or mental (e.g. depressive episodes secondary to heavy alcohol intake). Harmful use commonly, but not invariably, has adverse social consequences. The term was introduced in ICD-10 and supplanted “non-dependent use” as a diagnostic term.

**Hazardous use** is a pattern of substance use that increases the risk of harmful consequences for the user. In contrast to harmful use, hazardous use refers to patterns of use that are of public health significance despite the absence of any current disorder in the individual user.

In the context of international drug control, drug abuse constitutes the use of any substance under international control outside therapeutic indications, in excessive dose levels, or over an unjustified period of time.

<table>
<thead>
<tr>
<th>ABUSE LIABILITY</th>
<th>The propensity of a particular psychoactive substance to be susceptible to abuse, defined in terms of the relative probability that use of the substance will result in social, psychological and physical problems for an individual or for society.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACUTE EFFECT</td>
<td>Effects produced by a single dose or a short period of continuous administration of a drug.</td>
</tr>
</tbody>
</table>
| ADDICTION       | The terms “addiction” and “habituation” were abandoned by WHO in 1964 in favour of drug dependence. However, since those terms are still widely used, below is a definition of “addiction”.

“Addiction” refers to the repeated use of a psychoactive substance or substances, to the extent that the user is periodically or chronically intoxicated, shows a compulsion to take the preferred substance (or substances), has great difficulty in voluntarily ceasing or modifying substance use, and exhibits determination to obtain psychoactive substances by almost any means. |
| ADJUNCT         | An additional drug, substance or procedure that is used to strengthen or increase the efficacy of the initial treatment.                                                                                                                                                    |
| ADULTERANTS     | A substance that is added to a drug to increase the quantity produced, enhance the pharmacological and psychoactive effect, or facilitate the administration of the drug. Adulterants may include sugars, caffeine, lidocaine or paracetamol. However, other adulterants may be more harmful, particularly when administered through injection. |
### ADVERSE DRUG REACTION
In the general medical and pharmacological fields, “adverse drug reaction”
denotes a toxic physical or (less common) psychological reaction to a
therapeutic agent. The reaction may be predictable, or allergic or
idiosyncratic (unpredictable). In the context of drug abuse, the term
includes unpleasant psychological and physical reactions to drug taking.

### AGONIST
A substance that acts at a neuronal receptor to produce effects similar
to those of a reference drug. For example, methadone is a morphine-like
agonist at the opioid receptors.

- **Full agonist** is a substance that produces a full response or the
  maximum effect at a given receptor.
- **Partial agonist** is a substance that produces a reduced response as
  it is unable to elicit the maximum effect or response.

### ANALGESIC
A substance that reduces pain and may or may not have psychoactive
properties.

### ANTAGONIST
A substance that counteracts the effects of another agent.
Pharmacologically, an antagonist interacts with a receptor to inhibit
the action of agents (agonists) that produce specific physiological or
behavioural effects mediated by that receptor.

### ANTIDEPRESSANT
Any of a group of psychoactive agents prescribed for the treatment of
depressive disorders; also used for certain other conditions such as
panic disorder. There are three main classes:

(a) tricyclic antidepressants,
(b) serotonin receptor agonists and uptake blockers, and
(c) monoamine oxidase inhibitors. None of the common antidepressants is under
international control.

### BLOOD-BRAIN BARRIER
A network of blood vessels that separates the brain from the circulatory
system (blood) and acts as a protective layer of the central nervous
system (CNS), restricting the passage of certain harmful substances,
while enabling that of necessary substances.

### CENTRAL NERVOUS SYSTEM (CNS)
The CNS is a part of the nervous system, which comprises the brain and
spinal cord, and is responsible for most functions of the body, including
processes under voluntary and involuntary control.

Functions range from breathing and blinking, which are involuntary
processes, to speaking and walking, which are voluntary processes, and
to emotions and perceptions. Within the CNS, the brain stores, processes
and interprets sensory information and the spinal cord acts as the bridge
between the brain and peripheral nerves by relaying signals to the rest
of the body through the peripheral nervous system (PNS).

### CHRONIC USE
Prolonged, continuous, frequent, long-term or heavy use of a substance
over a certain period of time, leading to severe adverse health effects.
### INTERNATIONAL DRUG CONVENTIONS

The three main international drug conventions are:

- **Single Convention on Narcotic Drugs of 1961 as amended by the 1972 Protocol** establishes an international control system for narcotic drugs.

- **Convention on Psychoactive Substances of 1971** establishes an international control system for psychotropic substances.

- **United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988**, which provides comprehensive measures against drug trafficking, including provisions against money-laundering and the diversion of precursor chemicals.

### SUBSTANCES under INTERNATIONAL CONTROL

Refers to substances listed in the schedules (for the 1961 and 1971 Conventions) and tables (for the 1988 Convention) which are annexed to these conventions.

### (DRUG) DEPENDENCE

The term was introduced in 1964 by a WHO Expert Committee to replace *addiction* and habituation.

“Drug dependence” comprises a cluster of physiological, behavioural and cognitive phenomena of variable intensity, in which the use of a psychoactive drug (or drugs) takes on a high priority. It implies a need for repeated doses of the drug and indicates that a person has impaired control of substance use, as its use is continued despite adverse consequences.

- **PSYCHOLOGICAL or PSYCHIC DEPENDENCE** refers to the experience of impaired control over drug use.

- **PHYSIOLOGICAL or PHYSICAL DEPENDENCE** involves the development of *tolerance* and withdrawal symptoms upon cessation of use of the drug, as a consequence of the body's adaptation to the continued presence of a drug.

### DOSE

A dose is the quantity of a substance, which is required to elicit the desired response in the individual, both in medicine and for abuse purposes. This dose will vary depending on a number of factors, including the particular substance, its form, the route of administration, and the drug consumption history of the individual. Doses are therefore highly dependent on various effects, including past drug experiences, individual differences in weight and size and whether a drug is taken in combination with other substances (e.g. poly-drug use). Average doses are not generalizable or applicable to every person.

Differences in the purity, potency and concentration of substances has implications on dosages and the amount that is consumed by an individual. For example, substances with high potency may require small doses, to produce similar pharmacological effects. While some substances are effective in milligrams or grams, others may exert their effect with as little as a few micrograms (1 microgram is equal to 0.000001 grams).
Additional confounding factors exist that make accurate ranges of
dosing information equivocal. There is a lack of information about
social behaviour and drug consumption patterns are highly variable,
which in turn makes the level of use inexact. Data on average doses
can therefore only provide certain estimates of use, which does not
accurately reflect consumption patterns.

In certain cases, the “defined daily doses” used by the International
Narcotics Control Board (INCB) for narcotic drugs and psychotropic
substances, which is available in their technical reports, may provide
further guidance.

Drugs or substances that are used repeatedly over time can lead to the
development of tolerance. During tolerance the body does not respond
to the substance at the same dosage and therefore, higher amounts of
the substance are required to achieve the desired effect.

<table>
<thead>
<tr>
<th>DRUG</th>
<th>In the context of international drug control, “drug” means any of the substances in Schedule I and II of the 1961 Convention, whether natural or synthetic. A term of varied usage. In medicine, it refers to any substance with the potential to prevent or cure disease or enhance physical or mental welfare; in pharmacology it means any chemical agent that alters the biochemical or physiological processes of tissues or organisms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRUG TESTING</td>
<td>The identification and chemical analysis of drugs in seized material and biological specimens, i.e. body fluids (urine, blood, saliva), hair, or other tissue, in order to assess the presence of one or more psychoactive substances.</td>
</tr>
<tr>
<td>ENTACTOGEN (or EMPATHOGEN)</td>
<td>Term derived from the Greek “en” (inside) and “gen” (to induce) and the Latin “tactus” (tact). It describes a condition that allows users to “make contact” with their own feelings and those of others. Examples of controlled drugs include MDMA (“ecstasy”).</td>
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<tr>
<td>HYPERTHERMIA</td>
<td>An abnormally high body temperature.</td>
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<td>HYPNOTIC</td>
<td>Any of a group of central nervous system depressants with the capacity to induce sleep. Major classes of sedatives/hypnotics include the benzodiazepines and barbiturates. See also sedative.</td>
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<tr>
<td>ILLICIT TRAFFIC</td>
<td>The manufacture, cultivation or trafficking in drugs or psychotropic substances contrary to the provisions of the Conventions.</td>
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<tr>
<td>LICIT DRUG</td>
<td>A drug that is legally available by medical prescription in the jurisdiction in question, or, sometimes, a drug legally available without medical prescription.</td>
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<tr>
<td><strong>NARCOTIC DRUG</strong></td>
<td>In the context of international drug control, “narcotic drug” means any of the substances, natural or synthetic, in Schedules I and II of the Single Convention on Narcotic Drugs, 1961, and that Convention as amended by the 1972 Protocol Amending the Single Convention on Narcotic Drugs, 1961. In medicine, a chemical agent that induces stupor, coma or insensibility to pain (also called narcotic analgesic). The term usually refers to opiates or opioids, which are also named narcotic analgesics. In common parlance and legal usage, it is often used imprecisely to mean illicit drugs, irrespective of their pharmacology.</td>
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<tr>
<td><strong>NEUROLEPTIC</strong></td>
<td>Any of a group of drugs used for the treatment of acute and chronic psychoses. Also known as major tranquillizers and antipsychotics. Neuroleptics have low abuse potential.</td>
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<tr>
<td><strong>NEUROTRANSMITTER</strong></td>
<td>A chemical messenger that is endogenous to the body and transmits signals between neurons to enable a form of communication between individual cells or neurons in the body. Dopamine, norepinephrine (or noradrenaline) and serotonin are examples of neurotransmitters.</td>
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<tr>
<td><strong>OVERDOSE</strong></td>
<td>The use of any drug in such an amount that acute adverse physical or mental effects are produced. Overdose may produce transient or lasting effects, or death; the lethal dose of a particular drug varies with the individual and with circumstances. See also: intoxication; poisoning.</td>
</tr>
<tr>
<td><strong>PHARMACEUTICAL DRUGS</strong></td>
<td>Drugs manufactured by the pharmaceutical industry or made up by a pharmacist. Industry terminology categorizes drugs as ethical drugs, available only on prescription, and over-the-counter or proprietary drugs, advertised to the consumer and sold without prescription. The list of drugs requiring prescription varies considerably from country to country; most psychoactive pharmaceuticals are only available by prescription in industrialized countries.</td>
</tr>
<tr>
<td><strong>PHARMACOLOGY</strong></td>
<td>“Pharmacology” is the science of drugs, including their sources, appearance, chemical composition, properties, biological actions and therapeutic uses. It also covers allied fields such as toxicology and posology (see definition below).</td>
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<tr>
<td><strong>POSOLOGY</strong></td>
<td>“Posology” is the study of dosage and is an important division of pharmacology. Knowledge of the dose of commonly used drugs is essential for acquiring confidence in prescribing.</td>
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<tr>
<td><strong>PSYCHEDELIC</strong></td>
<td>The distinct feature of “psychedelic” drugs is their capacity to induce states of altered perception, thought and feeling that are not experienced otherwise except in dreams or at times of religious exaltation; they can, but not necessarily, produce overt hallucinations.</td>
</tr>
</tbody>
</table>
PSYCHOTROPIC or PSYCHOACTIVE SUBSTANCE

Any chemical agent affecting the mind or mental processes (i.e. any psychoactive drug). In the context of international drug control, “psychotropic substance” means any substance, natural or synthetic, or any natural material in Schedule I, II, III or IV of the 1971 Convention.

RECEPTOR

A protein structure, embedded in cell membranes, which enables the binding and movement of substances such as drugs, hormones or neurotransmitters and thus is involved in conveying cellular signals. Receptors are named after the type of neurotransmitter that they preferentially bind to, for instance, dopamine receptors.

ROUTE of ADMINISTRATION

The way in which a substance is introduced into the body, such as oral ingestion, intravenous (IV), subcutaneous or intramuscular injection, inhalation, smoking, or absorption through skin or mucosal surfaces, such as the gums, rectum or genitalia. This process determines the rate at which a substance is absorbed into the bloodstream. The following are some common routes of administration described in this publication:

**ORAL CONSUMPTION** refers to the administration of the substance using the mouth. Tablets or capsules are swallowed and substances are ingested and broken down into metabolites through the digestive system. These forms pass the intestines and only once dissolved are they able to cross the mucosal membranes in order to reach the bloodstream, pass the blood brain barrier and produce effects. Given the length of time needed for these processes to occur, substances administered orally have a slower onset but have a longer duration of effects. There is a dose-dependent mechanism of some drugs, in which a higher dose results in a longer duration of effects, thus making it difficult to quantify precisely.

- **Buccal** refers to the placement of a substance into the mouth until it is dissolved.
- **Sublingual** refers to the placement of a substance underneath the tongue until it is dissolved.

**INJECTION** refers to the administration of a drug through the skin using a syringe or any other injection tools. This route poses a serious public health risk as infectious diseases such as HIV or hepatitis can be passed from person to person through the sharing of injection equipment. Three methods of injection exist, namely intramuscular, intravenous (IV) or subcutaneous injections.

- **Intramuscular** is an injection through the muscle, which is the slowest method of drug delivery throughout the body.
- **Intravenous (IV)** is an injection through the veins, and also the fastest distribution, as the drug is inserted directly into the bloodstream.
ROUTE of ADMINISTRATION (continued)

Subcutaneous is an injection immediately under the skin, which is a relatively slow method of delivery.

NASAL INSUFFLATION refers to the consumption of a drug through snorting or sniffing its powder, or liquid, form. Onset is almost immediate, as the drug particles are able to cross the mucosal membranes within the nose and close to the brain.

RECTAL refers to the administration of a drug through the rectum with the use of suppositories. Suppositories are capsules that contain the substance powder, which can be easily administered rectally. The onset of effects is delayed as the capsule may take time to dissolve causing a delay of the absorption of the substance into the bloodstream.

SEDATIVE
Any of a group of central nervous system depressants with the capacity of relieving anxiety and inducing calmness. Major classes of sedatives/hypnotics include the benzodiazepines and barbiturates. See also hypnotic.

SIDE EFFECTS
See adverse drug reaction.

STIMULANT
In reference to the central nervous system (CNS), any agent that activates, enhances or increases neural activity; also called psychostimulants or CNS stimulants. Included are amphetamine-type stimulants, cocaine, caffeine, nicotine, etc. Other drugs have stimulant actions which are not their primary effect but which may be manifest in high doses or after chronic use.

TOLERANCE
A decrease in response to a drug dose that occurs with continued use, i.e. increased drug doses are required to achieve the effects originally produced by lower doses.

TOXICOLOGY
“Toxicology” is the science of substances as causes of side effects and disease in man, including their sources, appearance, chemical composition, properties, biological actions, detection and methods of treatment (antidotes). See also pharmacology.

TRANQUILLIZER
A tranquillizer is a calming agent. The term can be used to differentiate between these drugs and the sedative/hypnotics: tranquillizers have a quieting or damping effect on psychomotor processes without—except at high doses—interference with consciousness or thinking.

WITHDRAWAL SYNDROME
A group of symptoms of variable clustering and degree of severity which occur on cessation or reduction of use of a psychoactive substance that has been taken repeatedly, usually for a prolonged period and/or in high doses.
References
REFERENCES

1. Commission on Narcotic Drugs (CND), *Notes by the Secretariat on the challenges and future work in the review of substances for possible scheduling recommendations* 2014.


