

individual to another. Some people may suffer no serious side effects from a single experiment with drugs while for others it may be the beginning of a

Drugs can alter mood and behaviour and create dependence. Consequences of their use depend on characteristics of both drug and consumer.

lifetime addiction. Even a single experience can provoke an *acute* toxic reaction, while *chronic* effects come from the body's response to regular, long-term abuse. Either pattern of use can lead to dependence and to an impairment of the body's organs or its functions, or both. Unsupervised drug use may also have secondary effects in that it may conceal or delay recognition of genuine illnesses requiring treatment.

Estimates of *morbidity* and *mortality* are used to gauge the consequences of acute and chronic drug abuse. Morbidity indicators help us to understand the association of drugs with illness and disease by providing information on the numbers and frequency of treatment requests, drug-related emergency room incidents at public hospitals, hospitalizations and prevalence of communicable diseases relating to drug use. Mortality data tell us how many deaths are directly linked to the use of psychoactive drugs. Together these give us an estimate of harmfulness.

The term overdose is often applied in the case of drug-related mortality but in many cases death (or

A single experience can provoke an acute toxic reaction, chronic effects come from long-term abuse.

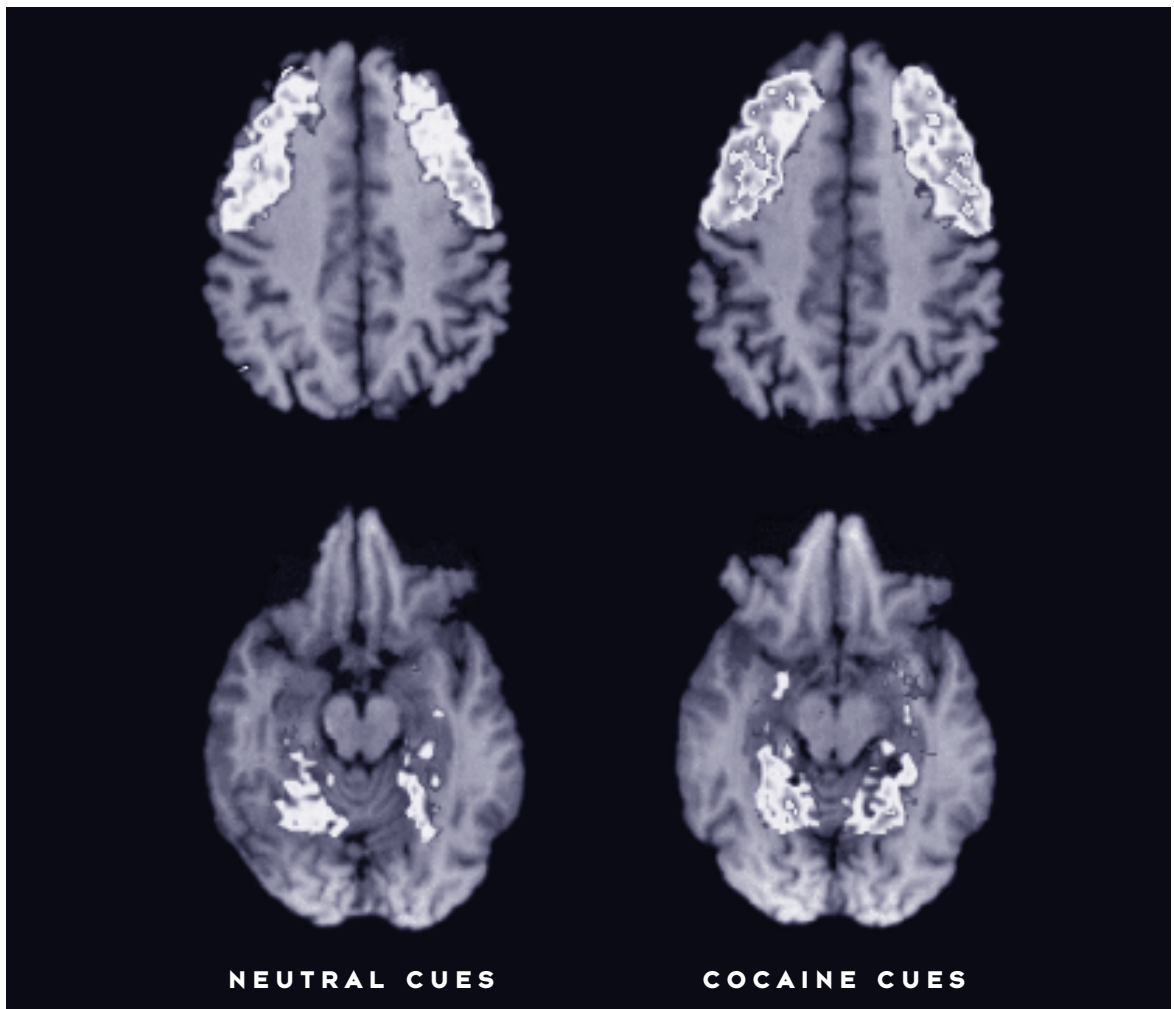
acute illness) may not be due to an excessive quantity of the drug but to an interaction with other psychoactive substances or with adulterants used by retailers to bulk out the dosage units. These impurities may do as much, if not more, harm than the drug itself. An important factor underlying all

illicit drug use is that the consumer – the last buyer in what may be a long chain of distribution – is rarely able to verify the dosage or the purity of the purchase. The absence of quality control and the furtive conditions in which drugs are dealt and consumed may result in acute poisoning – heroin may be diluted with strychnine or supplied in an excessively pure dose leading to death; gullible youngsters buying drugs at a 'rave' party can have no idea of what chemical cocktail is about to bombard their brains.

Drug types are described in various ways, depending on origin and effect. They can either be *naturally occurring*, *semi-synthetic* (chemical manipulations of substances extracted from natural materials) or *synthetic* (created entirely by laboratory manipulation). The principal categories are as follows:

1. Opiates: the generic name given to a group which includes naturally occurring drugs derived from the opium poppy (*Papaver somniferum*) such as opium, morphine and codeine, semi-synthetic substances such as heroin (the foregoing are *opiates* in the strictly correct definition); and *opioids* – 'opiate-like', wholly synthetic products such as methadone, pethidine and fentanyl. Opiates depress the central nervous system and are used therapeutically as analgesics (painkillers), as cough suppressants and against diarrhoea; in non-medical usage as euphorants and as a means of reducing anxiety, boredom, physical or emotional pain. Heroin is often the opiate preferred by consumers because it is relatively potent, easily dissolved in water for injecting and penetrates the blood-brain barrier more quickly than morphine. Effects may last from 4 – 6 hours. Heroin can also be snorted, smoked or inhaled by the method known as 'chasing the dragon' whereby it is heated on foil and the fumes inhaled. The effects of methadone, which is usually taken orally, may last up to 24 hours.

It can happen that opiate dependence brings few physical complications other than constipation, but such cases are rare; studies of British heroin addicts in the 1960s showed that even when maintained on medically prescribed 'clean' heroin and supplied



Using pet scanning, investigators at the US National Institute on Drug Abuse showed increased activity in brain regions implicated in several forms of memory when human volunteers who abuse cocaine were exposed to drug-related stimuli. Cocaine abusers were studied under a neutral condition (left) and also in a test session in which they were presented with drug related stimuli, such as a video tape of cocaine self-administration. A volunteer who experienced a high degree of cocaine craving, when viewing the cocaine cues (right) shows brain activation in the dorsolateral prefrontal cortex (upper scans), which is important in short-term memory, and the amygdala (lower scans) as compared to activity in the neutral test session. The findings, which have implications for the treatment of cocaine addiction, suggest that a distributed network, which integrates emotional and other aspects of memory, links environmental cues with cocaine craving. (Photo and caption courtesy National Institutes of Health, Brain Imaging Section; see S. Grant, London E. D., Newlin, D.B., Villemange, V.L., Liu, X., Contoreggi, C., Phillips, R.L., Kimes, A.S., Margolin, A (1996): Activation of memory circuits during cue-elicited cocaine craving. *Proc. Natl. Acad. Sci. U.S.A.* 93: 12040-12045, 1996.

with needles they had a much higher death rate than the rest of the population. Frequent side effects of high doses of opiates are a reduction in sexual drive and fertility, resulting in impotence in men and severe irregularities in the female menstrual cycle, as well as mood instability, lethargy and anorexia. Tolerance develops to some though not all the effects of opiates. Withdrawal symptoms are generally not life-threatening (if the individual

is otherwise healthy) but are extremely unpleasant for a period of 48 – 72 hours, resembling a particularly bad bout of influenza.

Some of the most severe effects of heroin abuse stem less from the drug itself than from unhygienic injecting practices which cause hepatitis, HIV and AIDS and the wider diffusion of these diseases by sexual contact (see 3.4). It is generally believed that

injecting heroin users are more severely dependent than inhalers, partly because injection is the least safe but most cost-effective way of using an illicit drug. It is also possible to take more of the drug by injection – inhalers tend to fall asleep before they reach the point of overdose. Switching between different routes is quite common, however, and may well be prompted by health considerations.

2. Central Nervous System Depressants (in addition to opiates): include barbiturates, non-barbiturate depressants and benzodiazepines; they are also referred to as sedative-hypnotics. They can be used therapeutically as anaesthetics, anticon-

Heroin withdrawal symptoms are grim – but not life-threatening.

vulsants, in the treatment of tension and anxiety, insomnia and some psychiatric illnesses. The first major type of drug in this group to be manufactured was the barbiturate group, synthetic pharmaceuticals which since the 1960s have largely been replaced therapeutically by benzodiazepines such as diazepam (Valium). Benzodiazepines and non-barbiturate sedatives such as methaqualone appear regularly on the illicit market and are used for sedation and for pleasurable intoxication, often in combination with alcohol.

Barbiturates such as phenobarbital and secobarbital are powerful central nervous system (CNS) depressants; they can cause excessive drowsiness and thereby put the user at risk if driving or operating machinery. Abuse may lead to respiratory problems such as bronchitis and emphysema and at high doses can cause unconsciousness or death through respiratory failure. Sudden withdrawal can also cause death. One of the greatest dangers of the barbiturate group is that as physical tolerance increases, the proportional difference between an effective dose and a lethal dose decreases. For this reason the barbiturate user is especially vulnerable to overdose.

Abuse of benzodiazepines can have adverse consequences for the cognitive functions such as memory and concentration, while tolerance and dependence can also result, even at therapeutic

doses, if taken over a long time. Withdrawal symptoms include anxiety, insomnia and restlessness. Although considered to be much less dangerous than the barbiturates, the recent trend of injecting benzodiazepines has caused particular concern because the drug does not dissolve in the blood stream.

3. Central Nervous System Stimulants: include naturally occurring plants such as coca (*Erythroxylum coca*), *khat* and betel nuts (which are not under international control), products extracted from the leaf of the coca bush – coca paste, cocaine hydrochloride and crack cocaine – and wholly synthetic substances in the form of amphetamine and amphetamine-type compounds. Cocaine has some therapeutic value as a local anaesthetic, while some synthetic stimulants are used as anorectics (slimming pills), in the treatment of narcolepsy and of children suffering from Attention Deficit Disorder (ADD). CNS stimulants are taken for non-medical purposes to elevate mood, to overcome fatigue and to improve performance. The effects of cocaine last from a few



“Chasing the Dragon”. This young boy has been an addict since being treated for the pain of a chronic medical condition with opium. Photo: United Nations.