

Chapter 3 – The burden of illicit drug use

3.1 Introduction

The use of illicit drugs – particularly strongly addictive drugs like heroin, cocaine and methamphetamine – is associated with a range of physical, psychological and social harms. This can include deaths from overdose, long-term adverse effects on health, dependence, and harms to families and communities. This chapter considers the harms associated with drug use per se. The harms associated with the regulatory framework of drug prohibition are considered in **Chapter 6**.^a

Not all illicit drugs are equally harmful and the extent of harm varies between individuals and depends on the level and pattern of drug use, as well as the pharmacological properties of each drug. Harm is also influenced by the setting in which the substances are used and the combination of substances used.

The level of harm is affected by:

- the **dosage of the drug** – the more of a drug that is taken on a specific occasion, the higher the risk of the user experiencing acute effects, including intoxication and overdose. The greater the amount taken over time, the higher the risk of chronic toxic effects. An additional risk with illicit drugs is that a user may be unaware of the exact dose they are taking; a dose that is higher than expected will increase the risk of harm or fatality
- the **pattern of drug use** – which is determined by the frequency and variability of drug use
- the **mode of administration** – which depends on the way the drug is ingested (eg swallowed, snorted, injected, etc).¹

The level of harm will also be affected by the purity of the drug. Many illicit drugs are commonly found to contain adulterants that can increase the risk of morbidity and mortality (see **Section 3.3.4**).

^a While we discuss the harms from drug use per se and those from prohibition and other social reactions to drug use separately, it is worth noting that in practice there is often a mixture.

3.2 Measuring the level of harm

In the last two decades, there have been a number of attempts to measure and rank the relative level of harm associated with different psychoactive substances.²⁻⁷

These have used various measures of harm, including a drug's safety ratio (usual effective dose for non-medical purposes divided by the usual lethal dose), intoxicating effect, general toxicity, social dangerousness, dependence potential and social and healthcare costs. It is worth noting that, while these evaluations do not directly consider the epidemiology of the respective drugs, some of the criteria (eg the harm that a drug causes to those other than the user) indirectly take account of the number of users.

In 2010, a Dutch addiction medicine expert group conducted a risk assessment of 19 recreational drugs (17 illicit drugs plus alcohol and tobacco), and ranked them on the basis of acute and chronic toxicity, addictive potency and social harm.⁸ The study ranked alcohol, tobacco, heroin, crack cocaine and methamphetamine as being most harmful, with benzodiazepines, GHB, cannabis, ecstasy and ketamine scoring in the moderately harmful range.⁸ Psilocybin (magic mushrooms), LSD and khat were regarded as the least harmful of the drugs in the study.⁸

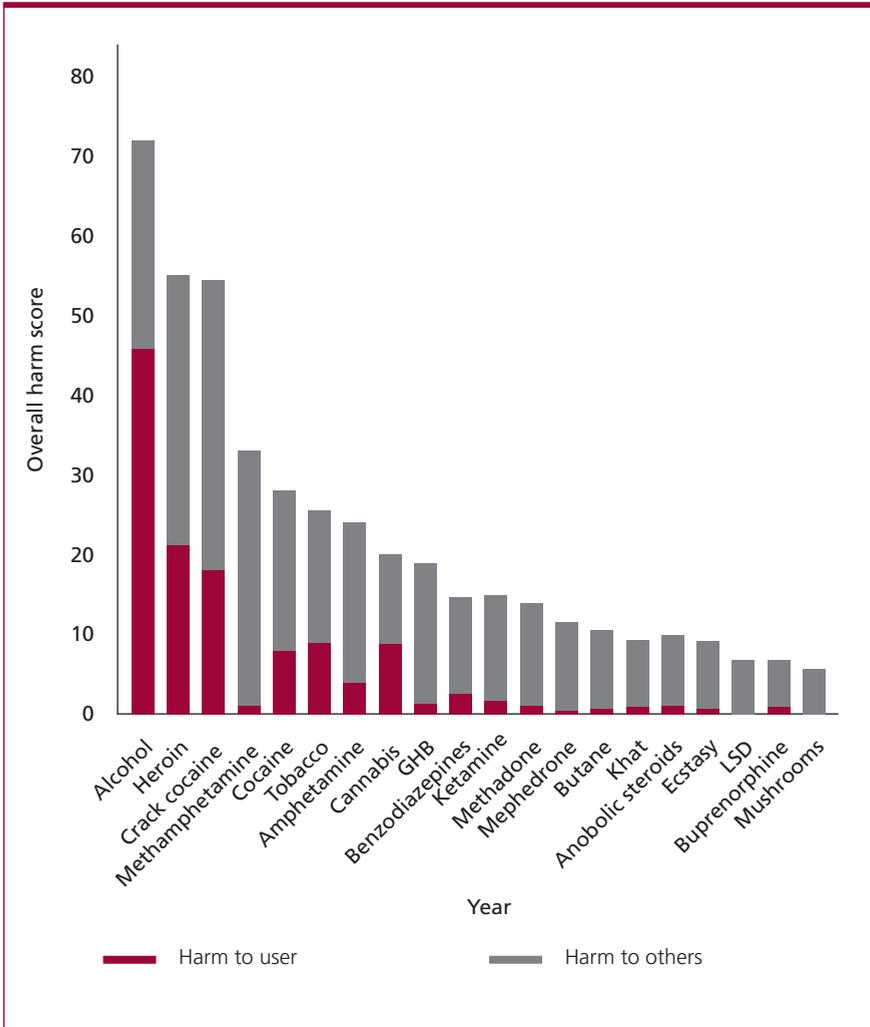
Similar conclusions were made in a 2010 study by Nutt and colleagues.² This study involved a multicriteria decision analysis of the level of harm associated with the use of different drugs in the UK. Each drug was scored out of 100 points based on 16 criteria, nine of which related to the individual harms, and seven to the harms caused to others.² The study found that heroin, crack cocaine, and methamphetamine were the most harmful drugs to individuals.² Alcohol, heroin, crack cocaine and cannabis were scored as the most harmful to others.² Overall, the most harmful drug was found to be alcohol, followed by heroin, crack cocaine, methamphetamine and cocaine (see **Figure 3**).²

Nutt et al and the authors of the Dutch study concluded that their findings on the relative levels of harm for the different drugs correlated poorly with the legal classification of drugs;^{2,8} legal substances such as tobacco and alcohol were found to be at least as harmful as commonly used illicit drugs.

It is important to note that the methodology for these studies evaluating and ranking drug harms has been questioned by Rolles and Measham⁹ and Caulkins et al.¹⁰ This primarily concerns the difficulty in quantifying the multiple and non-comparable dimensions of harm in a single measure, and the failure to disaggregate harms related to drug use from those related to drug user behaviours and the policy environment.^{9,10} Several rebuttals were published in response to the critique by Caulkins et al (including from the principal author of the 2010 study, Professor David Nutt). These noted that the importance of developing new approaches to ranking

drug harms was to progress the debate among policy makers and the public regarding the validity of the way illicit drugs are classified.¹¹⁻¹⁵

Figure 3 – Drugs ordered by their overall harm scores, showing the separate contributions to the overall scores of harms to users and harm to others



Reprinted from Nutt DJ, King LA & Phillips LD (2010) Drug harms in the UK: a multicriteria decision analysis. *The Lancet* **376**: 1558-65,² ©2010, with permission from Elsevier.

3.3 Primary and secondary health harms

The primary health harms associated with illicit drug use result from the acute and chronic toxic effects of individual drugs, as well as drug dependence (ie where the risk of harm is intrinsically raised due to the chronic drug use). Acute toxicity can lead to short-term harms, ranging from unpleasant side-effects such as vomiting and fainting, to more serious impacts such as seizures, tissue and neural damage or death. In the longer term, repeated drug use can lead to chronic physical and psychological health effects, as well as dependence.

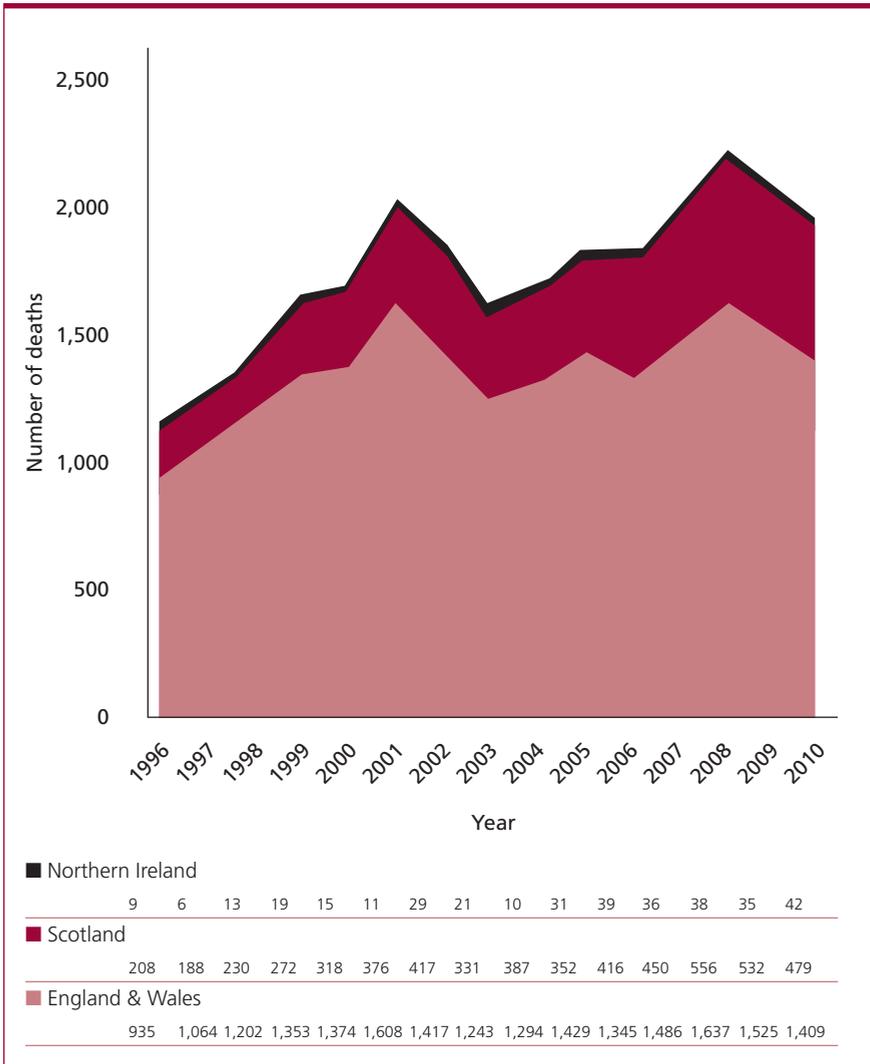
3.3.1 Drug-related deaths: overdoses, poisoning and suicides

While **Section 2.2** notes that current use of illicit drugs in the UK has been declining since the 1990s, the number of recorded drug-related deaths^b in the UK increased by 67.5 per cent between 1996 and 2010, with year-on-year fluctuations (see **Figure 4**).¹⁷ In 2010, there were 1,930 drug-related deaths, equivalent to a rate of 3.10 per 100,000 population (all ages).¹⁷ The vast majority of these were among men (79.4%) and the rate was highest in the 35 to 39 years age group. Deaths in all age groups decreased from the previous year, with the exception of the oldest age group (60 plus years) (see **Figure 5**). The largest decrease was seen among those aged 20 to 29 years (25.6%). The difference in trends for the 20 to 29 and 40 to 49 years age groups in **Figure 5** (with an ageing trend observed among overdose deaths) suggests there may be an ageing cohort effect.

Most of the drug-related deaths in the UK continue to be linked to the use of opioid drugs, primarily heroin/morphine and methadone, followed by cocaine and ecstasy (see **Table 2**).¹⁷ Overdoses related to opioid use are predominantly caused by respiratory depression, while cocaine-related deaths usually result from myocardial infarction or stroke, and ecstasy-related deaths from hyperthermia or hyponatraemia and reduced resilience to other concurrent threats (see **Appendix 3** for more details).¹ It is worth noting that some categories of illicit drugs, including cannabis, present no risk of death by overdose.

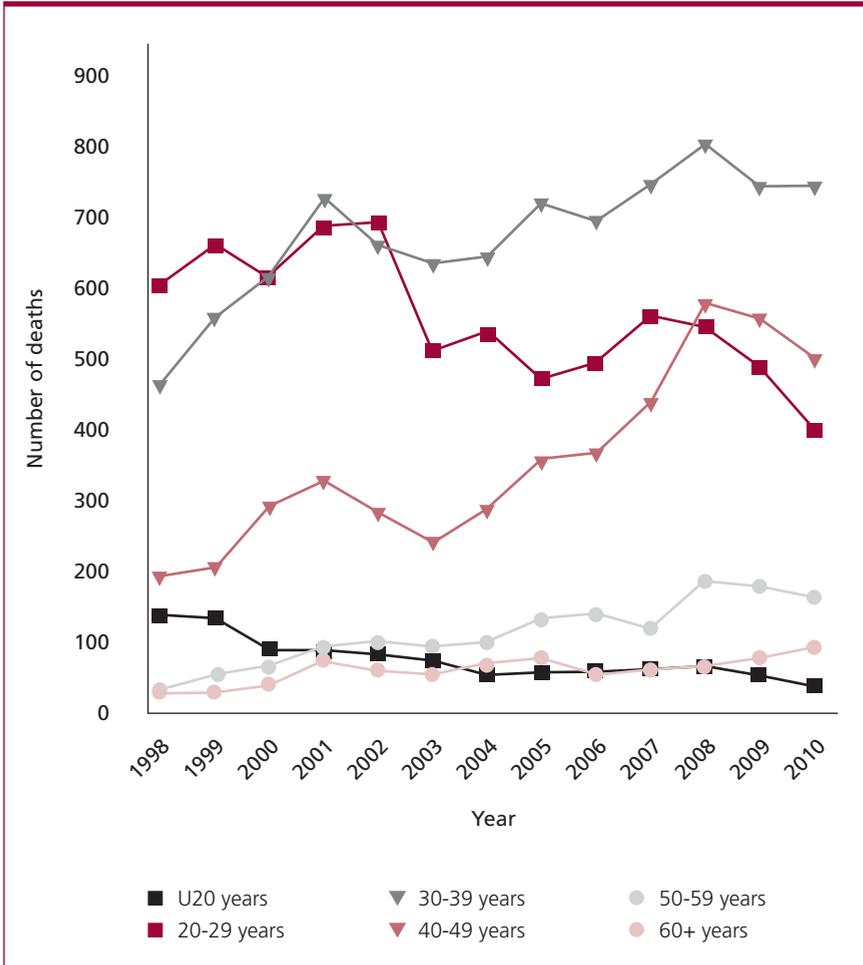
^b Defined as deaths caused directly by the consumption of at least one illegal drug. Interpretation of these data should be treated with caution, as death certificates do not always state specific drug types, which could lead to under-reporting, or deaths may be counted in more than one category.

Figure 4 – Drug-related deaths in the UK, 1996 to 2010



Source: Davies C, English L, Stewart C et al (2011) *United Kingdom drug situation: annual report to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) 2011*. London: United Kingdom Focal Point at the Department of Health.¹⁷ Reproduced with the permission of the UK Focal Point on Drugs, Department of Health.

Figure 5 – Drug-related deaths by age group in the UK, 1998 to 2010



Source: Davies C, English L, Stewart C et al (2011) *United Kingdom drug situation: annual report to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) 2011*. London: United Kingdom Focal Point at the Department of Health.¹⁷ Reproduced with the permission of the UK Focal Point on Drugs, Department of Health.

Table 2 – Drug mentions on death certificates in the UK, 2002 to 2010

| Drug | Year | | | | | | | | | Percentage change (2002-10) |
|------------------|-------|------|------|-------|------|-------|-------|-------|-------|-----------------------------|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | |
| Heroin | 1,118 | 883 | 977 | 1,043 | 985 | 1,130 | 1,243 | 1,210 | 1,061 | -5.1 |
| Methadone | 300 | 292 | 300 | 292 | 339 | 441 | 565 | 582 | 503 | +67.6 |
| Cocaine | 161 | 161 | 192 | 221 | 224 | 246 | 325 | 238 | 180 | +11.8 |
| Ecstasy | 79 | 66 | 61 | 73 | 62 | 64 | 55 | 32 | 9 | -88.6 |

Source: Davies C, English L, Stewart C et al (2011) *United Kingdom drug situation: annual report to the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) 2011*. London: United Kingdom Focal Point at the Department of Health.¹⁷ Reproduced with the permission of the UK Focal Point on Drugs, Department of Health.

Various studies have estimated that the annual death rate for 'high-risk' drug users, such as those who illegally inject opioid drugs, is between 1.1 per cent and 2.0 per cent.¹⁸⁻²¹ Increased risk of death from drug overdose has also been found to be associated with poverty, homelessness, polydrug and polysubstance use (see **Glossary**), impaired physical health, depression and a previous history of drug overdose.²¹⁻²³ Illicit drug users are known to have higher rates of completed and attempted suicide compared to the general population, and this is associated with psychopathology, family dysfunction, social isolation and polydrug use.²¹

3.3.2 Short- and long-term health harms

Illicit drug use can lead to a range of short- and long-term adverse health impacts.^{24,26} A detailed overview of the latest scientific evidence about the health-related harms of emerging and established licit and illicit psychoactive drugs commonly used in the UK is provided in **Appendix 3**.

Amphetamine and methamphetamine

Acute and chronic amphetamine and methamphetamine use is associated with a wide range of complications, although their incidence is unclear.²⁷ These complications include:

- cardiovascular disorders
- central nervous system (CNS)/psychiatric complications
- pulmonary disorders
- gastrointestinal complications
- metabolic disorders.^{26,28,29}

Deaths from amphetamine and methamphetamine use are reported, but are relatively uncommon.^{30,31}

Psychological dependence on amphetamine occurs in 30 to 40 per cent of repeated users,²⁴ but cessation of use is not associated with any physical symptoms. The use of methamphetamine (injected or smoked) in its crystal form (crystal meth) is also associated with a high potential for psychological as well as physical dependence.^{25,32-36}

Cannabis

The effects of cannabis are dependent on the strength and type used. Acute cannabis intoxication (at high doses) can result in anxiety and panic attacks, paranoia, dysphoria, cognitive impairment, perceptual distortions and confusion/delirium.^{24,26}

Death caused directly by an overdose of smoked cannabis is not possible. Chronic use is associated with impaired pulmonary function, recurrent bronchitis, worsening of asthma and lung cancer (from carcinogens in cannabis and tobacco smoke).^c Animal studies suggest that heavy use may cause disruption of ovulation, sperm production and sperm function.^{24,26,39,40}

Cannabis use is also associated with psychological harm, although there is considerable scientific disagreement regarding the relationship between the two. There is broad agreement in the medical community that:

- regular heavy users may suffer repeated, short episodes of psychosis and effectively maintain a chronic psychotic state

^c The evidence for the association between cannabis and lung cancer is unclear, owing to the difficulty in ruling out tobacco use as a confounder. Some studies report an increased risk,³⁷ while other studies find no link.³⁸

- cannabis use may trigger relapse or exacerbate existing symptoms in patients with schizophrenia, and may precipitate psychotic symptoms in individuals predisposed to developing schizophrenia. At an individual level, cannabis users have a two-fold increase in the relative risk for later developing schizophrenia, while at a population level, the effect size is relatively small, as eliminating its use in those at risk would reduce the incidence of schizophrenia by 8 per cent.^{24,41-45}

Emerging evidence also suggests that heavy cannabis use by adolescents increases the risk of depression and schizophrenia in later life, especially in individuals who already have a vulnerability to develop a psychiatric syndrome.⁴⁶⁻⁴⁸ Regular cannabis use during adolescence has also been found to result in declines in intelligence quotient (IQ). A 2012 study found that persistent regular cannabis use over 20 years was associated with neuropsychological decline broadly across the domains of functioning (ie executive function, memory, processing speed, perceptual reasoning and verbal comprehension).⁴⁹ This effect was concentrated among adolescent-onset users, and the cessation of cannabis use did not fully restore neuropsychological functioning in this group.⁴⁹

Approximately 10 per cent of people who have ever used cannabis develop features of dependence, which is associated with chronic regular use and may be physical or psychological.²⁴

Cocaine and crack cocaine

Cocaine use is linked to a high incidence of cardiac arrhythmias and sudden death from overdose, mainly owing to cardiovascular and cerebrovascular complications.⁵⁰⁻⁶¹ The risk of cocaine toxicity is influenced by concomitant use of other drugs, in particular alcohol and heroin.⁶¹ Many deaths caused by cardiovascular complications occur in individuals with pre-existing risk factors or conditions induced by chronic cocaine use, such as left ventricular hypertrophy, coronary atherosclerosis or vascular malformations in the brain.^{62,63}

While cardiovascular and cerebrovascular complications are the most common adverse health consequences,⁶⁴ acute and chronic cocaine use can also lead to:

- respiratory disorders, either acute (pulmonary oedema, pulmonary infarction, haemoptysis) or chronic (eg pulmonary hypertension)
- genitourinary and obstetric disorders, either acute (acute renal failure, mediated by rhabdomyolysis or direct toxicity, testicular infarction, placental abruption, spontaneous abortion) or chronic (premature birth, growth retardation)
- gastrointestinal complications (mesenteric ischaemia or infarction)
- psychiatric disorders (euphoria, dysphoria, agitation, anxiety, suicidal thoughts, paranoid psychosis, depression)
- musculoskeletal and dermatological disorders.⁶²

Ecstasy

The incidence of serious acute adverse events related to ecstasy use is low and their occurrence is unpredictable.^{65,66} Ecstasy-related deaths have received a lot of media attention,⁶⁷ but they are rare and usually result from hyperthermia or acute hyponatraemia (where a user drinks too much water to avoid dehydration), which can ultimately lead to cerebral oedema.^{66,68}

In the short term, regular use of ecstasy can lead to sleep problems, lack of energy, dietary problems and increased susceptibility to colds and flu. It is also associated with a range of psychological effects, including anxiety, visual hallucinations and paranoia.²⁴ In the longer term, ecstasy can cause psychological dependence as users seek the feelings of euphoria and calmness associated with its use.^{24,68,69} There is little evidence for long-term physical dependence associated with ecstasy.⁶⁸

There is also little evidence of longer-term harm to the brain in terms of either its structure or function.⁶⁶ There is some evidence for a small decline in a variety of domains, including verbal memory, even at low cumulative doses.^{68,70,71} The magnitude of such deficits appears to be small and their clinical relevance is unclear.

GHB

Use of GHB at high doses can lead to overdose, which is commonly associated with acute complications such as unconsciousness, vomiting, tremors, headache and confusion.⁷²⁻⁷⁴ Severe intoxication can lead to deep coma and breathing difficulties, and GHB-related deaths have been reported in rare cases.⁷⁵ As well as developing psychological dependence, users can become physically dependent on GHB.^{76,77} Although this is rare, it can be severe, with a rapid onset of severe withdrawal symptoms including delirium, psychosis, tremor, insomnia and severe anxiety.⁷⁸ Dependence can develop from severe bingeing over a short period, or may result from regular use over a longer period.

Adverse effects of the related drugs GBL and 1,4-butanediol (1,4-BD) are listed in **Appendix 3**.

Heroin and other opioid drugs

As noted previously, opioid overdose is the most common cause of drug-related death in the UK (predominantly from respiratory depression and drop in blood pressure resulting in respiratory arrest).¹⁷ A number of common correlates of overdose fatality have been identified, which include:

- a long history and high level of opioid dependence
- recent abstinence (eg prison, detoxification release)
- polydrug or polysubstance use (particularly with alcohol, which seems to be a factor in approximately half of overdoses, and benzodiazepines)
- being male
- increasing age (most fatalities occur among those in their 30s)
- social isolation
- neurocognitive deficits.²⁶

As discussed in **Sections 3.1** and **3.3.4**, the strength and purity of the drug also affect the risk of overdose.

In the short term, acute intoxication causes a range of common side-effects (eg nausea, vomiting, constipation, drowsiness and mental confusion), and in some cases hallucinations, dysphoria, sweating and itching.²⁶ Rare features of acute intoxication include complications associated with non-fatal overdose (eg hypoxia causing brain damage), and disease of the white matter of the brain (leukoencephalopathy) resulting from inhalation of heroin vapours.²⁶

Chronic use of opioids is associated with an increased risk of mortality (from overdose and route-specific hazards – see **Section 3.3.5**), and a suicide rate that is higher than that of the general population.^{26,79,80} A number of chronic complications can also occur, which include:

- constipation, dry mouth, menstrual irregularity, malnutrition, anorexia, tooth decay, decreased sexual desire and performance
- respiratory diseases (asthma, chronic obstructive pulmonary disease)
- modest suppression of hormone levels
- suppression of the immune system, social deprivation and malnutrition.²⁶

Opioid dependence is characterised by profound psychological and physical dependence and can develop through use of heroin, opium and other illicit opioids, as well as prescribed medications such as methadone and buprenorphine. When untreated, approximately 30 per cent of heroin-dependent individuals will have died by 10 years from overdoses,²⁴ or as a result of secondary complications, as described in **Section 3.3.5**. Those on prescribed heroin do not have a lower life expectancy. Individuals who are opioid dependent are five times more likely than the general population to have a depressive disorder, and three times more likely to be affected by

an anxiety disorder.²⁴ It is unclear whether this is a causal relationship. Withdrawal from opioid dependence is rarely life threatening, but can lead to a range of unpleasant symptoms (eg nasal discharge, sweating, sleep disturbance, anorexia, restlessness, irritability, tremor, weakness, depression, nausea, vomiting, abdominal cramps, muscle spasms and diarrhoea).

Hallucinogens (including LSD and psilocybin)

The hallucinogenic effects of LSD and psilocybin (magic mushrooms) vary, depending on the dose, and the situation the user is in. In the short term, their use leads to an increased risk of accidental death, violence and injuries, owing to perceptual distortions and impaired decision making.²⁶

A range of acute psychological/psychiatric effects are associated with the use of these hallucinogens:

- dysphoria
- distortions in shapes and colours
- illusions, delusions
- anxiety, panic, depression
- dizziness, disorientation and impaired concentration
- frequent mood changes
- recall of psychologically troubling memories
- short-lived psychotic episode (hallucinations, paranoia)
- precipitation of relapses in schizophrenia.²⁶

Chronic use of LSD and psilocybin (magic mushrooms) can lead to depression and feelings of isolation or delirium, and brief flashbacks or recollection of previous hallucinatory experience may occur days or months after use.²⁶ In rare cases, it can also cause persistence of low-level hallucinations, known as hallucinogen persisting perception disorder.²⁶ Only a few users of hallucinogens experience signs or symptoms of dependence.²⁶

Adverse effects of the hallucinogens mescaline and *N,N*-dimethyltryptamine (DMT) are listed in **Appendix 3**.

Ketamine and phencyclidine

Ketamine and PCP are dissociative anaesthetics that can cause loss of coordination and control.⁸¹ This can lead to an increased risk of death and injury as a result of accidents, as well as respiratory depression, loss of consciousness and coma.²⁶ There have been rare reports of overdose deaths from heart attack or respiratory problems associated with the use of ketamine, while PCP can cause death as a result of hyperthermia and convulsions.²⁶ The use of these dissociative anaesthetics can also lead to acute and chronic psychological and psychiatric symptoms such as hallucinations, impaired

attention and cognitive functioning, confusion, panic attacks and paranoia, depression, and extreme loss of motor skills (catatonia).

Chronic heavy use of ketamine can lead to ulcerative cystitis (marked thickening of the bladder wall and severe inflammation)⁸²⁻⁸⁴ and abdominal pain.²⁶ There is limited evidence that ketamine dependence and tolerance may occur among regular heavy users, but there is no evidence to suggest withdrawal symptoms. There is also some evidence that dependence and withdrawal syndrome can develop with chronic PCP use.²⁶

Other psychoactive drugs

Adverse effects of nitrites; novel psychoactive substances such as substituted cathinones, 2C series phenylalanines and tryptamine derivatives; khat; and *Salvia divinorum* are all listed in **Appendix 3**.

Polydrug use

Polydrug use or the combination of illegal drugs with alcohol (polysubstance use) can lead to an increased risk of serious health harm and death. This can result from pharmacokinetic factors (eg reduced metabolism) or drug interactions, or directly from the drugs' toxic effects. The use of one psychoactive substance can also lead to increased risk behaviour with another substance (eg alcohol use may reduce the capacity to judge the amount of opioids consumed).

Many of the drug-related deaths that occur among problem drug users, which most commonly involve opioid overdose, are also linked to polydrug use (including tobacco and alcohol).⁸⁵ Chronic polydrug use can also lead to increased mortality from other diseases, as the continued use of several substances leads to longer-term toxicities in various organs or body systems.⁸⁶

A specific example of chronic health damage resulting from polysubstance use is the high prevalence of tobacco smoking among individuals with cocaine-associated myocardial infarction.^{87,88} **Table 3** provides an overview of the harms associated with the concurrent use of specific substances.

Table 3 – An overview of the harms associated with the concurrent use of specific substances

| Drug | Effects associated with concurrent use of: | |
|---|---|--|
| | Alcohol | Illicit drugs |
| Amphetamines | <ul style="list-style-type: none"> Increases perceived total intoxication Increases adverse cardiovascular effects | Cocaine <ul style="list-style-type: none"> Limited evidence; may have adverse consequences on the CNS |
| MDMA (ecstasy) and related analogues | <ul style="list-style-type: none"> Reduces subjective sedation associated with alcohol, but not alcohol-induced impairments Increases plasma levels of MDMA Decreases blood alcohol levels May enhance the temporary impairment of immune cells associated with MDMA use (transient immune dysfunction) | Cannabis <ul style="list-style-type: none"> Users may potentially experience cumulative CNS impairment May increase susceptibility to infection Cocaine <ul style="list-style-type: none"> Evidence from animal studies suggests an increased risk of neurotoxicity |
| Cannabis | <ul style="list-style-type: none"> Reduces driving performance | |

| Drug | Effects associated with concurrent use of: | |
|-----------------|---|--|
| | Alcohol | Illicit drugs |
| Cocaine | <ul style="list-style-type: none"> Increases blood levels of cocaine and the active metabolite cocaethylene; users may perceive a more intense feeling of intoxication Users may perceive a reduction in the sedating effects of alcohol Combination potentially increases adverse cardiovascular effects Patients with coronary artery disease or alcohol dependence may be particularly vulnerable to the combined toxic effects of alcohol and cocaine | <p>Ketamine</p> <ul style="list-style-type: none"> Potential to exacerbate the cardiovascular risks of cocaine (crack) <p>Methadone</p> <ul style="list-style-type: none"> Increases adverse cardiovascular effects (eg increased blood pressure and heart rate) |
| GHB | <ul style="list-style-type: none"> Increases the risk of respiratory depression None documented | |
| Nitrites | <ul style="list-style-type: none"> None documented | <p>Use of drugs for treating erectile dysfunction (eg viagra)</p> <ul style="list-style-type: none"> Increases the hypotensive effects (abnormally low blood pressure) |
| Opioids | <ul style="list-style-type: none"> Increases the depressant effects of alcohol on the CNS; can be fatal Acute use of alcohol and methadone appears to result in lower blood-alcohol levels – the clinical significance is unclear | <p>Benzodiazepines</p> <ul style="list-style-type: none"> Increase the depressant effects of opioids on the CNS |

Source: Jones L, Bates G, Bellis M *et al* (2011) *A summary of the health harms of drugs*. London: Department of Health.²⁶ Reproduced with the permission of the Department of Health.

3.3.3 Effects on the fetus

Fetal development can be adversely impacted by maternal drug use. The BMA has previously considered the effects of prenatal alcohol exposure and smoking on the unborn fetus in its 2007 report *Fetal alcohol spectrum disorders – a guide for healthcare professionals* (2007)⁸⁹ and its 2004 report *Smoking and reproductive life – the impact of smoking on sexual, reproductive and child health*.⁹⁰

The risk of harm to the fetus from maternal drug use is generally considered to be greatest during the first trimester (especially the first 8 weeks),²⁴ although the second and third trimesters remain critical periods of exposure for fetal development. Damage may also be caused before the woman knows that she is pregnant. Evidence is continuing to emerge on the adverse effects of a number of specific drugs:

- babies born to opioid-dependent mothers may suffer neonatal abstinence syndrome. This can be characterised by short-term withdrawal symptoms affecting the CNS, the respiratory system and the gastrointestinal tract²⁴
- cocaine causes reduced blood flow to the placenta, thereby increasing the risk of placental abruption.^{26,91} Maternal cocaine use is also associated with an increased risk of spontaneous abortion and premature delivery, as well as sudden infant death syndrome (SIDS)^{24,92}
- a greater risk of prematurity and intra-uterine growth retardation is associated with multiple drug use.²⁴

There is also likely to be an increased risk of fetal harm from pregnant drug users who lead chaotic lifestyles (including as a result of the illegality of the drugs), as this can lead to poor nutrition and maternal health, as well as poor antenatal attendance.

3.3.4 Adulterants

Illicit drugs are commonly found to contain substances in addition to the purported active ingredient.^{93,94} These adulterants – any substance or organism found in illicit drugs at the point of purchase other than the active ingredient – can increase the risk of morbidity and mortality. They are commonly added to enhance or mimic the effects of an illicit drug (eg procaine in cocaine), or to facilitate its administration (eg caffeine in heroin).⁹³ Contaminants such as bacteria or other biological agents may adulterate illicit drugs, as a result of poor or unsterile manufacturing and production techniques, substandard packaging and inappropriate storage.⁹³

Evidence from case reports has found that the adverse health impacts and deaths associated with adulterants commonly result from poisoning, poor manufacturing techniques or poor storage or packaging, or occur as a result of the effects of other substances sold as the illicit drug.⁹³ Key findings from the case reports include:

- heroin adulteration is mostly associated with poisonings (eg by lead, scopolamine and clenbuterol) or bacterial infections

- cocaine/crack cocaine adulteration is mostly associated with poisonings, with a wide range of adulterants responsible, including phenacetin, thallium, benzocaine, scopolamine, strychnine, levamisole and anticholinergic poisoning
- methamphetamine adulterants are mostly associated with poisonings, for example with lead, toxic fumes and talcum powder
- two case reports detail the deaths of ecstasy users as a result of consumption of tablets adulterated with paramethoxymethamphetamine (PMMA) and/or paramethoxyamphetamine (PMA).

A more detailed overview of the evidence of drug adulterants, including information on the potential reasons for their inclusion and the health effects, is provided in **Appendix 5**.

3.3.5 Secondary health harms associated with injecting drug use

In addition to the direct adverse effects of illicit drug use, there can be a number of secondary health impacts associated with the way in which the drug is used. People who inject drugs and share needles are at risk of transmitting and acquiring a range of infections, including HIV, hepatitis B (HBV), hepatitis C (HCV), and, if using in unhygienic environments with unsterilised injecting paraphernalia, bacterial infections at the injection site.

In the UK, HIV prevalence among people who inject drugs was 1.5 per cent in 2009, compared to 0.8 per cent in 2000.¹⁷ This is matched by the increasing total prevalence of HIV infection. In England and Wales, the estimated number of prevalent HIV infections in 15 to 44 year olds increased from 1.5 per 1000 in 2000, to 2.4 per 1000 in 2008.⁹⁵ The proportion of these who were injecting drug users was 2.4 per cent.⁹⁵

In 2009, the prevalence of HCV among people who inject drugs was much higher, at 48 per cent for England and Wales, compared to 38 per cent in 2000.¹⁷ Around one in six people who inject drugs have ever had an HBV infection, and in this group the prevalence of infection in England, Wales and Northern Ireland fell from 28 per cent in 2000 to 17 per cent in 2009.¹⁷ In the general population in the UK, HBV infection has been estimated to affect 0.3 per cent and HCV 0.4 per cent.⁹⁶

3.3.6 Other secondary health harms

Other chronic secondary health harms include:

- the long-term adverse consequences of smoking cannabis on pulmonary function (including airways obstruction and hyperinflation)⁹⁷
- smoking crack cocaine can cause chest pain and lung damage⁹⁸⁻¹⁰¹
- snorting cocaine powder can lead to nasal bleeding and stiffening of the facial muscles, while heavy users may damage the nasal membranes or perforate the nasal septum.⁵⁴

3.3.7 Dependence

The repeated use of illicit drugs can lead to dependence syndrome – a cluster of behavioural, cognitive and physiological phenomena that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state (see **Glossary**). As can be seen from **Section 3.3.2** and **Appendix 2**, repeated use of some psychoactive drugs can lead to dependence.

Dependence per se is not necessarily significantly harmful but the risk of harm is intrinsically raised because of the chronic drug use. In the case of heroin, for example, as noted previously, its chronic use is characterised by profound psychological and physical dependence.²⁶ This chronic use significantly increases the risk of mortality from overdose and acquisition of a drug-related infectious disease.

Different drugs vary in their propensity to give rise to dependence (dependence potential, see **Glossary**). Illicit drugs such as heroin, crack cocaine and methamphetamine – as well as the licit drugs, tobacco and alcohol – rank highly in their tendency to encourage repeated use.²

3.4 Social harms

Illicit drug use is associated with a range of potential social harms, including deprivation and family adversity/neglect, criminality associated with intoxication, acquisitive crime associated with obtaining drugs, drug-impaired driving, and drug-impaired workplace performance. Some of these social harms result from the illegality of the drugs, while others are caused by factors such as the psychopharmacological effects of the drug.

3.4.1 The social effects of illicit drug use on families

Certain patterns of illicit drug use can adversely affect family life, in many of the same ways that problematic levels of drinking can: through domestic violence, loss of family income, poor role models for children, accidents and injuries, malnutrition and eating disorders, unemployment, social exclusion, self-harm and suicide, and problems in relationships with friends and partners.¹ Illicit drug use can significantly impact on family

economic resources through direct expenditure on drugs, increased medical expenses, reduced household income through drug-related morbidity and mortality, lost employment opportunities, legal costs of drug-related offences, and decreased eligibility for loans.^{1,16,102,103}

The children of drug users are likely to be adversely affected in a number of ways, including suffering from poverty, abuse and neglect, exposure to violence and crime, risks of harm from drug paraphernalia, going into care, absence of a parent, and disrupted schooling and education.¹⁰⁴⁻¹⁰⁶

3.4.2 Harm to communities – drug-related violence and crime

Drug-related crime falls into two categories. Drug law offences include possession, dealing or trafficking of drugs covered under the Misuse of Drugs Act 1971. This is dealt with in **Chapter 5**. Illicit drug use is also associated with a number of other criminal behaviours, which in turn are linked to underlying socioeconomic factors. In the UK in 2010-2011, there were 270,045 recorded drug law offences (39,966 (14.8%) of which were for trafficking, 228,425 (84.6%) for possession, and 1,384 (0.5%) for other drug offences), which was an increase (19.7%) from 225,670 in 2005-2006.¹⁷ The vast majority of these offences were for cannabis possession.¹⁷ This increase contrasts sharply with the long-term decline in current drug use outlined in **Section 2.2**).

Dependent use of drugs is associated with increased levels of acquisitive crime – such as theft, street robbery, car break-ins and burglary – as a means to fund habits. The link between illicit drug use and crime is complex and multifaceted, as not all drug types are associated with all forms of crime, and some drugs are not associated with crime at all. In England and Wales, according to the Home Office *Arrestee survey 2003-2006*, 81 per cent of regular (at least weekly) users of heroin or crack reported having committed acquisitive crime in the 12 months prior to arrest, compared to 30 per cent of respondents who did not use heroin or crack regularly (ie did not use them weekly).¹⁰⁷ A report from the UK Government Strategy Unit in 2003 suggested that dependent heroin and crack users '*commit substantial amounts of crime to fund their drug use (costing £16bn a year)*' and that '*Drug use is responsible for the great majority of some types of crime, such as shoplifting and burglary*', including '*85% of shoplifting, 70-80% of burglaries and 54% of robberies*'.¹⁰⁸ For dependent drug users with limited alternative sources of income, particularly women, street sex work often becomes the most viable source of fundraising to buy drugs. The UK Home Office has estimated that more than 85 per cent of street sex work is drug motivated.¹⁰⁹

In addition to the criminality and violence associated with acquisitive crime, the psychobiological effect of drugs may directly lead to violent behaviour; the drugs most commonly linked to psychopharmacological violence include amphetamines and cocaine.¹¹⁰ There is little evidence that the psychopharmacological effects of heroin, cannabis, ecstasy or other hallucinogens are associated with violence and crime.¹¹⁰ It should be noted that the evidence for the psychopharmacological causation of violent behaviour is weak (including for amphetamines and cocaine).^{110,111}

Other social harms associated with the law relating to drug use are considered in detail in **Chapter 6**.

A high level of drug use in the community is also linked to unsafe communities, through increases in violent incidents, antisocial behaviour, prostitution, begging, unusable public spaces, and people sleeping rough.¹¹² This in turn can depress house prices, reduce investment in the neighbourhood and create or maintain areas of deprivation.

3.4.3 Drug-driving

Data on the levels of drug-driving in the UK are limited. While drug use cannot be causally linked^d to road crashes, a number of small-scale studies provide some information on its prevalence:

- in 1989, random samples from a number of road traffic accident fatalities showed that only 3 per cent of the drivers involved in accidents had been driving with drugs in their systems, compared to 35 per cent for alcohol (25% over the legal limit)¹¹³
- a 2001 study of fatal road accident casualties found that at least one impairing prescription or illegal drug was detected in 24.1 per cent of the 1,184 casualties, and that alcohol was present in 31.5 per cent of the sample (21.5% over the legal limit).¹¹⁴ The study identified cannabis as the drug most frequently found among casualties. There was a substantial increase in the incidence of cannabis in fatal road casualties, from 2.6 to 11.9 per cent over the period between the two studies. The authors found that those who had consumed drugs were no more likely to have also consumed alcohol than drivers who had not used drugs – when considering drivers over the legal limit for blood alcohol, there was no significant difference (at the 5% significance level) between those with no drugs, single drug use and multiple drug use: 20.6 per cent, 17.3 per cent and 16.1 per cent respectively
- surveys of drug use among Scottish drivers arrested under Section 4 of the Road Traffic Offenders Act 1988¹⁷ have shown that cannabinoids were consistently present,

^d A causal link cannot be stated because of poor data levels and a lack of information on the effect of various drug levels on driving performance.

ranging from 36 per cent in 2003 to 53 per cent in 2008, while cocaine was detected in around 15 to 25 per cent of cases.¹¹⁵

Limited data are available internationally. A study by the EMCDDA, published in 2008, concluded that the prevalence of drivers under the influence of drugs on EU roads had increased significantly since the late 1990s.¹¹⁶ A Dutch study conducted in the mid-1980s found that 8.5 per cent of injured drivers were under the influence of illegal and impairing medicinal drugs.¹¹⁷ A similar survey conducted in 2000-2001 found the proportion of injured drivers under the influence of illegal or impairing medicinal drugs had increased to 30 per cent.¹¹⁸

3.5 The economic and social costs of illicit drug use

Estimates for the cost of illicit drug use to society in economic terms are limited (see **Box 3**). These include costs to the individual, such as the costs related to premature death, drug-related illness and the loss of earnings through criminality/imprisonment, sickness, temporary or permanent unemployment and reduced educational attainment. The costs to society can be divided into four broad categories:

- **healthcare service costs:** including costs to primary care services and hospital services (A&E, medical and surgical inpatient services, paediatric services, psychiatric services, and outpatient departments)
- **costs of drug-related crime, disorder and antisocial behaviour:** including costs to the criminal justice system, costs to services (eg social work services), costs of drug-driving, and the human cost of drug-related harm (eg domestic abuse, assault)
- **loss of productivity and profitability in the workplace:** including costs to the economy from drug-related deaths and drug-related lost working days
- **impact on family and social networks:** including human and emotional costs such as breakdown of marital and family relationships, poverty, loss of employment, domestic and child abuse, and homelessness.

Box 3 – Estimates for the costs of drug-related harm in the UK^e

The economic and social costs of Class A drug use (cocaine, crack, ecstasy, heroin, methadone, LSD and psilocybin (magic mushrooms)), in 2003-2004 in England and Wales were estimated by a Home Office report to be £15.4 billion, equating to £44,231 per year per problematic drug user:

- problematic Class A drug use (opioid drug and/or crack users) accounted for the majority (99%) of the total costs
- health and social care costs accounted for £557 million
- the measured costs of drug-related deaths were estimated to account for £923 million.¹¹⁹

This report says that the cost estimates include two components of the cost of crime: expenditure by the criminal justice system in dealing with crimes committed (with no further details supplied in the report, it is assumed this does not include the costs associated with imprisonment) and cost consequences for the victims of crime.

Hospital admissions arising from diseases or conditions directly and indirectly related to substance use make a large contribution to the costs to the NHS. The most recent data available indicate that there are around 6,400 admissions for drug-related mental health and behavioural disorders each year in England, and over 12,500 admissions for drug poisoning.¹²⁰

In 2003, the Prime Minister's Strategy Unit (PMSU) estimated that the cost in terms of health and social functioning harms of drug use in the UK was £24 billion per year.¹²¹ This report does not specify what constitutes drug-related crime.¹⁰⁹

The economic and social cost of drug-related harm in Scotland, which includes criminal justice costs (extent unspecified) has been estimated as £2.6 billion per annum.¹²²

^e It is worth noting that the costs associated with the impact on family and social networks are not included in these estimates because of the difficulty in determining the level of cost associated with these factors.

The total economic and social cost of Class A drug use in Wales has been estimated to be around £780 million per year, and drug-related crime accounts for 90 per cent of this.¹²³ Similar data are not available for Northern Ireland.

The criminal justice costs associated with illicit drug use, including prison costs, are discussed in more detail in **Section 6.4.5**.

Summary

- The use of illicit drugs is associated with a range of physical, psychological and social harms. These are affected by the dosage of drug, the pattern of drug use and the mode of administration.
- Most drug-related deaths in the UK are related to the use of opioid drugs, followed by cocaine. The vast majority of these deaths are in men and many are associated with polydrug or polysubstance use. Ecstasy-related deaths are very rare and deaths from cannabis overdose do not occur.
- The risk of death from accidental drug overdose, and from suicide, is associated with poverty, homelessness, polydrug or polysubstance use, impaired physical health and depression.
- While dependence per se is not necessarily significantly harmful, the risk of harm is intrinsically raised as a result of chronic drug use. The following are associated with physical and psychological dependence: cannabis, cocaine, gamma-hydroxybutyrate (GHB), heroin, methamphetamine and other opioid drugs. Amphetamine and ecstasy are associated with psychological dependence only, and there is limited evidence for dependence with ketamine and phencyclidine (PCP). Dependence is rare with hallucinogens.
- Fetal development can be adversely impacted by maternal drug use.
- Adverse health impacts and drug-related deaths may also be associated with adulterants.
- Social harms of drug use include deprivation and family adversity/neglect; criminality associated with drug intoxication or with the need to obtain drugs; and drug-impaired performance at work or when driving. These can result from the illegality of the drugs, or from factors such as the psychopharmacological effects of the drug. They have associated costs for the individual related to loss of earnings, reduced educational attainment and damage to personal relationships. High levels of drug use in a community are linked to unsafe communities because of the associated social problems.
- Studies of the level of harm associated with use of different drugs in the UK scored heroin, crack cocaine and methamphetamine as most harmful to individuals; alcohol, heroin, crack cocaine and cannabis as most harmful to others; and alcohol as most harmful overall, followed by heroin, crack cocaine, methamphetamine and cocaine. The relative levels of harm for the different drugs correlate poorly with the legal classification of drugs.

- Economic and social costs of drug use are related to health and social care costs and criminality; 99 per cent of costs are linked to Class A drug use (cocaine, crack, ecstasy, heroin, methadone, lysergic acid diethylamide (LSD) and psilocybin (magic mushrooms)), and a large proportion is linked to crime, including crimes of illegality. The economic and social costs of Class A drug use in 2003-2004 in England and Wales were estimated to be £15.4 billion, which equates to £44,231 per year per problematic Class A drug user.