

= Mephedrone =

Mephedrone, also known as 4 @-@ methyl methcathinone (4 @-@ MMC) or 4 @-@ methyl ephedrone, is a synthetic stimulant drug of the amphetamine and cathinone classes. Slang names include drone, M @-@ CAT, White Magic and meow meow. It is chemically similar to the cathinone compounds found in the khat plant of eastern Africa. It comes in the form of tablets or a powder, which users can swallow, snort or inject, producing similar effects to MDMA, amphetamines and cocaine.

In addition to its stimulant effects, mephedrone produces side effects, of which teeth grinding is the most common. The metabolism of mephedrone has been studied in rats and humans and the metabolites can be detected in urine after usage.

Mephedrone was first synthesised in 1929, but did not become widely known until it was rediscovered in 2003 at which point it was legal to produce and possess in many countries. By 2007, mephedrone was reported to be available for sale on the internet, by 2008 law enforcement agencies had become aware of the compound, and by 2010, it had been reported in most of Europe, becoming particularly prevalent in the United Kingdom. Mephedrone was first made illegal in Israel in 2008, followed by Sweden later that year. In 2010, it was made illegal in many European countries and in December 2010, the EU ruled it illegal. In Australia, New Zealand and the United States, it is considered an analog of other illegal drugs and can be controlled by laws similar to the US Federal Analog Act. In September 2011, the US temporarily classified mephedrone as a Schedule I drug, effective October 2011. This classification was made permanent in July 2012 with the passage of the Synthetic Drug Abuse Prevention Act (SDAPA).

= = Uses = =

= = = Recreational = = =

Users have reported that mephedrone causes euphoria, stimulation, an enhanced appreciation for music, an elevated mood, decreased hostility, improved mental function and mild sexual stimulation; these effects are similar to the effects of cocaine, amphetamines and MDMA, and last different amounts of time depending on the way the drug is taken. Of 70 Dutch users of mephedrone, 58 described it as an overall pleasant experience and 12 described it as an unpleasant experience. In a survey of UK users who had previously taken cocaine, most users found it produced a better @-@ quality and longer @-@ lasting high and was less addictive. The users were also asked to compare the " risk ", and they answered that it was equal. A study of users in Northern Ireland found they did not equate the fact that mephedrone was legal with it being safe to use. This was contrary to another study in New Zealand, where users of benzyloperazine thought that because it was legal, it was safe.

= = = Available forms = = =

Mephedrone can come in the form of capsules, tablets or white powder that users may swallow, snort, inject, smoke or use rectally. When taken orally, users reported they could feel the effects within 15 ? 45 minutes; when snorted, the effects were felt within minutes and peaked within half an hour. The effects last for between two and three hours when taken orally or nasally, but only half an hour if taken intravenously. It is sometimes sold mixed with methylone in a product called bubbles in the UK and also mixed with other cathinones, including ethcathinone, butylone, fluoromethcathinone and methedrone.

= = = Purity = = =

One published study that analysed samples of mephedrone bought using the internet in the UK in

2010 found it was racemic (a mixture of both stereoisomers) and of high purity . An unpublished study of six samples also ordered off the internet in the UK in 2010 found they contained very few organic impurities . Four products sold in Irish head shops were tested in 2010 and were found to contain between 82 % and 14 % mephedrone , with some products containing benzocaine and caffeine .

= = Adverse effects = =

= = = Short @-@ term effects = = =

The ECMDDA reported mephedrone can cause various unintended side effects including : dilated pupils , poor concentration , teeth grinding , problems focusing visually , poor short @-@ term memory , hallucinations , delusions , and erratic behaviour . They noted the most severe effects appear anecdotally to be linked with high doses or prolonged usage , and the effects may be due to users taking other intoxicants at the same time . Other effects users in internet forums have noted include changes in body temperature , increased heart rate , breathing difficulties , loss of appetite , increased sweating , discolouration of extremities , anxiety , paranoia and depression . When snorted , it can also cause nose bleeds and nose burns . A survey conducted by the National Addiction Centre , UK , found 67 % of mephedrone users experienced sweating , 51 % suffered from headaches , 43 % from heart palpitations , 27 % from nausea and 15 % from cold or blue fingers , indicative of vasoconstriction occurring . Doctors at Guy 's Hospital , London reported , of 15 patients they treated after taking mephedrone in 2009 , 53 % were agitated , 40 % had increased heart rates , 20 % had systolic hypertension and 20 % had seizures ; three required treatment with benzodiazepines , predominantly to control their agitation . They reported none of their patients suffered from cold or blue peripheries , contrary to other reports . Nine of the 15 of patients had a Glasgow coma scale (GCS) of 15 , indicating they were in a normal mental state , four had a GCS below 8 , but these patients all reported using a central nervous system depressant , most commonly GHB , with mephedrone . The patients also reported polydrug use of a variety of compounds .

= = = Neurotoxicity = = =

Despite similarities to known neurotoxins such as methamphetamine and cathinone derivatives , mephedrone does not appear to produce neurotoxic effects in the dopamine system of mice .

= = = Reinforcement disorders = = =

There have been reports of users craving mephedrone , suggesting it may be addictive .

= = Overdose = =

= = = Toxicity = = =

In 2009 , one case of sympathomimetic toxicity was reported in the UK after a person took 0 @.@ 2 g of mephedrone orally , and after this did not achieve the desired effect , subcutaneously injected 3 @.@ 8 g mixed with water into his thighs . Shortly afterwards , the user " developed palpitations , blurred tunnel vision , chest pressure and sweating " . The patient was treated with 1 mg of lorazepam and the sympathomimetic features decreased and the user was discharged within six hours of arrival . One case of serotonin syndrome has been reported , where the patient was already prescribed fluoxetine and olanzapine , and then took 40 tablets containing mephedrone in one night . He was treated with lorazepam and discharged 15 hours after admission . Both

enantiomers of methcathinone , which differs only in the lack of the methyl group on the aryl ring when compared to mephedrone , have been shown to be toxic to rat dopamine neurons , and the S @-@ enantiomer was also toxic against serotonin neurons . Simon Gibbons and Mire Zloh of the School of Pharmacy , University of London stated , based on the chemical similarities between methcathinone and mephedrone , " it is highly likely that mephedrone will display neurotoxicity " . However , Brunt and colleagues stated , " extreme caution " should be used when inferring the toxicity of mephedrone from methcathinone , noting some of the toxicity associated with methcathinone is due to manganese impurities related to its synthesis , rather than the compound itself . They concluded more experimental research is needed to investigate the toxicity of mephedrone .

Doctors who treated a 15 @-@ year @-@ old female suffering from mephedrone intoxication suggested in The Lancet that , like MDMA , mephedrone may promote serotonin @-@ mediated release of antidiuretic hormone , resulting in hyponatraemia and an altered mental state . In another case , a 19 @-@ year @-@ old male was admitted to hospital suffering from inflammation of the heart , 20 hours after taking one gram of mephedrone . The doctors treating the patient stated it was caused by either a direct toxic effect of mephedrone on the heart muscle , or by an immune response . One case of acquired methaemoglobinaemia , where a patient had " bluish lips and fingers " , has also been reported , after the user snorted one gram of mephedrone . The patient started to recover after arriving at the hospital and it was not necessary to administer any medication .

= = = Deaths = = =

= = = = Sweden = = = =

In 2008 , an 18 @-@ year @-@ old Swedish woman died in Stockholm after taking mephedrone . The newspaper Svenska Dagbladet reported the woman went into convulsions and turned blue in the face . Doctors reported she was comatose and suffering from hyponatremia and severe hypokalemia ; the woman died one and a half days after the onset of symptoms . An autopsy showed severe brain swelling . Mephedrone was scheduled to be classified as a " dangerous substance " in Sweden even before the woman 's death at Karolinska University Hospital on 14 December , but the death brought more media attention to the drug . The possession of mephedrone became classified as a criminal offence in Sweden on 15 December 2008 .

= = = = United Kingdom = = = =

In 2010 , unconfirmed reports speculated about the role mephedrone has played in the deaths of several young people in the UK . By July 2010 , mephedrone had been alleged to be involved in 52 fatalities in the UK , but detected in only 38 of these cases . Of the nine that coroners had finished investigating , two were caused directly by mephedrone . The first death reported to be caused by mephedrone use was that of 46 @-@ year @-@ old , John Sterling Smith , who had underlying health problems and repeatedly injected the drug . A report in Forensic Science International in August 2010 stated mephedrone intoxication has been recorded as the cause of death in two cases in Scotland . Post mortem samples showed the concentration of mephedrone in their blood was 22 mg / L in one case and 3 @.@ 3 mg / L in the other . The death of a teenager in the UK in November 2009 was widely reported as being caused by mephedrone , but a report by the coroner concluded she had died from natural causes . In March 2010 , the deaths of two teenagers in Scunthorpe were widely reported by the media to be caused by mephedrone . Toxicology reports showed the teenagers had not taken any mephedrone and had died as a result of consuming alcohol and the heroin substitute methadone . According to Fiona Measham , a criminologist who is a member of the ACMD , the reporting of the unconfirmed deaths by newspapers followed " the usual cycle of ? exaggeration , distortion , inaccuracy and sensationalism " associated with the

reporting of recreational drug use .

== = United States = = =

Mephedrone has been implicated in the death of a 22 @-@ year @-@ old male , who had also injected black tar heroin . Mephedrone was found in his blood at a concentration of 0 @.@ 50 mg / L and in his urine at a concentration of 198 mg / L. The blood concentration of morphine , a metabolite of heroin , was 0 @.@ 06 mg / L. For comparison , the average blood morphine concentration resulting from deadly overdoses involving only heroin is around 0 @.@ 34 mg / L.

= = Pharmacology = =

= = = Pharmacodynamics = = =

The pharmacology and toxicology of mephedrone had not been studied in detail until well after its sale as a designer drug and its addition to controlled drug lists in many countries . Writing in the British Medical Journal , psychiatrists stated , given its chemical structure , " mephedrone is likely to stimulate the release of , and then inhibit the reuptake of monoamine neurotransmitters " . The cathinone derivatives methcathinone and methylone act in a similar way to amphetamines , mainly acting on catecholamine transporters , so mephedrone is expected also to act in this way . The actions of amphetamines and cathinones are determined by the differences in how they bind to noradrenalin , dopamine and serotonin transporters . Molecular modelling of mephedrone suggests it is more hydrophilic than methyl @-@ amphetamines , which may account for the higher doses required to achieve a similar effect , because mephedrone is less able to cross the blood ? brain barrier . Mephedrone has a chiral centre , so exists in two forms , called enantiomers ; the S form is thought to be more potent than the R form , because this applies to cathinone . A study by Gregg et al . , determined that the R form is more dopaminergic and rewarding than the S form , in contrast to what is observed with cathinone .

Mephedrone is often consumed with alcohol . A study in mice investigated the interrelation between these two substances , focusing on the psychostimulant and rewarding properties of mephedrone . It found that at low (non stimulant) doses alcohol significantly enhanced the psychostimulant effects of mephedrone . This effect was mediated by an increase in synaptic dopamine , as haloperidol , but not ketanserin , was able to block the potentiation by alcohol . Similarly , the rewarding properties of mephedrone were enhanced by a low non @-@ rewarding dose of alcohol .

= = = Pharmacokinetics = = =

Several articles published near the end of 2011 examined the effects of mephedrone , compared to the similar drugs MDMA and amphetamine in the nucleus accumbens of rats , as well as examining the reinforcing potential of mephedrone . Dopamine and serotonin were collected using microdialysis , and increases in dopamine and serotonin were measured using HPLC . Reward and drug seeking are linked to increases in dopamine concentrations in the nucleus accumbens , and drug half @-@ life plays a role in drug seeking , as well . Based on histological examination , most of the author 's probes were in the nucleus accumbens shell . Mephedrone administration caused about a 500 % increase in dopamine , and about a 950 % increase in serotonin . They reached their peak concentrations at 40 minutes and 20 minutes , respectively , and returned to baseline by 120 minutes after injection . In comparison , MDMA caused a roughly 900 % increase in serotonin at 40 minutes , with an insignificant increase in dopamine . Amphetamine administration resulted in about a 400 % increase in dopamine , peaking at 40 minutes , with an insignificant increase in serotonin . Analysis of the ratio of the AUC for dopamine (DA) and serotonin (5 @-@ HT) indicated mephedrone was preferentially a serotonin releaser , with a ratio of 1 @.@ 22 : 1 (serotonin vs. dopamine) . Additionally , half @-@ lives for the decrease in DA and 5 @-@ HT were calculated for

each drug . Mephedrone had decay rates of 24 @. @ 5 minutes and 25 @. @ 5 minutes , respectively . MDMA had decay values of 302 @. @ 5 minutes and 47 @. @ 9 minutes , respectively , while amphetamine values were 51 minutes and 84 @. @ 1 minutes , respectively . Taken together , these findings show mephedrone induces a massive increase in both DA and 5 @- @ HT , combined with rapid clearance . The rapid rise and subsequent fall of DA levels could explain some of the addictive properties mephedrone displays in some users .

= = = Metabolism = = =

Based on the analysis of rat and human urine by gas chromatography and mass spectrometry , mephedrone is thought to be metabolised by three phase 1 pathways . It can be demethylated to the primary amine (producing compounds 2 , 3 and 5) , the ketone group can be reduced (producing 3) or the tolyl group can be oxidised (producing 6) . Both 5 and 6 are thought to be further metabolised by conjugation to the glucuronide and sulfate derivatives . Knowledge of the primary routes of metabolism should allow the intake of mephedrone to be confirmed by drug tests , as well as more accurate determination of the causes of side effects and potential for toxicity .

= = = Detection in body fluids = = =

Mephedrone may be quantitated in blood , plasma or urine by gas chromatography @- @ mass spectrometry or liquid chromatography @- @ mass spectrometry to confirm a diagnosis of poisoning in hospitalized patients or to provide evidence in a medicolegal death investigation . Blood or plasma mephedrone concentrations are expected to be in a range of 50 ? 100 ?g / l in persons using the drug recreationally , > 100 ?g / l in intoxicated patients and > 500 ?g / l in victims of acute overdosage .

= = Physical and chemical properties = =

= = = Appearance and odour = = =

Mephedrone is a white substance . It is sold most commonly as crystals or a powder , but also in the form of capsules or pills . It can have a distinctive odour , reported to range from a synthetic fishy smell to the smell of vanilla and bleach , stale urine , or electric circuit boards .

= = = Synthesis = = =

Mephedrone can be synthesised in several ways . The simplest method , due to the availability of the compounds , is to add 4 @- @ methylpropiofenone dissolved in glacial acetic acid to bromine , creating an oil fraction of 4 ' -methyl @- @ 2 @- @ bromopropiofenone . The oil fraction can then be dissolved in dichloromethane (CH₂Cl₂) and drops of the solution added to another solution of CH₂Cl₂ @- @ containing methylamine hydrochloride and triethylamine . Hydrochloric acid (HCl) is then added and the aqueous layer is removed and turned alkaline using sodium hydroxide before the amine is extracted using CH₂Cl₂ . The CH₂Cl₂ is then evaporated using a vacuum , creating an oil which is then dissolved in a nonaqueous ether . Finally , HCl gas is bubbled through the mixture to produce 4 @- @ methylmethcathinone hydrochloride . This method produces a mixture of both enantiomers and requires similar knowledge to that required to synthesise amphetamines and MDMA .

It can also be produced by oxidising the ephedrine analogue 4 @- @ methylephedrine using potassium permanganate dissolved in sulfuric acid . Because 4 @- @ methylephedrine can be obtained in a specific enantiomeric form , mephedrone consisting of only one enantiomer can be produced . The danger associated with this method is it may cause manganese poisoning if the product is not correctly purified .

A stereospecific form of (S) -mephedrone could be prepared via Friedel ? Crafts acylation . The first step in the synthesis would be to react toluene and (S) -N @-@ trifluoroacetylalanoyl chloride in the presence of aluminium chloride , then deprotect the intermediate with hydrochloric acid @-@ propyl alcohol . This would produce (S) -4 @-@ methylcathinone , which could then be methylated to produce mephedrone .

= = = Analysis = = =

Mephedrone does not react with most reagent testing kits . The exception is the liebermann reagent , which gives a bright yellow reaction .

= = History = =

Mephedrone is one of hundreds of designer drugs or legal highs that have been reported in recent years , including artificial chemicals such as synthetic cannabis and semisynthetic substances such as methylhexanamine . These drugs are primarily developed to avoid being controlled by laws against illegal drugs , thus giving them the label of designer drugs . According to the European Monitoring Centre for Drugs and Drug Addiction , the synthesis of mephedrone was first reported in 1929 by Saem de Burnaga Sanchez in the Bulletin de la Société Chimique de France , under the name " toluyyl @-@ alpha @-@ monomethylaminoethylcetone " , but the compound remained an obscure product of academia until 2003 , when it was " re @-@ discovered " and publicised by an underground chemist on The Hive website , working under the pseudonym " Kinetic " . Kinetic posted on the site , " I ? ve been bored over the last couple of days and had a few fun reagents lying around , so I thought I ? d try and make some 1- (4 @-@ methylphenyl) -2 @-@ methylaminopropanone hydrochloride , or 4 @-@ methylmethcathinone . " before going on to describe that after taking it , the user had a " fantastic sense of well @-@ being that I haven ? t got from any drug before except my beloved Ecstasy . " In interviews Kinetic was described as " a mathematician who used to design sleeping pills for a major pharmaceutical company " and he stated that he was based in Israel when he rediscovered mephedrone .

A drug similar to mephedrone , containing cathinone , was sold legally in Israel from around 2004 , under the name hagigat . When this was made illegal , the cathinone was modified and the new products were sold by the Israeli company , Neorganics . The products had names such as Neodoves pills , but the range was discontinued in January 2008 after the Israeli government made mephedrone illegal . The Psychonaut Research Project , an EU organisation that searches the internet for information regarding new drugs , first identified mephedrone in 2008 . Their research suggested the drug first became available to purchase on the internet in 2007 , when it was also discussed on internet forums . Mephedrone was first seized in France in May 2007 , after police sent a tablet they assumed to be ecstasy to be analysed , with the discovery published in a paper titled " Is 4 @-@ methylephedrone , an " Ecstasy " of the twenty first century ? " Mephedrone was reported as having been sold as ecstasy in the Australian city of Cairns , along with ethylcathinone , in 2008 . An annual survey of regular ecstasy users in Australia in 2010 found 21 % of those surveyed had used mephedrone , with 17 % having done so in the previous six months . The price they paid per gram varied from A \$ 16 to \$ 320 .

Europol noted they became aware of it in 2008 , after it was found in Denmark , Finland and the UK . The Drug Enforcement Administration noted it was present in the United States in July 2009 . By May 2010 , mephedrone had been detected in all 22 EU member states that reported to Europol , as well as in Croatia and Norway . The Daily Telegraph reported in April 2009 that it was manufactured in China , but it has since been made illegal there . In March 2009 , Druglink magazine reported it only cost a " couple of hundred pounds " to synthesise a kilogram of mephedrone , the same month , The Daily Telegraph reported manufacturers were making " huge amounts of money " from selling it . In January 2010 , Druglink magazine reported dealers in Britain spent £ 2 @,@ 500 to ship one kilogram from China , but could sell it for £ 10 a gram , making a profit of £ 7 @,@ 500 . A later report , in March 2010 , stated the wholesale price of mephedrone was £ 4000 per kilogram .

In March 2011 , the International Narcotics Control Board published a report about designer drugs , noting mephedrone was by then being used recreationally in Europe , North America , Southeast Asia , New Zealand and Australia .

= = = United Kingdom = = =

Between the summer of 2009 and March 2010 , the use of mephedrone grew rapidly in the UK , with it becoming readily available at music festivals , head shops and on the internet . A survey of Mixmag readers in 2009 , found it was the fourth most popular street drug in the United Kingdom , behind cannabis , cocaine , and ecstasy . The drug was used by a diverse range of social groups . Whilst the evidence was anecdotal , researchers , charity workers , teachers and users reported widespread and increasing use of the drug in 2009 . The drug 's rapid growth in popularity was believed to be related to both its availability and legality .

Fiona Measham , a criminologist at The University of Lancaster , thought the emergence of mephedrone was also related to the decreasing purity of ecstasy and cocaine on sale in the UK , a view reinforced in a report by the National Treatment Agency for Substance Misuse . The average cocaine purity fell from 60 % in 1999 to 22 % in 2009 and about half of ecstasy pills seized in 2009 contained no MDMA , and by June 2010 almost all ecstasy pills seized in the UK contained no MDMA . A similar pattern was observed in the Netherlands , with the number of ecstasy tablets containing no MDMA rising from 10 % in mid @-@ 2008 to 60 % by mid @-@ 2009 , with mephedrone being detected in 20 % of ecstasy tablets by mid @-@ 2009 . The decrease of MDMA was thought to be partly due to the seizure of 33 tonnes of sassafras oil , the precursor to MDMA , in Cambodia in June 2008 , which could have been used to make 245 million doses of MDMA . According to John Ramsey , a toxicologist at St George 's , University of London , the emergence of mephedrone was also related to the UK government banning the benzylpiperazine class of drugs in December 2009 @.@ gamma @-@ Butyrolactone (GBL) , another previously " legal high " , was also banned in August 2009 despite concerns it would be replaced by other drugs .

By December 2009 mephedrone was available on at least 31 websites based in the UK and by March 2010 there were at least 78 online shops , half of which sold amounts of less than 200 grams and half that also sold bulk quantities . The price per gram varied from £ 9 @.@ 50 to £ 14 . Between July 2009 and February 2010 , UK health professionals accessed the National Poisons Information Service 's (NPIS) entry on mephedrone 1664 times and made 157 telephone inquiries ; the requests increased month on month over this period . In comparison , over a similar time period , the entries for cocaine and MDMA were accessed approximately 2400 times . After mephedrone was made illegal the number of inquiries to the NPIS fell substantially , to only 19 in June 2010 .

Media organisations including the BBC and The Guardian incorrectly reported mephedrone was commonly used as a plant fertiliser . In fact sellers of the drug described it as " plant food " because it was illegal to sell the compound for human consumption . In late 2009 UK newspapers began referring to the drug as meow or miaow (sometimes doubled as meow meow or miaow miaow) , a name that was almost unknown on the street at the time . In November 2009 , the tabloid newspaper , The Sun published a story stating that a man had ripped off his own scrotum whilst using mephedrone . The story was later shown to be an online joke posted on mephedrone.com , later included in a police report with the caveat that it could be unreliable . The police report was used as a source for the story in The Sun . Other myths the media often repeated during 2010 were that mephedrone had led to the deaths of over 20 people , teachers were unable to confiscate the drug from pupils and the government was too slow to ban the drug . Parallels were drawn between the media coverage of mephedrone and a piece of satire by Chris Morris in 1997 on Brass Eye when he tricked public figures into talking of the dangers of taking the fictional legal drug " cake " . The Advisory Council on the Misuse of Drugs (ACMD) have suggested that the media coverage of the drug led to its increased usage . Jon Silverman , a former BBC Home Affairs Correspondent , has written two articles discussing how the media had a strong influence over the UK government 's drugs policy , particularly in that the government wished to demonstrate they were being " tough " on drugs .

A survey of 1000 secondary school pupils and university students in Tayside conducted in February 2010 found 20 % of them had previously taken mephedrone . Although at the time it was available legally over the internet , only 10 % of users reported purchasing it online , with most purchasing it from street dealers . Of those who had used mephedrone , 97 % said it was easy or very easy to obtain . Around 50 % of users reported at least one negative effect associated with the use of mephedrone , of which teeth grinding is the most common . Detailed interviews with users in Northern Ireland similarly found that few purchased mephedrone online , with most interviewees citing concerns that their address would be traced or that family members could intercept the package .

On 30 March 2010 , Alan Johnson , the then Home Secretary , announced mephedrone would be made illegal " within weeks " after the ACMD sent him a report on the use of cathinones . The legislation would make all cathinones illegal , which Johnson said would " stop unscrupulous manufacturers and others peddling different but similarly harmful drugs " . The ACMD had run into problems with the UK Government in 2009 regarding drugs policy , after the government did not follow the advice of the ACMD to reclassify ecstasy and cannabis , culminating in the dismissal of the ACMD chairman , David Nutt , after he reiterated the ACMD 's findings in an academic lecture . Several members resigned after he was sacked , and prior to the announcement that mephedrone was to be banned , the trend continued when Dr Polly Taylor resigned , saying she " did not have trust " in the way the government would use the advice given by the ACMD . Eric Carlin , a member of the ACMD and former chairman of the English Drug Education Forum , also resigned after the announcement . He said the decision by the Home Secretary was " unduly based on media and political pressure " and there was " little or no discussion about how our recommendation to classify this drug would be likely to impact on young people 's behaviour . " Some former members of the ACMD and various charity groups expressed concern over the banning of the drug , arguing it would inevitably criminalise users , particularly young people . Others expressed concern that the drug would be left in the hands of black market dealers , who will only compound the problem . Carlin 's resignation was specifically linked to the criminalisation of mephedrone , he stated : " We need to review our entire approach to drugs , dumping the idea that legally @-@ sanctioned punishments for drug users should constitute a main part of the armoury in helping to solve our country ? s drug problems . We need to stop harming people who need help and support " .

The parliamentary debate was held on 8 April , one day after the 2010 general election had been announced , meaning it was during the so @-@ called " wash @-@ up period " when legislation is passed with little scrutiny . Only one hour was spent debating the ban and all three parties agreed , meaning no vote was required . In an interview conducted in July 2010 , when he was no longer a minister , Johnson admitted the decision to ban mephedrone was sped up after widespread reporting of deaths caused by the drug , and because the government wished to pass the law before parliament was dissolved prior to the upcoming general election . In January 2011 , however , Johnson told the Scunthorpe Telegraph that the decision was based only on information from the ACMD . An editorial in the April 2010 edition of The Lancet questioned the decision to ban mephedrone , saying the ACMD did not have enough evidence to judge the potential harms caused by mephedrone and arguing that policy makers should have sought to understand why young people took it and how they could be influenced to not take it . Evan Harris , then the Liberal Democrat science spokesman , stated the ACMD " was not ' legally constituted ' " as required by the Misuse of Drugs Act , when the report on cathinones was published , since after Taylor resigned , it lacked a veterinary surgeon . In the rush to make mephedrone illegal , the act that was passed specified the inactive enantiomer of mephedrone , leaving the active form legal until the loophole was closed in February 2011 by another act of parliament . In Chemistry World , John Mann , professor of chemistry at Queen 's University Belfast , suggested the UK create a law similar to the Federal Analog Act of the United States , which would have made mephedrone illegal as an analog of cathinone . In August 2010 , James Brokenshire , the Home Office drugs minister , announced plans to create a new category in the Misuse of Drugs Act , through the Police Reform and Social Responsibility Bill , that would allow new legal highs to be made temporarily illegal , without the need for a vote in parliament or advice from the ACMD , as was required to categorise mephedrone .

According to the Independent Scientific Committee on Drugs , after mephedrone was made illegal , a street trade in the drug emerged , with prices around double those prior to the ban , at £ 20 ? £ 25 per gram . In September 2010 , Druglink reported the ban had had a mixed effect on mephedrone use , with it decreasing in some areas , remaining similar in others and becoming more prevalent in some areas . In an online survey of 150 users after the ban , 63 % said they were continuing to use mephedrone , half of those used the same amount and half said they used less . Compared to previous surveys , more users purchased it from dealers , rather than the internet . The average price per gram was £ 16 , compared to around £ 10 before the ban . The 2010 Mixmag survey of 2500 nightclubbers found one @-@ quarter had used mephedrone in the previous month , the price had roughly doubled since it was made illegal , and it was more likely to be cut with other substances . Of those who had already used mephedrone prior to the ban , 75 % had continued to use it after the ban . Of the various drugs used by the survey participants , users were more likely to have concerns about it . Interviews with users in Northern Ireland also found the price had roughly doubled since it was made illegal , to around £ 30 a gram . Rather than the price rising due to increased scarcity of the drug , it is thought to have risen for two other reasons . Firstly , dealers knew there was still demand for mephedrone , but were aware the supplies may be exhausted in the future . Secondly , the dealers perceived customers were likely to be willing to pay more for an illegal substance .

Professor Shiela Bird , a statistician at the Medical Research Council , suggested the ban of mephedrone may lead to more cocaine @-@ related deaths . In the first six months of 2009 , the number of cocaine @-@ related deaths fell for the first time in four years , and fewer soldiers tested positive for cocaine in 2009 than in 2008 . She suggested this may have been due to users switching to mephedrone from cocaine , but cautioned that before full figures are available for 2009 and 2010 , it will be difficult to determine whether mephedrone saved lives , rather than cost them . Other supposedly legal drugs have filled the gap in the market since mephedrone was made illegal , including naphyrone (NRG @-@ 1) (since made illegal) and Ivory Wave , which has been found to contain MDPV , a compound made illegal at the same time as mephedrone . However , some products branded as Ivory Wave possibly do not contain MDPV . When tested , some products sold six weeks after mephedrone was banned , advertised as NRG @-@ 1 , NRG @-@ 2 and MDAI , were found to be mephedrone . A Drugscope survey of drugs workers at the end of 2012 reported that mephedrone use was still widespread in the UK and that there increasing reports of problematic users . It was being taken as not only a " poor man 's cocaine " but also amongst users of heroin and crack cocaine . Cases of intravenous use were also reported to be on the increase .

= = Society and culture = =

= = = Legal status = = =

When mephedrone was rediscovered in 2003 , it was not specifically illegal to possess in any country . As its use has increased , many countries have passed legislation making its possession , sale , and manufacture illegal . It was first made illegal in Israel , where it had been found in products such as Neodoves pills , in January 2008 . After the death of a young woman in Sweden in December 2008 was linked to the use of mephedrone , it was classified as a hazardous substance a few days later , making it illegal to sell in Sweden . In June 2009 , it was classified as a narcotic with the possession of 15 grams or more resulting in a minimum of two years in prison ? a longer sentence , gram for gram than given for the possession of cocaine or heroin . In December 2008 , Denmark also made it illegal and through the Medicines Act of Finland , it was made illegal to possess without a prescription . In November 2009 , it was classified as a " narcotic or psychotropic " substance and added to the list of controlled substances in Estonia and made illegal to import into Guernsey along with other legal highs , before being classified as a Class B drug in April 2010 . It was classified as a Class C drug in Jersey in December 2009 .

In 2010 , as its use became more prevalent , many countries passed legislation prohibiting

mephedrone . It became illegal in Croatia and Germany in January , followed by Romania and the Isle of Man in February . In March 2010 , it was classified as an unregulated medicine in the Netherlands , making the sale and distribution of it illegal . The importation of mephedrone into the UK was banned on 29 March 2010 . The next day , the ACMD in the UK published a report on the cathinones , including mephedrone , and recommended they be classified as Class B drugs . On 7 April 2010 , the Misuse of Drugs Act 1971 (Amendment) Order 2010 was passed by parliament , making mephedrone and other substituted cathinones , Class B drugs from 16 April 2010 . Prior to the ban taking effect , mephedrone was not covered by the Misuse of Drugs Act 1971 . It was , though , an offence under the Medicines Act to sell it for human consumption , so it was often sold as " plant food " or " bath salts " , although it has no use as these products ; this , too , was possibly illegal under the Trade Descriptions Act 1968 . In the US , similar descriptions have been used to describe mephedrone , as well as methylenedioxypyrovalerone (MDPV) . In May 2010 , the Republic of Ireland made mephedrone illegal , followed by Belgium , Italy , Lithuania , France and Norway in June and Russia in July . In August 2010 , Austria and Poland made it illegal and China announced it would be illegal as of 1 September 2010 . Mephedrone had been reported to be used in Singapore in February 2010 , but it was made illegal in November 2010 . In December 2010 , following the advice of the EMCDDA , mephedrone was made illegal throughout the EU , a move Switzerland also made shortly afterwards . Countries which have not already banned it , such as the Netherlands , Greece and Portugal , will need to change legislation to comply with the EU ruling . In Hungary , a government advisory body recommended mephedrone should be made illegal in August 2010 , which was followed , making it illegal in January 2011 ; Spain followed in February 2011 . Mexico , by Decree , outlawed mephedrone as a substance " with low or no therapeutical use which pose a serious threat to public health " in 2014 .

In some countries , mephedrone is not specifically listed as illegal , but is controlled under legislation that makes compounds illegal if they are analogs of drugs already listed . In Australia during 2010 , it was not specifically listed as prohibited , but the Australian Federal Police stated it is an analogue to methcathinone and therefore illegal . It is now listed as a Schedule 9 prohibited substance in Australia under the Poisons Standard (October 2015) . A Schedule 9 substance is a substance which may be abused or misused , the manufacture , possession , sale or use of which should be prohibited by law except when required for medical or scientific research , or for analytical , teaching or training purposes with approval of Commonwealth and / or State or Territory Health Authorities . In February 2010 , 22 men were arrested in connection with importing mephedrone . By January 2011 , every state in Australia , other than Victoria , had listed it as a controlled drug .

In New Zealand , it is not included in the Misuse of Drugs Act 1975 , but is illegal , as it is similar to controlled substances .

In Canada , mephedrone is not explicitly listed in any schedule of the Controlled Drugs and Substances Act , but " amphetamines , their salts , derivatives , isomers and analogues and salts of derivatives , isomers and analogues " are included in Section 19 of Schedule I of the act . Cathinone and methcathinone are listed in separate sections of Schedule III , while diethylpropion and pyrovalerone (also cathinones) , are listed in separate sections of Schedule IV , each without language to capture analogues , isomers , etc . Mephedrone is considered a controlled substance by Health Canada . According to the Canadian Medical Association , mephedrone is grouped with other amphetamines as Schedule I controlled substances . There have been several media reports of the Canadian police seizing mephedrone . Mephedrone is also currently scheduled in the United States as of 2011 . The Drug Enforcement Administration (DEA) states , as an analogue of methcathinone , possession of mephedrone can be controlled by the Federal Analog Act , but according to the Los Angeles Times , this only applies if it is sold for human consumption . Several cities and states , such as New York State , have passed legislation to specifically list mephedrone as illegal , but in most areas it remained legal , so long as it is not sold for human consumption , so retailers described it as ' bath salts ' . In September 2011 , The DEA began using its emergency scheduling authority to temporarily control mephedrone . Except as authorized by law , this action made possessing and selling mephedrone or the products that contain it illegal in the US for at least one year while the DEA and the United States Department of Health and Human Services conduct

further study . Control of these compounds became permanent on 9 July 2012 , via passage of the Synthetic Drug Abuse Prevention Act of 2012 .

== Usage ==

A survey conducted in late 2009 by the National Addiction Centre (UK) found 41 % of readers of Mixmag had used mephedrone in the last month , making it the fourth most popular drug amongst clubbers . Of those , two thirds snorted the drug and the average dosage per session was 0.9 g ; the length of sessions increased as the dosage increased . Users who snorted the drug reported using more per session than those who took it orally (0.97 g compared to 0.74 g) and also reported using it more often (five days per month compared to three days per month) . An Irish study of people on a methadone treatment program for heroin addicts found 29 of 209 patients tested positive for mephedrone usage .

== Harm assessment ==

Professor David Nutt , former chair of the Advisory Council on the Misuse of Drugs (ACMD) in the UK has said , " people are better off taking ecstasy or amphetamines than those [drugs] we know nothing about " and " Who knows what 's in [mephedrone] when you buy it ? We don 't have a testing system . It could be very dangerous , we just don 't know . These chemicals have never been put into animals , let alone humans . " Les King , a former member of the ACMD , has stated mephedrone appears to be less potent than amphetamine and ecstasy , but that any benefit associated with this could be negated by users taking larger amounts . He also told the BBC , " all we can say is [mephedrone] is probably as harmful as ecstasy and amphetamines and wait until we have some better scientific evidence to support that . "