

1 THE PURPOSE AND SCOPE OF THE REPORT

Deaths due to drug misuse in this country are currently at the highest level ever recorded and rising. The problem lies not only with overdoses and other acute causes of death but also with fatal long-term consequences of HIV and hepatitis. We outline the contents of a report which identifies a range of actions to reduce these deaths.

INTRODUCTION

- 1.1 Official statistics suggest that there were more than 2300 drug-related deaths identified in England and Wales in 1998 due to accidental or intentional overdose, and with a rising trend. While this will account for only a small proportion of all deaths (around 0.6% for men and 0.2% for women), because of the young age at which they occur they approach the number of years of working life lost through road traffic accident fatalities (78,000 years of working life were lost due to road traffic accidents in 1997. ONS figures) Another way to put the matter in perspective is to state that a young person who is injecting heroin has about a 14 times higher risk of death than someone who is not.
- 1.2 Rates of drug-related deaths appear to be no less in Scotland [paragraphs 5.10–5.11]. In Northern Ireland the numbers remain low [para 5.12].
- 1.3 However, the position is worse than those official statistics suggest. These take no account of drug-related deaths from HIV/AIDS (of which there were about 40 in 1997), nor other blood borne virus diseases such as hepatitis B and C, nor motor vehicle accidents.
- 1.4 The fact that there may be between 152,000 and 228,000 present or former injecting drug users in the UK infected with hepatitis C, is a cause for concern because of the premature deaths which will occur from cirrhosis and cancer of the liver over the next 10–30 years. The numbers who die prematurely from these causes – maybe 30% – seem likely greatly to exceed those who will die from overdose and the other immediate effects of drug misuse.
- 1.5 Society expends a good deal of effort in preventing premature deaths from all causes. That is a characteristic of a caring and civilised society, and should apply no less to drug misusers than it does to other classes of people. The previous paragraphs amply demonstrate why preventing deaths from drug misuse warrants attention as a subject in its own right.

- 1.6 As we have been deliberating on this report we have been surprised at the large volume of material which is available on the subject of drug-related deaths. Australia, which has in recent years proved a research powerhouse on drugs issues, has, for example, produced studies on trends in opiate overdose deaths in Australia and, nearer home, work has been undertaken in the UK and in other European countries. The material is not only concerned with the number of deaths but also deals, for example, with information about the ways in which drugs cause death and the likely circumstances of death, and the interventions which may reduce the numbers.
- 1.7 The National Plan of the United Kingdom's Anti-Drugs Co-ordinator which was published in April 1999, includes among its performance indicators one to reduce the number of drug-related deaths.
- 1.8 Some people might want to argue that all available resources should be directed at prevention of drug misuse, with prevention of deaths then taken in passing. ACMD attaches considerable importance to the primary prevention of misuse but is also committed to supporting harm minimisation, whenever and wherever opportunities for reducing any aspect of drug-related harm can be identified. Within that perspective we believe that it should be feasible significantly to reduce the death rate among drug users, while continuing to work by every means possible to prevent misuse. We believe that even if for the time being misuse remained at a high level, related deaths can and should be significantly reduced. It is not necessary to wait on the day.
- 1.9 As well as seeking to identify a range of particular opportunities for action on prevention of drug-related deaths, we believe that there is a necessity, also, to work for a heightened awareness of the urgent national, local, and across-agency responsibility to meet the problem with determination. Stridency would be unhelpful, but we believe that it is appropriate to state that, in our view, a blind eye has over recent years too often been turned to the fact that drug misuse is a life-threatening condition. Changed attitudes will be needed as context for the strengthened and multiple actions.

THE SUBSTANCES WHICH THE REPORT COVERS

- 1.10 The terms of reference of the Advisory Council naturally point this report towards preventing deaths from the misuse of controlled drugs. However we have in the past felt it to be within the bounds of our responsibilities to report on volatile substance abuse (VSA), and noted within our last report a statistical relationship between deprivation and VSA deaths. We will touch again on that subject later in this report.

- 1.11 We will also be mindful that often drugs are not misused in isolation but are taken in combination with one another. Their interaction in the body may render them more likely to cause death than if they were each taken alone. Alcohol, given its widespread consumption, will often be one of the substances in the combination.
- 1.12 While this report must necessarily confine its scope, we feel that it would be remiss not to acknowledge that premature deaths also occur from using other substances. We are aware that smoking kills about 120,000 people each year ('Smoking Kills' White paper published by Department of Health 1998), while alcohol is responsible for between 28,000–33,000 deaths annually (information given by Alcohol Concern). Premature deaths from drug misuse are part of a wider phenomenon. But that does not mitigate the responsibility to do everything possible to reduce deaths from illicit drugs and VSA.

WHAT IS A DRUG-RELATED DEATH?

- 1.13 Immediate, or virtually immediate deaths, may arise directly from the pharmacological action of the drug. They may occur as the result of a “normal” dose, an accidental overdose or deliberate overdose (suicide) by the user. Less directly the drug may cause the taker to lose their normal judgement or control, leading to an accident. Less directly still, the taking of drugs may lead to violent behaviour which causes death of others; to the deaths of children through accidental overdose of a drug which has fallen into their hands; and to accidents, notably in road vehicles, killing third parties. Drugs can even contribute towards death without their being taken, when violent rivalry occurs between dealers.
- 1.14 Immediate deaths from drug misuse need to be distinguished from delayed deaths which arise from virus infections such as HIV and hepatitis viruses, which can be transmitted through injecting. The conditions may not lead to death for many years after initial infection.

STRUCTURE OF THE REPORT

- 1.15 Following this introductory chapter the report is structured in the following way:–

Chapter 2 This reviews what is known about the **toxicology and pathology of immediate deaths related to drug misuse**. In cross-cutting fashion it looks at how various different systems within the human body may be impaired or overwhelmed by the action of drugs, and then goes on to look at the dangers associated with particular drugs. Drug interactions are also discussed.

Chapter 3 Drugs are important as constituting the obvious ultimate agent of a drug-related death. But in reality the causes of a death are usually multiple, complex and interactive. Building on the previous chapter, Chapter 3 therefore goes on to consider the **social, situational, and personal factors which may contribute to risks of death associated with drug misuse.**

Chapter 4 For purposes of policy, official data need to be grouped so as to give the best possible estimate of how many deaths are being caused by drug misuse in any one year. **Here we describe the current system for gathering data on drug-related deaths, identifying some problems within it.**

Chapter 5 **Makes suggestions for improvements in the data gathering system which will strengthen the reliability of the output.**

Chapter 6 This gives a synopsis of **the most recent data on the numbers of drug-related deaths in the UK.** We examine the relationship between such mortality and age, sex, and social deprivation. An estimate is also offered of the number of years of life lost due to drug-related deaths.

Chapter 7 The most widely used drug in the treatment of opioid dependence is **methadone.** A serious public health problem has arisen over recent years because this useful drug can, if laxly prescribed, itself cause fatalities. We make recommendations on how such dangers may be reduced.

Chapter 8 This chapter makes a series of recommendations on strategies for **reducing deaths from the immediate effects of taking drugs.** Here the larger part of the problem concerns death by accidental overdose among injecting drug users, but deaths by suicidal overdose also make a contribution.

Chapter 9 This addresses the parallel question of the need to identify **strategies for reducing death from chronic diseases resulting from drug misuse.** We argue that the importance of preventing deaths from acute causes should not be allowed to overwhelm the fact that deaths from virus infections (HIV and hepatitis B and C), are likely in the medium or long term to build up to become a very significant or even the major element within the totality of drug deaths.

Chapter 10 In this final statement we seek to bring together thinking from the previous chapters, and outline what we see as **priorities for a policy framework.**

THE INTENDED READERSHIP

- 1.16 In the preface we stated our hope that in addition to this report meeting our responsibility to advise Ministers, it would be useful to people who deal with drug problems “at many different front lines”. An attempt to spell out the nature of those front lines may be useful in conveying a sense of the breadth of action

which will be needed if drug-related deaths are to be effectively tackled. The following list does not imply an ordering in terms of importance or priority and it is undoubtedly incomplete:

Administrators in central and local Government; Accident and Emergency departments; ambulance staff and paramedics; Drug Dependence Units and community drug teams; NHS Managers; NHS Commissioners; obstetric departments and midwives; voluntary sector drug agencies of many different types and needle exchanges; residential treatment facilities; GPs and primary health care teams within the NHS; medical practitioners within the private sector; pharmacists; police, probation officers, prison staff, the Courts; national statistical offices; drug users; educationalists; health education; the media; research centres; those responsible for many different aspects of professional training; coroners; procurators fiscal; social services; mental health services; Drug Action Teams (DATs) and Drug and Alcohol Action Teams (DAATs).

A REPORT WITH VERY PRACTICAL INTENTIONS

- 1.17 Drug-related deaths pose for society a complex problem and one requiring careful analysis. We have therefore seen it as necessary in this report to give space to discussion of the nature of this problem and how best to measure its extent. Our aim is not, however, to conduct analysis for its own sake but to offer a report which is a strong catalyst for action, both in terms of reducing drug-related fatalities and improving the means for monitoring the scale of these deaths.

2 PATHOLOGY AND TOXICOLOGY OF IMMEDIATE DEATHS RELATED TO DRUG MISUSE

Characteristics of the drug, the route of use, and of the individual user help to explain why drugs used singly, in combination, or with alcohol, can act on many different body systems so as to cause death more or less immediately.

INTRODUCTION

IMMEDIATE DEATH FOLLOWING DRUG MISUSE

- 2.1 We use the term immediate death to describe those cases where death results directly from use of a drug, rather than from long term consequences of use. Many factors combine to lead to this outcome. This chapter will give an account of the mechanisms involved in the causation of immediate or near-immediate death from illicit drugs. It concentrates on the major causes and mechanisms of such deaths. Inevitably we are here going to use some technical terms but we will do our best to explain them as we go along.

THE SUBSTANCES WHICH WILL BE CONSIDERED

- 2.2 The following substances will be dealt with in turn: heroin, methadone, other opioids, cannabis, cocaine, Ecstasy, the benzodiazepines. Brief notes are given on amphetamine sulphate, LSD (lysergic acid diethylamide) and volatile substances. Alcohol also receives attention. We discuss the highly important issue of drug interactions and multiple drug use as cause of death. We would, however, plead that sight not be lost of the fact that heroin misuse is today in this country the predominantly important cause of acute drug-related deaths.

THE NEED TO CONSIDER THE DIFFERENT POSSIBLE MECHANISMS OF DEATH

- 2.3 Among the many factors which determine whether an individual exposed to a particular substance will succumb to its toxicity, the pharmacological properties of the substance, together with the amount used, rank highly. In most cases they are the decisive factors responsible for death. Drugs can cause a critical interference with the function of vital organ systems which maintain life. As a basis for preventing drug-related deaths, it is essential to have an understanding of the precise mechanisms which may be implicated for each substance.

Table 2.1 Acute drug-related deaths: the drug, the route and the user.

FACTORS INVOLVED	COMMENT	CONTRIBUTION TO A FATAL OUTCOME
<i>I The drug itself</i>		
Nature of drug	The chemical structure is the main factor responsible for the toxicity of a drug.	+++
Dose of drug	Most toxic effects are dose-dependent, and a lethal outcome is most commonly attributable to the amount of drug taken.	+++
Purity of drug supply	Change in strength of supply may be responsible for some accidental deaths, but is not a major factor	+
i) Inert contaminants (diluents)		
ii) Toxic contaminants (intended as diluents)	Though highly publicised, toxicity due to contaminants is rare.	+/-
iii) Manufacturing error leading to a new toxic substance	This is a potential danger but most unusual in practice.	+/-
<i>II The route of administration</i>		
Intravenous	Potentially most toxic method due to rapid onset of peak levels of drug.	+++
Smoked / Inhaled	Gives a rapid effect. Heroin can be inhaled as vapour ("chasing the dragon"). Crack cocaine is inhaled as vapour.	+
Intranasal (snorting of powdered substance)	Gives a rapid effect, especially with cocaine.	+
Oral	Slower absorption and broken down by liver in many cases, therefore generally less toxic. Ingestion of a lethal dose is relatively easy (see 1).	++
<i>III The individual</i>		
Tolerance	Loss of tolerance plus use of previous customary dose appears to be an important factor in many opioid deaths.	+++
	Prescription or illicit sale of a "tolerant" dose of methadone to a naïve subject is an important and avoidable factor.	+++
Individual variation	Many drugs (e.g. methadone) have a large natural variation in their toxicity as between people.	++
Physical factors	Prolonged dancing without replacing fluid losses after taking ecstasy can cause hyperthermia. Water intoxication can occur in individuals who have taken ecstasy.	+
Illness	Physical illness may render drug use more hazardous.	+
Intention	The aim to obtain a greater "high" by using a larger dose involves a risk to life. Suicidal overdose is frequently successful, as the user knows the amount needed.	+

A FRAMEWORK

- 2.4 A useful framework within which to see much that we will discuss below on causes of immediate drug-related deaths involves the dimensions of drug, route of use, and characteristics of the user. That kind of perspective is represented in the mapping of the problem given in Table 2.1.

MAJOR TOXIC EFFECTS

LUNGS AND BREATHING

- 2.5 Direct depression of respiration, by a specific mechanism, such as depression by opioids of the centre in the brain which controls respiration, is the leading cause of immediate death. A generalised depression of the central nervous system can also have fatal consequences (as may occur with barbiturates, benzodiazepines or alcohol). If the victim is not breathing in enough oxygen, this can lead to a cardiac arrest and to low-oxygen brain damage.
- 2.6 Secondary effects may also occur when respiration is depressed. Blockage of the airways by saliva, mucus or vomit, can lead to a reduction in respiratory capacity below that required to maintain life. This usually only occurs when the level of consciousness and the cough reflex are depressed to a degree where the normal protective mechanisms do not operate. Secretions are permitted to accumulate, or vomit enters the airways. Acute respiratory distress due to conditions such as “crack lung” or opiate-induced asthma, can also be fatal.¹

HEART

- 2.7 A reduction in the heart’s output below that required to maintain life, apart from being a terminal event in many forms of illness and toxicity, is a cause of death in many forms of drug abuse. The reduction of cardiac output can be associated with direct or primary drug effects:
- cardiac depression (reduced contracting power of the heart leading to a fall in blood pressure and ultimately to collapse of the blood circulation system).
 - cardiac arrhythmias (heart rhythm disturbances leading to a major fall or complete cessation of cardiac output).
 - myocardial infarction (heart attacks may very rarely occur from acute spasm of the coronary arteries; but more commonly they result from accelerated coronary atheroma due to long-term use of stimulants, notably cocaine).
- 2.8 Reduction in cardiac output may also occur due to aspects of drug toxicity as a secondary effect:

- respiratory depression (which deprives the heart of oxygen, causing secondary cardiac depression, most typically with opioids).
- fluid volume depletion (due to extreme vasodilatation or sweating, most commonly in association with extreme rise in body temperature as typically may occur with stimulants)
- hyperthermia – (raised body temperature secondary to effects on heat production or to heat generation due to excessive muscular activity)
- hypothermia – (fall in body temperature usually in association with exposure to cold for a period of time – as may occur when a drug user is left collapsed and unconscious in a cold room or outdoors).

STROKES

- 2.9 The stimulant group of drugs (amphetamine, cocaine, Ecstasy) when taken in “recreational” doses tend to result in an acute rise in blood pressure which can be sufficient to cause a cerebrovascular accident (a term used to describe any kind of occurrence in which something untoward happens to blood vessels in the brain). This may be from an acute bleed (intracerebral haemorrhage or subarachnoid haemorrhage), or sometimes from thrombosis of cerebral arteries. More rarely, the same group of drugs can be associated with cerebral vasculitis (inflammation around blood vessels in the brain), which can reduce the flow of oxygenated blood and cause brain damage. Bleeding within the brain in particular can result in a fatal outcome.² The risk of such bleeds is much greater in people who have as congenital malformations small symptomless aneurysms (“berry” aneurysms), where the cerebral vessels branch.
- 2.10 Cerebrovascular accidents are likely to lead to a deficit in brain function which may be permanent (a “stroke”). Unless a good medical history is obtained and a history of drug misuse sought, the cause may not be recognised. The link between cerebrovascular accidents and cocaine is well described³, while that with amphetamine and ecstasy is less widely known

LIVER

- 2.11 Cocaine and MDMA use may occasionally lead to liver failure, which can be fatal⁴.

KIDNEY

- 2.12 Kidney failure can follow drug use, through a variety of mechanisms, which include an immunological reaction or a blood vessel illness. Kidney failure may also be due to rhabdomyolysis (damage to muscle tissue with release of

breakdown products into the bloodstream) associated with raised body temperature (cocaine, MDMA), and it may occasionally occur with heroin.

INFECTIVE COMPLICATIONS

- 2.13 Intravenous drug use may result in virus infections which can be delayed in their consequences for many years, and those kinds of risk are dealt with in Chapter 9. But there are in addition a number of less common types of potentially fatal infective complications of drug misuse. These include septicaemia and infections which damage the valves of the heart (infective endocarditis). One study showed that intravenous drug users were 300 times more likely to die from infective endocarditis than non-intravenous users⁵.

FATALITIES DUE TO ACCIDENTS OR VIOLENCE

- 2.14 All the drugs with which we are dealing in this chapter can in one way or another immediately impair mental functioning. They will therefore put the users (or other people) at risk of potentially fatal accidents. The most common dangers relate to driving and road traffic accidents. Many drugs, alone or in combination, can affect reaction time and co-ordination. There is also the danger of drug-induced impairment in judgement and a blurred sense of reality resulting in risky behaviour. How different drugs will in different circumstances affect different individuals will always be difficult to predict, and there is still much about the nature and extent of the fatal drug-accidents connection which is unknown.
- 2.15 As psychological depression is a common consequence of taking drugs, or of the drug taker's lifestyle, suicide often occurs in addicts. One study estimated that 8–17% of fatalities in heroin addicts were due to suicide.⁶ Another aspect of drug taking is impaired judgement and sudden mood changes which can sometimes lead to aggression and violence. Coupled with the need to obtain money for addictive substances, violent crime (including domestic violence) and homicide can also be associated with drug taking but we would warn against exaggeration of this connection. Violent deaths may also occur as a result of drug dealing.

FACTORS WHICH INFLUENCE THE RISK ASSOCIATED WITH DRUG USE

MODE OF USE

- 2.16 Toxicity may be modified by the mode of use of a drug. When a drug is taken orally, the onset of effect tends to be gradual. When a drug is taken by injection, the blood levels peak rapidly and unconsciousness may occur more or less on the instant. The peak may exceed a potentially fatal level or trigger toxic mechanisms.

Inhalation of a drug, a relatively common method of use, whether by smoking so that the substance passes through the alveolar (lung) membrane, or by “snorting” so that the substance is absorbed through the lining of the nose, provides a rapid peak of drug levels. Smoked substances reach the brain quickly. With smoking there is also the potential problem of toxicity of products produced during combustion of the drug. This may be due to the substance itself or a contaminant. Fatal toxicity can occur with much lower doses after injection, smoking and inhalation than after oral consumption, and these routes are therefore more hazardous than when drugs are taken by mouth. Furthermore, damage to veins and arteries caused by injecting drugs can give rise to thrombosis which threatens life and causes death. Death may result from pulmonary embolus (clots moving to obstruct lung blood flow). In the case of injecting into an artery, damage to an arm, or more usually a leg, can if not surgically treated lead to infection and gangrene.

- 2.17 Both UK and international studies report that compared to the general population, injecting drug users are at increased risk of death from overdose; alcoholism; trauma; AIDS; infectious, circulatory, respiratory, and digestive diseases; violence; and unknown or ill-defined causes.

DRUG PURITY

- 2.18 Hammersley⁷ concluded that an influx of exceptionally pure heroin alone could not explain an increase in drug deaths in Glasgow, although pure heroin mixed with other drugs might be implicated. Hall⁸ has similarly argued that fatal heroin overdoses are probably only rarely a consequence of unexpectedly high purity, and that whilst variations in purity can cause overdoses, they appear to be a minor factor in causing fatal overdoses.

THE ROLE OF CONTAMINANTS

- 2.19 Street drugs tend to be diluted (cut) with inert substances intended as diluents or “fillers”, or by other substances intended to modify the taste, appearance or effect of the drug. Death can ensue from the inclusion of a toxic substance by accident, or from an error in manufacture. Such fatalities are not however common, and the role of contaminants in drug-related deaths has sometimes been exaggerated. Much more usually it is the drug itself which kills.

THE SIGNIFICANCE OF DEPENDENCE AND TOLERANCE

- 2.20 Dependence to substances occurs when the brain adapts to repeated drug exposure and brain cells only fire in the presence of the drug. This is the basis for the withdrawal syndrome; a physiological reaction to drug withdrawal that can range from mild to life-threatening with different drugs (barbiturates and alcohol

can give rise to particularly dangerous withdrawal states). In many drugs of misuse the dopamine system (dopamine is one of the body's naturally occurring chemical messengers) is involved in both dependence and withdrawal. This is, for instance, seen in the actions of cocaine on the nucleus accumbens, a small area of the brain which activates the dopamine reward system.

- 2.21 Heroin withdrawal produces a severe flu-like illness lasting up to 10 days. It is not fatal. Other opiates produce similar withdrawal states but of varying durations and intensities, but again they are not fatal. Withdrawal symptoms after benzodiazepine dependence are generally mild, but can be unpleasant and of long duration: if withdrawal from a benzodiazepine is abrupt after high doses have been used for a prolonged time, more severe symptoms, including convulsions and a delirium tremens like state may occur. Death is very unlikely on benzodiazepine withdrawal. Withdrawal from stimulant drugs such as cocaine and amphetamines can cause sleepiness, lack of energy and depression, but there are no marked physiological disturbances.
- 2.22 Repeated exposure to morphine results in less potent effect, that is, tolerance develops. For example, the initial dose of 10 mg of heroin escalates rapidly with regular use over as little as two weeks. The drug user who comes to an agency may be taking around 750 mg of street heroin daily. Tolerance begins to be lost immediately after cessation of use, and will be completely lost within two weeks of stopping the drug, so that a single dose of the amount previously taken has now become a potentially fatal overdose. Fatalities can occur among opioid users as a result of loss of drug tolerance, after a period of abstinence due to any cause.⁹
- 2.23 As for research on this topic, Shewan¹⁰ investigated the likelihood of drug-related death amongst a sample of female drug users soon after release from prison. He concluded that the high proportion of fatal overdose deaths was likely to be related to the large number of drug users being held and then released. Consequently, the data did not seem to support the simple explanation that after release, individuals typically soon relapse to heroin use, and then overdose due to reduced tolerance. Contrary to this, Seaman¹¹ found that for injecting drug users infected with HIV, the risk of death from overdose during the 2 weeks after release from prison was 34 times higher than during other time spent outside prison. Findings from this study are more consistent with international research which suggests that overdose deaths are common among individuals who have lost tolerance.¹²⁻¹³ Although much of the focus on loss of tolerance has concentrated upon release from prison as a possible risk factor, research in Italy provides a reminder that residential treatment of drug dependence may also be a situation where loss of tolerance can lead to increased risk of overdose¹⁴.

SUBSTANCES

HEROIN (DIAMORPHINE)

2.24 Deaths from acute causes are common. Although respiratory depression is the commonest cause of death, there have been no reliable studies of the relative frequencies of different modes of death due to heroin, and one would expect these to vary over time. When Roberts and his colleagues¹⁵ examined trends in death rates from accidental poisoning in teenagers aged 15–19 years from 1985–1995, they found that the largest single category of death from poisoning was accidental poisoning by opioids, which accounted for 21% (90/436) of the deaths recorded in the relevant ICD codes (this excludes deaths from VSA). A British study by Oppenheimer¹⁶ which involved follow-up of 100 known users over a twenty year period, found them to have a mortality rate 14 times that of age-matched controls. Eskild followed up 200 injectors in Oslo and over a 36 month period found a 32 fold excess mortality¹⁷. In a study of non-fatal heroin overdose amongst heroin users recruited in non-clinical settings in London, Gossop¹⁸ found that 9% of the 438 heroin users in their study reported at least one non-fatal overdose in the previous twelve months. A similar study by Taylor¹⁹ of 1018 drug injectors recruited from Glasgow found that 27% reported at least one non-fatal overdose over a twelve month period. A study of 155 heroin users attending the Maudsley Hospital, London which was conducted on our behalf by Professor John Strang and Dr David Best is geographically limited but usefully topical. These investigations found that in the previous 12 months 43% had witnessed an average of 1.7 overdoses. Over their drug using careers (mean age now 36.1) 82.6% had witnessed an average of 5.6 overdoses of which 16.9% had resulted in death.

2.25 Mechanisms for heroin-related deaths include:

- Respiratory depression. This is the probable mode of death when a user is found dead with evidence of recent injection (a syringe still in the arm for instance, or other obvious signs of recent injection). However, death may not be instantaneous but a matter perhaps of the individual sliding into a deepening coma over some hours.
- Aspiration of vomit. This is sometimes found at post mortem, and is due to a combination of the emetic (vomiting) effect of heroin, combined with depression of the cough reflex.
- Pulmonary oedema (waterlogging of the lungs) due to injection of heroin, is a possible but uncommon cause of acute heroin-related fatality. The lungs are flooded by an outpouring of fluid and the person in effect drowns.

- Some of the fatalities that have resulted from heroin misuse may be due to an anaphylactoid reaction, that is to say an acute allergic response to the drug or its contaminants.²⁰
- Heroin leucoencephalopathy (damage to the white matter of the brain) can occur after inhalation of vaporised heroin, but not after inhalation of powder or after injection of the drug. This complication, marked by progressive signs of brain impairment occurring over some time, was the cause of progressive neurological deterioration with 11 fatalities out of 47 cases reported from the Netherlands in 1981.²¹ This neurotoxic effect is possibly due to a pyrolysis (thermal degradation) product of heroin or a contaminant. Sporadic cases have been reported elsewhere.

METHADONE

- 2.26 Methadone causes death in a similar manner to heroin (diamorphine). This topic is not dealt with further here, as it is the subject of Chapter 7.

OTHER OPIOIDS

- 2.27 There are number of pharmaceutical preparations containing opioids which may be obtained illegally and used by drug misusers. The principal drugs in this group are Diconal (dipipanone with cyclizine), Palfium (dextromoramide), DF118 (dihydrocodeine) and Temgesic (buprenorphine). Their pharmacological action is similar to heroin, and the side effects and mode of toxicity the same. In addition as they are marketed in tablet form, tablets are often ground up and injected. Diconal in particular causes a severe local inflammation, and blockage of the blood vessels into which it is injected. This may have serious consequences particularly if the drug is injected into a vein in the groin.

CANNABIS

- 2.28 There are no literature reports of acute death directly due to toxicity from cannabis. However, several reports have pointed to a statistical association between cannabis use and risk of road traffic accidents. In a study in the United States of 182 fatal truck accidents, 12.8% of drivers had used marijuana.²² Williams *et al* reported a 36.8% incidence of cannabis use in fatally injured drivers in California.²³ A correlation has also been made between increased cannabis consumption and increased suicide rates.²⁴ Both in relation to road traffic accidents and suicides, we would however caution that neither presence nor correlation is the same as cause. In our view the causal significance of cannabis in relation to these kinds of deaths is still an open question. Cannabis may be found in blood or urine up to 28 days after last use or even longer, so positive

laboratory findings at the time of an accident are only an uncertain indicator that the drug has been used at or near to the time of the accident (see paragraphs 4.41–42).

COCAINE

- 2.29 Cocaine is well known to have the potential for causing death, usually in relatively high recreational doses or in accidental overdose. The incidence of death in association with cocaine is currently in the UK much lower than that occurring in association with opioid misuse, but it is increasing and deserves attention. Heart and blood vessel deaths from cocaine use escalated in the United States during the 1980s as cocaine became purer, cheaper and easier to obtain.²⁵ The lethal effect is most commonly cardiac depression^{26,27}, which may be aggravated by exertion or arousal, or may occur in association with violent struggling which involves both of these. Severe toxicity is frequently accompanied by convulsions which may also aggravate the potential for heart toxicity by inducing hypoxia (depletion of oxygen in the body). Disturbance of the heart's rhythms and damage to the heart muscle have also been reported in some patients.^{28,29,30} There is now ample evidence that cocaine use is associated with an increase in deaths from myocardial infarction. This is due to a combination of acute and chronic effects. Cocaine causes accelerated coronary atheroma, most probably due to repeated stresses on the cardiovascular system from the acute hypertensive effects of cocaine, and acute coronary spasm which is more likely to cause myocardial infarction when the vessels are damaged. Sudden cardiac death can also occur without evidence of myocardial changes or ischaemia, or with only minimal pathological changes in the heart.³⁰
- 2.30 Chronic cocaine use appears to predispose patients with incidental or genetically determined abnormalities (aneurysms) in the blood vessels of the brain, to present with problems at an earlier point in their natural history than similar non-cocaine users.³¹ Cocaine users can have significant atherosclerosis in their cerebral arteries.³² Several studies, using PET scans and SPECT scans (brain imaging), have suggested that cocaine results in blood flow deficits in the brain which would be likely to cause local ischaemia (shortage of blood) and possibly local brain damage³³.
- 2.31 Cocaine can cause hypertension, rapid pulse rate and increased body temperature. High ambient temperature is associated with a significant increase in mortality from cocaine overdose.³⁴ Fatal overdoses have occurred in smugglers who have sought to secrete the drug by packing it in condoms, and then either swallowing it or packing it into the rectum. If a condom bursts, a fatal drug level will easily be achieved. One major complication of regular cocaine use is agitated delirium, in which over a short space of time the body overheats, the individual becomes agitated and paranoid, tears off their clothes and becomes violent and

uncontrollable. Death frequently ensues, often while the sufferer is being restrained for their own and the public's safety.

- 2.32 To date there has been no UK research focusing specifically on cocaine overdoses. This probably reflects the fact that historically cocaine has not been central to the British illegal drug markets. In the US, however, where the misuse of cocaine—mainly in the form of cheap and highly addictive crack is considerably more widespread, research has tended to examine the role of cocaine more closely. For example, a 1988–1990 study of 699 crack and other cocaine users in Miami by Pottieger (1992)³⁵ found that a history of cocaine overdose was extremely common and that intravenous use was especially likely to result in overdose. Tardiff (1996)³⁶ found that of all accidental fatal overdoses (total 1,986) in New York City from 1990 to 1992, cocaine, often with opioids and ethanol, caused almost three-fourths of deaths, while opiates without cocaine caused roughly one-fourth of fatal overdoses. That cocaine is dangerous cannot be doubted.

ECSTASY

- 2.33 The use of “dance drugs” although relatively new in the UK, is now a cultural phenomenon. This is due to the introduction of the “Ecstasy” drugs, principally 3,4-methylenedioxymethamphetamine (MDMA) and related drugs, particularly 3,4-methylenedioxyethamphetamine (MDEA) and 3,4-methylenedioxyamphetamine (MDA). These drugs give rise to a small number of deaths in Britain each year. Deaths which occur soon after ingestion are usually due to cardiac arrhythmias, caused by the adrenaline-like properties of the drug. Hyperthermic collapse (overheating) is the commonest acute complication, due to dancing for long periods in a hot environment without adequate fluid replacement. This is largely due to the effect of the drug which enables the user to dance continuously without any feeling of tiredness or exhaustion, while at the same time suppressing the sensation of thirst. The result may be that the user becomes dehydrated, and loses the ability to lose heat by sweating and vasodilatation. The clinical pattern of toxicity in these cases includes potentially fatal hyperthermia (with body temperatures often in the region of 40–43°C), muscle tissue breakdown (sometimes leading to acute renal failure), and a condition known as disseminated intravascular coagulation in which there is widespread bleeding from the blood vessels. This drug is also capable of causing deaths from liver damage and from cerebrovascular accidents. Post mortem examination in MDMA-related fatalities may reveal widespread organ damage³⁷. A few reports have linked MDMA (Ecstasy) use with non-fatal cerebrovascular accidents.³⁸
- 2.34 So-called hyponatraemic collapse (hyponatraemia implies dilution of the blood), is an uncommon complication of MDMA which began to be reported from 1993 onwards. It appears to be partly due to a mistaken interpretation of harm limitation messages urging Ecstasy users to drink fluids. In these cases, the

clinical pattern tends to be remarkably uniform, with initial vomiting and disturbed behaviour, followed by drowsiness, agitation and convulsions. Drowsiness, a mute state and disorientation, may persist for up to 3 days. In these cases, excess fluid ingestion is compounded by inappropriate secretion of antidiuretic hormone which is due to a pharmacological effect of the drug. The overall consequence is death by water intoxication.

BENZODIAZEPINES

- 2.35 Used properly within medical practice, the benzodiazepine class of drugs rightly enjoys the reputation of carrying a very low risk of death by accidental or intentional overdose. These drugs are in this regard much safer than the barbiturates which they have come almost entirely to replace as sedatives and sleeping tablets. The dependence potential of benzodiazepines means, however, that they should be used cautiously and in the short term only.
- 2.36 Besides their legitimate use in clinical practice, benzodiazepines have today become in Britain widespread drugs of misuse. Different benzodiazepines carry different levels of danger but all can cause fatal respiratory depression, particularly so if tablets are ground up and injected or when benzodiazepines are taken in conjunction with opioids and alcohol. Temazepam has been widely misused, but more recently in some parts of the country diazepam (Valium), is causing major problems. We feel that the risk of death resulting from misuse of these drugs, and their potential for adverse or even fatal interactions, has somewhat slipped from awareness. This has resulted in the too great willingness of doctors to prescribe benzodiazepines to their drug misusing patients on a continuous basis, with consequent risks of diversion (see Chapter 8). Benzodiazepines can, when taken with alcohol or opioids, all too easily give rise to fatal overdose.

ALCOHOL AS CAUSE OF DEATH

- 2.37 We have in a previous ACMD report (Drug Misuse and the Environment) emphasised our belief that in broad terms prevention of alcohol-related problems and of problems relating to illicit drugs, cannot always be separated at the practical level. Problems of use overlap, and fatal mechanisms can also interact.
- 2.38 The popular view of alcohol-related deaths probably still centres on chronic physical diseases such as cirrhosis of the liver, and mortality among the middle-aged or elderly sectors of the population. In fact, alcohol is also a significant cause of death among young people. The mechanisms include poisoning by alcohol overdose, inhalation of vomit, alcohol-induced lowering of blood sugar, and deaths by road traffic accident, and other types of accident and violence. Among the older population those same causes contribute to acute alcohol-related

mortality, but acute deaths due to cardiac arrhythmia, stroke, acute pancreatitis and gastro-intestinal bleeding, also need to be taken into the reckoning.

OTHER DRUGS

AMPHETAMINE SULPHATE

2.39 Amphetamine use leads to an increase in heart rate and blood pressure, and can cause strokes. It can also result in cardiac arrhythmias, cardiovascular collapse and death. Hyperthermia and convulsions can rarely also be fatal. Thus its toxic effects are in many ways similar to those of cocaine. However, despite relatively widespread use, deaths are rare but appear to be increasing. A few reports in the international literature highlight the role of accidents, particularly traffic accidents, and suicides in the deaths of amphetamine users. This, commentators suggest, results from the bizarre and reckless behaviour that may result from the drug-induced “high”, and from the circumstances in which it is commonly used.³⁹⁻⁴⁰

LYSERGIC ACID DIETHYLAMIDE (LSD)

2.40 Deaths due to a direct toxic effect of LSD are virtually unknown, but there are anecdotal cases of fatal road traffic accidents, and of falling to death from high places. LSD may also be associated with unpredictable and sometimes violent behaviour towards self and others.

VOLATILE SUBSTANCES

2.41 We dealt with causes of deaths related to volatile substance abuse in a previous ACMD report⁴¹ and will not repeat those details here. We must however note that VSA continues to be a significant cause of acute deaths among young people, and we will return to issues of prevention in a later chapter. From 1970 to 1990 the number of deaths occurring each year in the UK from VSA rose steadily, peaking at 152 in 1990. Annual totals decreased over the subsequent four years to 65 deaths in 1994, probably at least in part because of a Department of Health publicity campaign initiative. They then rose again in 1995 (73 deaths) and 1996 (79 deaths), although falling back slightly in 1997 to 73 deaths.⁴² This recent upward trend, although not statistically significant, is worrying. One would rather have seen a further fall.

MULTIPLE SUBSTANCES

2.42 Drug misuse is rarely confined to a single substance. When an individual takes two substances in sub-lethal amounts, the combination may be capable of causing

death if they affect similar body functions. Even if, for example, opioids and benzodiazepines depress respiration by different methods, this effect can combine to convert an otherwise sub-lethal amount of each drug into a fatal combination (see 2.30). Studies have shown the simultaneous consumption of heroin and benzodiazepines places individuals at a particularly high risk of overdose. Hammersley⁷ reported that heroin, often mixed with other drugs which most often included temazepam, diazepam and alcohol, was implicated in the increase in drug-related deaths in Glasgow between 1990 and 1992. Furthermore, buprenorphine-benzodiazepine mixtures seemed much less likely to lead to fatal overdose than heroin-benzodiazepine mixtures, or heroin alone⁴³. Even small amounts of alcohol will increase the risk with heroin.⁴⁴

- 2.43 Drugs of misuse are, as mentioned above, often taken at the same time as alcohol. In the human liver, cocaine and alcohol are combined to form cocaethylene, which intensifies the euphoric effects of cocaine but which may also increase the risk of sudden death. This substance has been found in post mortem blood, liver and nervous system tissue in amounts which may exceed those of cocaine.⁴⁵ But the types of interaction between alcohol and other drugs which may be involved in acute drug-related deaths are various.
- 2.44 In summary, every drug combination that occurs in the course of drug misuse adds to the dangers, is unpredictable in its consequences, and may all too easily lead to tragedy. Users are repeatedly inflicting on themselves types of pharmacological experiment which no doctor would dare carry out.
- 2.45 Clinicians should be aware of the many types of interactions which can occur between prescribed and illicit drugs. Useful guidance is given in the British National Formulary.

CONCLUSIONS

- 2.46 This chapter has sought to provide a scientific basis for understanding why and how drugs can acutely kill their users. As stated in the opening paragraph, we believe these kinds of insight can inform the needed prevention policies. Beyond the directly instrumental implications of this science for prevention, we would however also suggest that a reading end-to-end of the facts laid out here may serve as a corrective to any view of drugs as no more than symbols, fun, or recreational substances. Drugs can kill, suddenly and often unexpectedly. They can do so in many different and interacting ways which can overwhelm many different body systems and leave people dead.

3 SOCIAL, SITUATIONAL, AND PERSONAL FACTORS WHICH MAY CONTRIBUTE TO RISK OF DEATH ASSOCIATED WITH DRUG MISUSE

This chapter seeks to identify the characteristics of people most at risk of death from drug misuse. That kind of information will help target preventive action.

INTRODUCTION

- 3.1 The previous chapter dealt with the dangers to the individual of drugs as drugs, within the toxicological perspective. Building on that discussion, we now proceed to an analysis which acknowledges that drug misuse is an individual behaviour which occurs within a social context. An understanding of personal and social factors that bear on the risk of a fatal toxicological outcome or virus transmission, will contribute further and usefully to the broad understandings needed to strengthen prevention.
- 3.2 Perhaps the first point to note here is that there have been relatively few distinctly sociological studies on the topic of drug-related death. In the nineteen sixties and seventies social scientists were interested in the processes underlying the labelling of certain deaths as “suicide”. More recently attention has focussed upon the social processes of death certification¹. Throughout most of the nineteen eighties and early nineteen nineties, much of the attention of social scientists working in the addictions field was directed at HIV infection. Early research of this trend focussed upon such topics as establishing the prevalence of injecting drug use, identifying the frequency with which injecting drug users shared injecting equipment, and identifying the frequency with which injecting drug users had unprotected sexual contact. It was only in the latter stages of this research that sociological work was undertaken into such topics as, for example, the determinants of drug injectors’ risk behaviour, the social meaning of needle and syringe sharing, and the place of risk-taking more generally within the everyday world of injecting drug users.
- 3.3 Alongside a reduction in behavioural research on HIV, there has recently been a marked increase in research on drug-related deaths. In a similar way to the behavioural research on HIV, much of the initial research on this topic has had a clear medical focus. It has, for example, sought to identify the extent of drug-

related deaths, the role of different drugs in such deaths, the impact of loss of tolerance, and the effects of drug combinations.

- 3.4 By and large we are not yet at the stage where sociological research has been undertaken on such topics as, for instance, drug injectors' attitudes towards overdose and drug-related deaths, individual strategies for reducing the risk of death and drug overdose, and drug users' reactions to overdose. Nor do we fully understand the way in which factors such as gender, age, and social class may impinge upon injectors' behaviour so as to increase the risk of death. Research in these areas is however now beginning to take place.
- 3.5 As a result of the current state of research there is therefore rather less in this review chapter of a social science kind than one might have expected. Nonetheless, there is some very interesting and policy relevant research which can be identified and it is on this which we will now report.

USER CHARACTERISTICS

GENDER

- 3.6 Most UK and international studies report higher drug-related mortality rates for men than for women. The review of drug-related deaths reported by coroners in England and Wales, reported a male:female ratio of 3.8:1². In a survey of deaths of chronic drug abusers who came to medico-legal autopsy in the South-east of Scotland, the ratio was 6.1:1. VSA deaths are also more common among males than females.³ The 1997 ratio was 3.3:1, having been around 7.2:1 for the period 1971–1995.
- 3.7 Some qualifications regarding this gender difference are, however, required. Attention needs to be directed at the relative size of the using population (denominator) as well as the number of deaths (numerator). Thus, in their study of deaths among opioid dependent subjects in the Brighton Health District, O'Doherty and Farrington⁴ noted that the finding of 47 male deaths versus 13 female deaths, obscured the actual doubled rate of death among female compared to male drug dependency unit attenders. Similarly, Frischer⁵ found that whilst male injectors in Glasgow were 1.4 times more likely to die than their non-injecting counterparts, female injectors were over 4 times more likely to die. Oppenheimer and her colleagues⁶ found no sex differences in mortality rates among the 43 people who died over a 22 year follow-up period of a cohort of 128 heroin addicts. However, it is important to recognise that the research in this area has been largely correlational in identifying a statistical relationship between the two variables of drug-related death, and gender. What such research has not been able to do is to identify those aspects of male and female gender, which might

explain why drug-related deaths should generally appear to be a greater risk for males, compared to females.

AGE

- 3.8 Studies consistently report that the majority of deaths by volatile substance abuse are of young people in their mid to late teens⁷. The pattern of death by age for other drugs is not quite so consistent, but on the whole research tends to show that deaths are more likely to occur amongst individuals in their twenties (see 6.4). In the study by Ghodse⁸, the median age at death was 33 years. The Oppenheimer study⁶ reported that among heroin addicts the observed mortality rates increased with age, although the excess mortality was concentrated at the younger ages. According to Bentley and Busuttill⁹, the peak age at death of chronic drug misusers was in the third decade of life.
- 3.9 The association between age and risk of drug-related death is likely to be in part a function of the length of time the individual has been using drugs. However, it is also likely to be the case that amongst neophyte users who have little knowledge of drug concentrations, there may be an increased risk of overdose. Equally there may be an association between the length an individual has been using illegal drugs, the development of a pattern of dependent drug use and an increasing sense of despair at the individual's circumstances, which may increase the risk of suicidal thoughts. Thus these linked factors of age and length of time using illegal drugs may exert an influence in their own right, but they also provide an increasing opportunity for all sorts of other factors to intervene that may have an impact on an individual's risk of drug-related death. The relationship between age and drug-related death is likely to be a good deal more complicated than might appear at first, and it would be wrong to assume that it is only or specially the novice user who is at risk.

EMPLOYMENT, INCOME AND SOCIAL CLASS

- 3.10 Drug deaths tend to be more common amongst unemployed and unskilled workers. In the study by Ghodse⁸, 49% of individuals who died were unemployed, whilst the survey of 62 drug deaths in Glasgow identified an even higher degree of unemployment (91%)¹⁰. The data we give in Chapter 6 (paragraph 6.7) which show the relationship in England and Wales between social deprivation and drug-related deaths should also be noted. Data from Scotland show a remarkable correlation between non-psychiatric hospital admissions related to drug misuse and levels of socio-economic deprivation as measured by the Carstairs deprivation score (Figure 3.1) (Reference: The Scottish Office: Tackling Drugs in Scotland : Action in Partnership, Edinburgh 1999). There are nearly four times as many deaths from VSA in social class V compared with other social

classes, and areas with high VSA death rates have high levels of deprivation.¹¹ Although the UK literature discussing drug deaths, employment, income and social class is limited, it is consistent with international findings.¹²⁻¹⁴

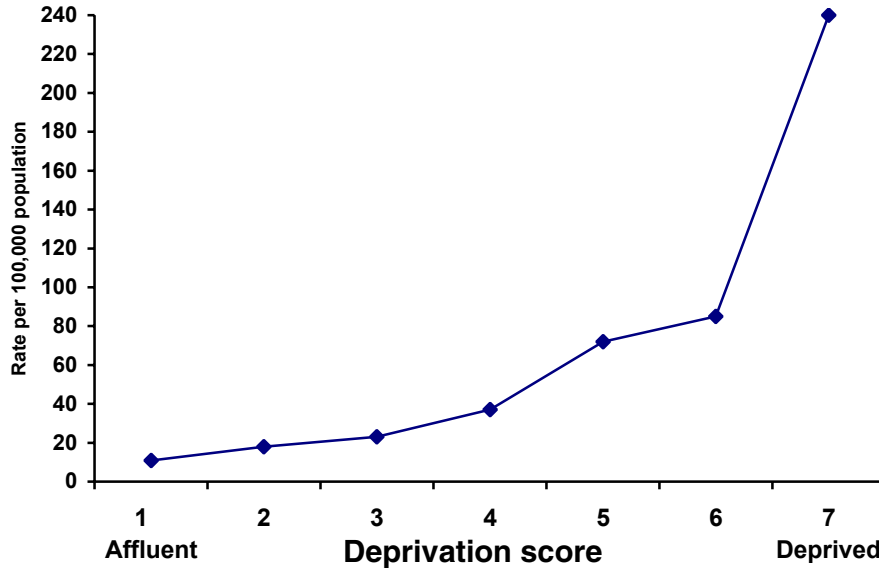


Figure 3.1 Non-psychiatric hospital admissions related to drug misuse in Scotland 1996-98 by deprivation score of patients' place of residence

- 3.11 The relationship between these environmental variables and drug-related deaths is likely to be far from straightforward. Problematic drug misuse, including drug injecting, is itself highly influenced by these factors. Moreover the relationship between such factors as income, social class, and problematic drug misuse is not one way; developing a pattern of dependent drug use or drug injecting is itself likely to exert an influence upon the level of an individual's income and their capacity to remain in employment. But a reasonable conclusion might be that drug-related deaths are often causally embedded in a complicated and as yet not fully understood nexus of adverse social context.

MENTAL HEALTH STATUS, DEPRESSION AND SUICIDE

- 3.12 Poor mental health, particularly depression, is a key factor predisposing individuals to suicide. Physical illness, poor family relationships, social isolation, and stressful life events, also increase the likelihood of suicide. Since all of these are associated with drug misuse, it is unsurprising that individuals with a history of drug problems often take their own lives. Bentley and Busuttill⁹ reported that 16 (9%) of drug-related deaths in their study were the result of suicide. Crighton and Towl¹⁵, provided a detailed analysis of self inflicted deaths in prison custody and found that drug users were over-represented, with 29% of those who killed

themselves having had a history of drug misuse. This compared with estimated rates of drug use for the prison population of around 11.5%.

- 3.13 There is also some evidence to suggest that HIV infection and AIDS add to suicidal risk.^{16–18} The incidence of psychiatric co-morbidity and suicidality among drug users, including methadone maintained clients, has not been well researched in the UK, but has been highlighted in the international literature, particularly in the USA.^{19–20}

LOCATION

- 3.14 According to Ghodse and his team², the highest drug-related death rates per 100,000 population were reported by 8 of the 96 coroners' jurisdictions which they studied. These were: Blackpool and Fylde, Brighton & Hove, Inner London (North), Lincoln, Norwich, Peterborough, Pembrokeshire and Reading. The extent to which this reflects reporting habits as opposed to actual incidence is uncertain. Where place of death was reported, 68% of individuals died in a residence, 25.9% died in hospital, and 6% died in other locations, for instance public toilets. In Glasgow, Cassidy¹⁰ noted that the majority of deaths occurred near centres of known supply. Furthermore, although a number occurred in the family home, a large proportion were not at the place of residence. In respect of VSA, the place where the substance was abused prior to death has been fairly evenly divided between indoors, and public places such as parks and shopping centres.^{3,21} Although VSA is a national problem, it has an uneven geographical distribution, with death rates highest in the northern areas of the United Kingdom.³

HOMELESSNESS

- 3.15 Although Ghodse⁸ reported that only 4.6% of his sample were without fixed abode, British research has not to-date focused on any additional risk of mortality amongst homeless drug users. Data from Hamburg²², however, showed that approximately one-third of all drug-related deaths in 1991 occurred in users who were without housing. The injection of drugs in public places was identified as a risk factor in causing overdose in Paris.²³ This was because the drug would have to be injected quickly and without caution, and this would increase the risk of toxic accidents. Consistent with this argument, Gutierrez-Cebollada²⁴ found that the self-injection of heroin in an unusual place, was a risk factor for heroin overdose in Barcelona. We think that this non-UK literature probably carries relevance for this country, and here too homelessness and injecting outdoors are likely to be risk factors.

DRUG AVAILABILITY

3.16 Although there is no UK literature specifically considering the impact of drug availability on the incidence of drug-related deaths, international research suggests that the incidence of use or misuse of any substance largely reflects the availability of that substance. One aspect of availability is price. According to Hyatt and Rhodes²⁵, there was a significant negative relationship between the estimated street price of cocaine and the level of related medical emergencies and deaths due to misuse of this drug. As is true of the demand for other products, the demand for cocaine was, in other words, sensitive to its price. Consistent with the availability argument, Howard²⁶ found that deaths due to barbiturate poisoning in a metropolitan area in the USA, decreased with the decreased prescribing of those drugs, while benzodiazepine-related deaths increased with the increased availability of those substances. The curtailment of the heroin epidemic in that same area during the mid 1970s reflected drug misuse treatment and prevention programmes, and a concentrated effort by enforcement officials at restricting the flow and sale of heroin. We think that this international literature is, in broad terms, likely to bear on the problems in this country. If availability of drugs decreases, deaths due to the relevant drugs are likely to decrease. But at present one cannot go beyond an assertion of likelihood. Drug-related deaths could decrease even if there was an increase in the use of less harmful drugs, or an increase in the use of drugs in less harmful ways.

RISK PERCEPTION AND RISK RESPONSE AMONGST DRUG USERS

3.17 It is important to understand drug users' own assessments of their risk of overdose. Such assessments are likely to influence their reactions to overdose and the probability of their adopting strategies aimed at reducing that risk. However, this is not a topic that has been widely studied to date. Although useful information in this area is beginning to emerge, for the time being we again have to rely on overseas findings. For instance, in a recent Australian study, Darke and Ross²⁷ found that of 312 heroin users surveyed only 20% believed that they were likely to overdose in the future, 30% thought that this was unlikely and 50% thought it very unlikely. And 77% of drug users said that they rarely or never worried about overdose. This was despite the fact that these subjects estimated that 60% of heroin users would experience an overdose in their heroin-using career. Whilst it might have been thought that witnessing an overdose would exert a positive influence on drug users' assessments of risk, in fact the authors of this research found no such clear relationship.

3.18 Although from an outsider's perspective it might be assumed that drug users and in particular drug injectors, would inevitably be concerned with the risk of overdose, in fact this is not necessarily the case. Using interviews and focus groups with illicit drug users, Rhodes²⁸ concluded that everyday heroin use is

permeated by risks. There are risks of dependence; overdose; HIV or hepatitis transmission; injecting damage; using bad heroin; risks related to buying and dealing and going to jail. Thus, for many drug users, the risk of overdose is likely to be a relatively small concern, part of the routine danger of using street heroin, and not an unusual occurrence.

- 3.19 Building on this theory, Rhodes²⁹ subsequently explored how risk behaviour is socially organised among drug users. He concluded that such behaviour is the outcome of a complex interplay between individual and social factors. Behaviours which are, for public health reasons, considered 'risky', may be viewed in different terms by drug users themselves. Without understanding how drug users perceive and behave in response to risk, it is not possible fully to appreciate why it is that they behave as they do, and why it is that they may continue to engage in behaviours they know to carry a risk.
- 3.20 The reactions of drug users to overdose is particularly important in view of the finding³⁰ that many drug deaths occur in the company of other drug users. Zador *et al*³¹ reported that, in their study, 58% of overdose cases occurred while other people were present. In a study by Walsh³² the figure was 79%. In the research reported by Manning³³ in 1983, more than half of the overdoses occurred with others present. In only 23% of the cases of overdose reported by Manning did the individual collapse immediately. In over half of the cases reported by Garriet and Sturmer³⁴, an interval of more than 3 hours elapsed before medical assistance was sought. In the study by Nakamura³⁵ in 1978, 44% of cases had an interval greater than 2 hours before help was sought. Manning found that in 42% of cases help was acquired 3 hours after final injection and after other remedies, such as a cold shower, had been tried. On the basis of such findings one would have to conclude that there is considerable potential to intervene at an earlier point in drug-related emergencies than may generally be occurring at the moment, with a reduction in the likelihood of a fatal outcome on at least some occasions.
- 3.21 Researchers are also beginning to look at drug injectors' attempts at reducing their risk of overdose. Darke and Ross³⁶ found in Australia that 73% of injectors said that they did things to reduce their risks of overdose; 20% said that they rarely injected heroin after having used alcohol; 54% said that they never consumed alcohol in conjunction with heroin. However, 5% said that they always combined these drugs. Injecting on one's own is likely to carry a particularly high risk, because of the reduced likelihood of someone discovering the overdose and alerting medical services. But 52% of injectors in Darke and Ross's study reported having injected alone, and 10% said that they always injected alone.

CONCLUSIONS

- 3.22 In the opening paragraph to this chapter we suggested that drug use is behaviour which occurs within a social context. The complexities hidden in that word “context” have become apparent as this exposition has proceeded. For instance, some of the context is the individual’s age and gender and length of drug use. Background factors such as employment, income, social class and social deprivation may be relevant. Virus status and mental health bear on individual vulnerability to suicide. There is the immediate physical and social context which will or will not offer support if overdose occurs: a cold room or a heated flat; a friend present or run away. And within this nexus there is the individual using a more or less dangerous drug by a route of use carrying lesser or greater risk, and with that individual making an accurate or blithely inaccurate personal appraisal of the riskiness of their drug-taking.
- 3.23 We believe that what we have summarised of this chapter in the paragraph above, amply supports the contention that although drugs are a prime cause of drug-related deaths, the totality of a complex personal and social context (the person within a contextual background and foreground), also has to be taken into the reckoning if we are to build intelligent prevention policies. Prevention of drug-related deaths must deal with drugs but be sensitive to the wider realities.

4 THE PRESENT SYSTEM FOR COLLECTING DATA ON DRUG DEATHS AND PROBLEMS WITHIN THEM

The availability of credible data on drug-related deaths is of great importance. Regrettably, the current system for generating these data is flawed. We describe that system and identify the multiple problems within it.

THE APPROACH WHICH WE TAKE

- 4.1 Chapters 4, 5 and 6 are closely linked and they all bear on the issue of data. Chapter 4 describes the relevant current data system in different countries within the UK, and identifies the problems. Chapter 5 makes suggestion for improvement, and Chapter 6 gives some key selected output available from present sources.
- 4.2 To have in place a system which can year-on-year generate trustworthy data on drug-related deaths is of fundamental importance to the national drugs strategy. Without such data the policy process will be in the dark as to how often what drugs are causing death to what people, and in what circumstances. There will be no confident ability to monitor trends over time, and no basis for assessing the efficiency of policies directed at reducing these deaths. Good data are here, and as ever, the foundation of good public health.
- 4.3 Such data are in this instance important because they enumerate these deaths, describe their correlation, and provide the basis for monitoring the efficiency of policies targeted at their prevention. We see this as their prime contribution, rather than their providing a reliable indirect indicator of the size of the overall drug problem. It is possible to envisage drug-related deaths going up while the national prevalence of drug misuse went down, and vice versa.
- 4.4 As an essential first step we have attempted to develop a detailed understanding of how the present system work. We admit that we have at times felt somewhat baffled by that question. It is not only a matter of understanding how the system operates in theory, but also of how a linked system of personal and professional interpretations of administrative rules and intentions works out in practice. This is a system which has grown incrementally, rather than having a strong coherence and with everyone serving one common intention. That may have been a

satisfactory state of affairs when there were only a few drug-related deaths each year, but it is inadequate for the accurate monitoring of what has become a major public health problem.

- 4.5 The intention must be to capture all deaths where, on a reasonable balance of probabilities, one or more stated substance is in some degree implicated in the cause of the individual's death. We do not aim for certainty but only at reasonable probability.
- 4.6 The substances with which this report is most directly concerned are illicit drugs. Volatile solvent abuse deaths should also be captured within the system. Deaths related to over-the-counter medications are not our direct concern. The system must succeed in distinguishing between deaths due to those substances and due to illicit drugs, but we believe that their reporting can be contained as separate data within the same framework. Alcohol is not the primary concern of this report, but its interactions with illicit drugs are of such importance as to persuade us that there is a case for again trying to get it within the same general reporting frame as we will be proposing. The implications of these suggestions would however, require consideration by some group other than ourselves. We are well aware that alcohol-related deaths have their own recording complexities.
- 4.7 Within the perspectives of this report at least the following major underlying types of 'relatedness' then have to be considered as cutting across the different substance-related causes:
- Deaths due to acute poisoning whether accidental or self intended, or due to drug-related acute illness
 - Deaths due to chronic illnesses
 - Deaths due to road traffic accidents
 - Deaths of victims due to an intentional poisoning by some other party

We see 4.5–4.7 as representing the core perspective expressed within the present system, and it should be preserved.

THE CURRENT SYSTEM AND ITS PROBLEMS: ENGLAND AND WALES

- 4.8 What we will do in this section is go through the present system step by step, and at each step seek to identify any implicit problems. In Table 4.1 a summary of those problems is given. In describing the current system we seek to describe their essentials rather than going into every administrative detail. Different parts of the United Kingdom have in this arena somewhat different administrative

systems in place (that is part of the problem), and we start here with England and Wales. Figure 4.1 summarises the basic steps.

Table 4.1 Problems within the present data collection system on England and Wales collection system on deaths related to drug misuse. References to appropriate paragraphs are given in brackets

Deaths due to chronic virus diseases are not captured (4.9)

The coroner's fundamental responsibility is not that of collecting public health data (4.11)

A post mortem does not necessarily include a toxicological examination (4.12)

The choice of verdicts open to the coroner when recording a drug-related death are unsatisfactory and confusing (4.15).

The information which is gathered on the drugs involved in the death may be incomplete (4.18)

The coroner's certificate gives no indication as to whether a toxicological examination was carried out (4.18)

The certificate gives no indication as to whether injected drug misuse was involved (4.18)

The criteria which will lead a coroner to request a toxicological examination are unclear (4.18)

ONS appears to have no routine way of checking back with the coroner's office if information is incomplete (4.22)

The coding frame used by ONS which mirrors the coroner's approach is similarly unsatisfactory (4.23)

The current ONS approach to reporting drug-related deaths is unsatisfactory for our purposes in that it also will capture cases other than drug-misuse related deaths (4.27)

There are some unnecessary variations in the recording of drug-related deaths across the constituent parts of the UK (4.36)

The problem of how to get data on the involvement of drug misuse in road traffic accidents has not been resolved (4.41–4.43)

CDSC and SCIEM tracking of drug-related deaths is incomplete (4.46)

International comparisons on rates of drug-related deaths are at present likely to be unreliable (4.50)

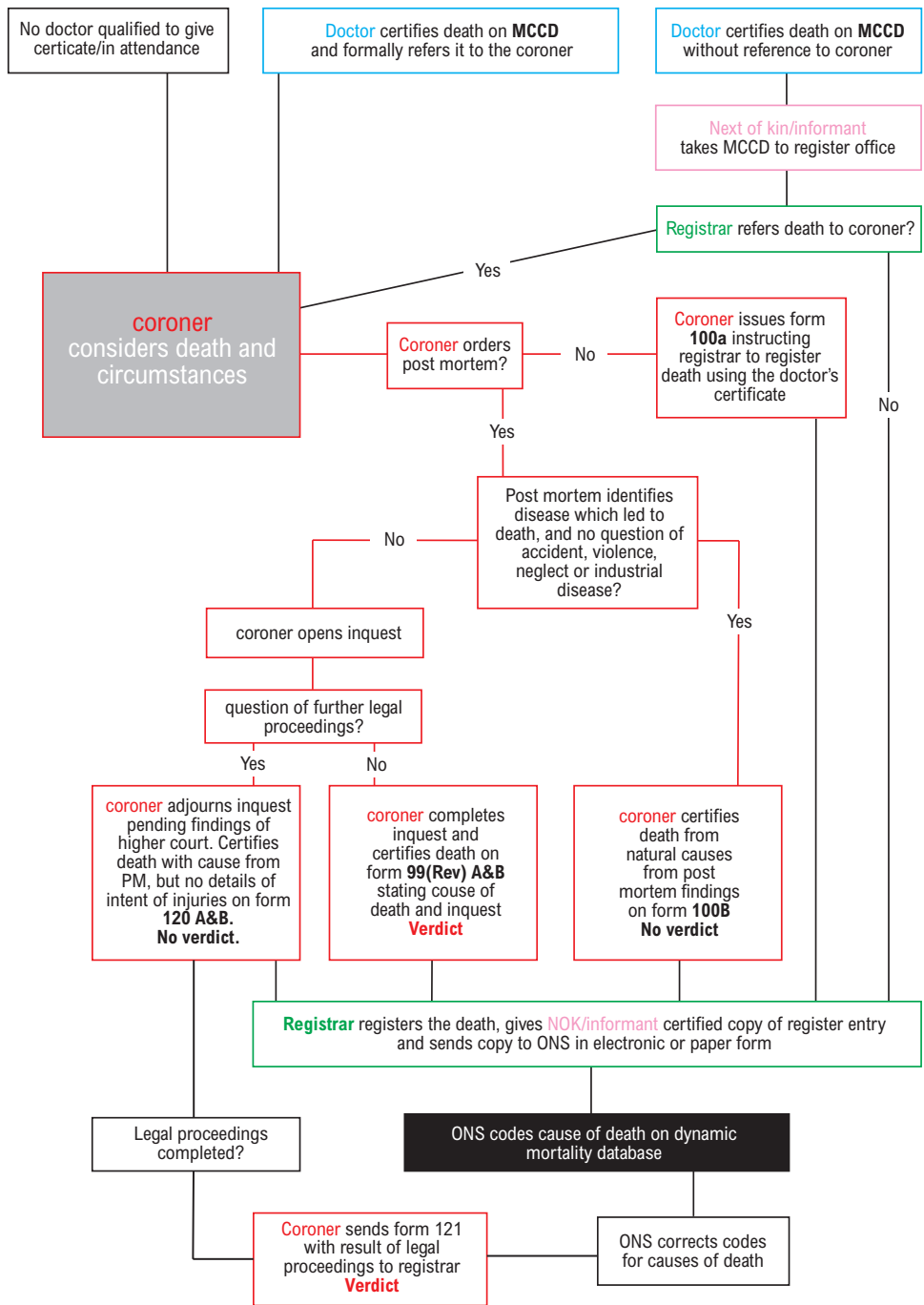


Figure 4.1 Process of collecting and coding cause of death data, England and Wales

DOCTORS NOTIFY THE CORONER

4.9 Doctors traditionally see it as their duty to refer deaths to coroners when appropriate although strictly speaking responsibility lies with the Registrars of Births Deaths and Marriages. The statutory requirement is that the Registrar will report deaths to the coroner if

- the deceased was not attended during his last illness by a medical practitioner;
- a duly completed certificate of cause of death cannot be obtained;
- the deceased was not seen after death, nor within 14 days before death, by the certifying medical practitioner;
- the cause of death appears unknown;
- the death appears to be unnatural, caused by violence or neglect, abortion, or attended by suspicious circumstances;
- the death appeared to have occurred during an operation or before recovery from the effects of an anaesthetic; or
- the death appears to have been due to industrial disease or poisoning.

In turn, coroners are required to hold an inquest if the death was due to violence, unnatural, or sudden and of unknown cause. (They must also hold inquests into deaths in prison.) The registrar is thus required to report a rather wider selection of cases than will necessarily result in an inquest in the interests of ensuring, as far as possible, that deaths which might need to be subject to an inquest can be considered by the coroner. However, as mentioned, in practice most doctors know what sort of deaths will be reportable to coroners and by-pass the registrar by contacting the coroner themselves, saving time in the interests of the deceased's relatives. They may not include deaths due to HIV or hepatitis where the deceased may be known to have contracted the disease through injecting drug use many years previously.

4.10 Doctors are trained from their earliest professional days to take the need to notify the coroner seriously and will probably err on the side of caution. Deliberate failures by a GP or hospital practitioner to notify acute drug-related deaths to the coroner are therefore likely to be rare, although a doctor might be unaware of the drug involvement in some instances of death.

THE CORONER

4.11 The coroner's primary function is to establish the circumstances and cause of death and to investigate the possibility of any criminal involvement. Compiling statistical data is a secondary concern, although some coroners are known to have a particular interest in drug-related deaths. There are 138 coroners in England

and Wales, of which about 25 are full time, including the seven coroners in London. Many of the rest are solicitors who act as coroners part-time. There is considerable variation between coroners in terms of facilities, resources and workloads. Coroners have to decide their verdicts in the light of the evidence presented at the inquest and in the exercise of their judicial discretion. They also have discretion in deciding what information they record on the coroner's certificate of cause of death. The result can be the immediate and evident problem that there are coroners working in areas of known high drug prevalence who never certify a death as related to drug misuse.

4.12 The coroner generally orders a post mortem to be carried out by a pathologist. The post mortem may, but does not necessarily, include a toxicological examination, and we return to this issue shortly (para 4.20).

4.13 The coroner or coroner's officer (often a retired police officer), then collects additional information on the deceased, from various sources such as the police, medical records, relatives, friends and any available witnesses. This may include information on the drug history of the deceased although this can be difficult to collect. For example, relatives are often unaware of, or are unwilling to give details on, the deceased's drug habits. Similarly, where witnesses are also drug users, they may be reluctant to supply information on the deceased's drug use for fear of being implicated in the death.

4.14 Following the post mortem, the coroner may hold an inquest, which will normally be held without a jury. The coroner takes into account the pathologist's report if there is one, together with the findings of their own investigations. He or she then decides the cause, or causes, of death and gives a verdict. In the case of drug-related deaths, the coroner has a choice of six alternative and mutually exclusive verdicts:

Dependence on drugs

Non-dependent abuse of drugs

Accident/misadventure

Suicide

Lawful killing

Unlawful killing

Open (only to be used where there is insufficient evidence to record any other verdict)

4.15 We believe that the above framework is for several reasons inadequate for purposes of systematic data collection.

- It is unreasonable to expect a coroner to distinguish between “Dependence on drugs” and “Non-dependent abuse of drugs”.
 - The first two choices are not logically alternatives to any of the four which follow, but potentially complementary.
 - This rubric gives potential for the drug-relatedness of a death to go unrecorded.
- 4.16 Having completed the inquest, the coroner certifies the death. Where both a post mortem and an inquest have been carried out, which is the case for virtually all deaths which are known to be drug-related including suicides and accidents (over 99 per cent between 1993 and 1996), the coroner certifies the death using Form 99 (Rev) (Appendix C). Alternative forms are used if there is no inquest or if the inquest is adjourned pending criminal proceedings (ONS Series DH4).
- 4.17 In addition to general details on the deceased such as name, age, sex, date of death, occupation, usual address, cause(s) of death and marital status, the coroner’s certificate also contains information on whether a post mortem was held and the coroner’s verdict. In the case of deaths by accident or misadventure, Part V of Form 99 (Rev) (Appendix 1) requires the coroner to supply details of where and how the “accident” happened. This section may also be completed for non-accidental deaths, but is not obligatory.
- 4.18 In the cause of death section of the certificate, the coroner may mention any drugs identified but this is not a requirement. Where more than one substance is recorded, there is usually no indication of the relative quantities, or which substance was likely to be responsible for the death. Often only a general description, such as ‘drug overdose’, is recorded; this is the case in around 10 per cent of deaths attributed to drugs. In some cases this may be because the coroner only received the pathologist’s report just before the inquest. The coroner’s certificate generally does not include any indication of whether a toxicological examination was carried out nor on the route(s) of drug administration.
- 4.19 We see it as unsatisfactory that the recording of important matters relating to the role of drugs in the cause of deaths should thus, in effect, be left to a voluntary and unstructured annotation on a report form.

POST MORTEM TOXICOLOGICAL EXAMINATIONS

- 4.20 As mentioned above (4.12), a coroner may or may not request a toxicological examination at the time when a post mortem is performed. We found no way of discovering the criteria which effect this choice, the consistency with which those criteria are applied nationally, or the range of tests likely to be requested. We suspect that in general post mortem testing for the presence of drugs is only performed at the coroner’s specific request and in the following circumstances:–

- When there is strong presumptive evidence that a sudden death is drug-related, and confirmation is being sought as to the substances involved.
- Screening for drugs when the death is a suspected suicide.
- Somewhat uncertainly, screening for drugs where death is due to a road traffic accident. This is not routine.
- Screening where the cause of death is obscure.

THE REGISTRAR OF BIRTHS AND DEATHS

4.21 The coroner's certificate is sent to the registrar of births and deaths, who registers the death using the information on the certificate, together with details from an informant where no inquest has been carried out. The registrar does not receive the reports made by the pathologist or the police.

OFFICE FOR NATIONAL STATISTICS (ONS)

4.22 ONS receives only the information on the registration form, together with Part V of the coroner's certificate. Since 1993 the information on the death certificate has been stored electronically on the ONS mortality database (ONS 1996). So far as we can discover, ONS has no routine way of checking back with the coroner's office if information is incomplete. However, when ICD10 is introduced in 2001, medical enquiries may be undertaken once again.

4.23 From this information and working within set rules, the officer concerned will code up all causes of death mentioned on the death registration form, according to the Ninth Revision of the International Classification of Diseases (ICD9)¹. There are five main groups of ICD9 codes which cover deaths directly due to drugs:

304	Drug dependence
305	Non-dependent abuse of drugs
E850–E858	Accidental poisoning by drugs, medicaments and biologicals
E950	Suicide and self-inflicted poisoning by solid or liquid substances
E980	Poisoning by solid or liquid substances, undetermined whether accidentally or purposely injected

In addition, a small number of deaths may be attributed to assault by poisoning (ICD9 E962), or to drug psychoses (ICD9 292). Deaths attributed to ICD9, 292, 304 and 305 may be processed by the automatic coding system. All other codes, including external cause, are allocated by members of ONS staff.

- 4.24 We see this approach as logically unsatisfactory for much the same reasons as pertain to the framework employed by the coroner (4.15). Furthermore, we do not believe that drug dependence per se can ever be a cause of death, and we doubt whether drug psychosis is a feasible cause of death.
- 4.25 Further complications arise from the way in which the five main three-digit ICD9 codes are subdivided into more specific four-digit codes. These four-digit codes mostly cover groups of drugs, and therefore cannot be used to derive the number of deaths from specific substances. Moreover, the subcategories are different within the main three-digit code groups so they cannot be added together to give the number of deaths from particular types or groups of drugs. We cannot see this as helpful.
- 4.26 The four-digit codes cover a broad range of legal and illegal substances, including some that would not be classified as drugs under most conventional definitions. In particular, ICD9 305.0 and ICD9 305.1, which account for a high proportion of deaths coded to ICD9 305, cover non-dependent abuse of alcohol and tobacco, and ICD9 E950.6-9 and E980.6-9 cover 'Agricultural and horticultural chemical and pharmaceutical preparations, other than plant foods or fertilisers'; 'corrosive and caustic substances'; 'arsenic and its compounds'; and 'other and unspecified solid and liquid substances'. Similarly, the majority of deaths coded to ICD9 304.6 are due to volatile substance abuse (VSA). Between 1993 and 1996 around one fifth of deaths attributed to drug dependence (ICD9 304) were coded to ICD9 304.6. It is worth noting that cocaine is coded to 'local anaesthetic' (ICD9 E855.2) under accidental poisoning, but to 'cocaine' under the dependence and abuse codes (ICD9 304.2 and ICD9 305.6). What one is of course looking for is a ready method of using these codes in a way to capture deaths due to any and all substances relevant to the interests of this report, with other chemicals and drugs e.g. weed killer and paracetamol, excluded.
- 4.27 ONS's current approach to the definition of drug-related deaths (Table 6.1) does not meet the inclusion/exclusion requirements in a way to reflect our needs, and is likely to be considerably over-inclusive from our perspective. Even the restrictive group of codings with which ONS kindly ran certain calculations for the purposes of this report, seem to us potentially over-inclusive in some ways and under-inclusive in others.
- 4.28 Where a number of drugs are mentioned on a death certificate, it is not always possible to tell which of them made a major contribution to the death. Therefore, ONS's estimates of the number of deaths due to specific drugs are based on the number of deaths where the underlying cause of death was drug-related (i.e. assigned one of the ICD9 codes in Box 4), and where the drug is mentioned on the death certificate. This procedure cannot reveal whether the stated drug was primarily responsible for the death.

- 4.29 When analysing figures on deaths due to specific drugs, it is important to be aware of these limitations. ONS has recently developed a database which will allow deaths from specific drugs to be extracted more easily and reliably. The database contains all deaths assigned one of the underlying causes of death within ONS's broad definition of drug-related deaths in Box 4. Information for 1993 onwards has been entered onto the database in such a way that ONS can now run queries to retrieve information on the number of cases where particular substances were mentioned on the death certificate, much more efficiently than before. Most of the variables on the death certificate, including age, sex, postcode, occupation and marital status, are stored on the database, and it can therefore be used to carry out much more detailed analysis than was previously feasible.
- 4.30 ICD10 will be adopted by GRO (Scotland) in 2000, and by ONS and GRO (Northern Ireland) in 2001².

THE CURRENT SYSTEM AND ITS PROBLEMS: SCOTLAND

- 4.31 In Scotland all suspicious deaths must be referred to a procurator fiscal, and the cause of death is determined by the pathologist. There are no inquests. Occasionally, fatal accident inquiries are held but not usually for drug-related deaths. The procurator fiscal does not give a verdict but instead the 'manner of death' is recorded (accident, suicide, homicide, pending investigation, undetermined, self-inflicted or natural), based on police reports and the findings of the pathologist. The procurator fiscal notifies GRO (Scotland) when changes are required to the cause(s) of death reported at the time of registration, and the register entry is annotated accordingly. In virtually all cases this revised information is used to code the cause of death. GRO (Scotland) is notified by the Crown Office of deaths that were considered to be suicides. All deaths are registered within a few days in Scotland, but this is not the case in England and Wales.
- 4.32 In 1994, GRO (Scotland) introduced new arrangements for collecting information on drug-related deaths. Forensic pathologists conducting post mortems were asked to pay particular attention to deaths which might be drug-related and to complete questionnaires for these deaths, giving greater detail than is applied on the death certificate. GRO (Scotland) also follows up all deaths of young people where the information on the death certificate is vague or suggests an involvement with drugs. Following the introduction of this system, GRO (Scotland) has published annual figures on drug-related deaths in Scotland. These were first published in 1995 with figures for 1992 to 1994. Data from 1994 are based on the new system of collecting data and provide a baseline against which trends can be measured. In quantifying drug-related deaths, GRO (Scotland) uses a slightly different set of ICD codes from those used in England and Wales.

- 4.33 The new system for collecting information on drug-related deaths has led to improved data quality. There has been a decline in the proportion of deaths classified in vaguer categories, both in terms of the type of drug involved and whether the deceased was known or suspected to be drug dependent. There has been a corresponding increase in the proportion of deaths given more specific descriptions and a rise in the total number of drug-related deaths recorded, which may be partly explained by improved data collection. The success of this project was facilitated by the fact that most forensic blood analysis is carried out in four main forensic departments. It has therefore been relatively easy to establish good working relations with these departments and keep track of them (Arrundale and Cole, 1995)³.
- 4.34 GRO (Scotland) also assigns supplementary codes to causes of death of particular interest, including drug-related deaths, allowing them to be identified easily from their mortality database. The definition of deaths included as 'drug-related' has however altered over the years, so this information cannot be used on its own to give an indication of long-term trends in drug deaths. From 1988 onwards, individual records of drug-related deaths have been held on spreadsheets with each drug mentioned on the death certificate held in a separate cell, facilitating the quantification of deaths due to specific drugs.

THE CURRENT DATA SYSTEM AND ITS PROBLEMS : NORTHERN IRELAND

- 4.35 In Northern Ireland, the system of referring deaths to a coroner, who then orders a post mortem and an inquest, is similar to the system operating in England and Wales, although the inquest results in a 'finding' rather than a verdict. Where the information provided on the death certificate is vague (for example, if 'drugs overdose' is stated with no mention of which drugs were involved), GRO (Northern Ireland) will contact the coroner responsible for certifying the death to obtain more detailed information. GRO (NI) do not record the individual drugs implicated in deaths in a database.

VARIATIONS IN PROCEDURES ACROSS THE CONSTITUENT PARTS OF THE UK: SOME GENERAL COMMENTS

- 4.36 We see it as inevitable with the existing differences between the English Coroner and the Scottish Procurator Fiscal, that there should be some differences in the approaches to collection of data on drug-misuse related deaths. For problems of very common cross-country public health concern, it does however seem to us disadvantageous if data collection systems are allowed to vary in their type of

output. We will return to this matter when making our recommendations on improvements to data collection (Chapter 5).

OTHER SOURCES OF INFORMATION ON DRUG-RELATED DEATHS IN THE UK

HOME OFFICE: STATISTICAL BULLETIN OF NOTIFIED ADDICTS

4.37 Until 30 April 1997, the Misuse of Drugs (Notification of and Supply to Addicts) Regulations 1973, required doctors to notify the Chief Medical Officer at the Home Office of any persons considered to be, or suspected of being, addicted to any one of 14 controlled drugs. That system is now defunct and we will not comment on it further. A statistical bulletin published details of the notifications, and also of drug-related deaths. The last bulletin contained information of such deaths for the period up to and including 1995.⁴

ST GEORGE'S HOSPITAL MEDICAL SCHOOL: NATIONAL PROGRAMME ON SUBSTANCE ABUSE DEATHS

4.38 The Department of Addictive Behaviour at St George's Hospital Medical School is currently developing a database of drug abuse deaths in the UK under the National Programme on Substance Abuse Deaths, np-SAD⁵. All coroners in England and Wales and Northern Ireland, together with the procurators fiscal in Scotland, have been invited to complete a standard questionnaire on drug-related deaths. This gives more detailed information than is available from the death certificate, including ethnicity, living arrangements and addict status.

4.39 During the first six months of the study, 35 coroners in England and Wales responded to the questionnaire, reporting a total of 247 drug-related deaths (Ghodse et al, 1998b). This increased to 80 coroners and 491 cases during the second 6 month period⁶. The third report covers 96 coroners' jurisdictions and is based on 695 cases⁷.

4.40 The group was grateful for the opportunity to discuss this scheme with Professor Ghodse's colleagues and were impressed by the degree of collaboration they had been able to achieve with coroners. Questions remain as to how complete the coverage obtained would be if the scheme remained open, and the costs of keeping a satisfactory level of collaboration in place in the longer term on this informal basis are unclear.

DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS

4.41 The DETR's three-year study into the presence of drugs – medicinal and illegal – in road traffic fatalities (drivers/riders, passengers, cyclists and pedestrians) ended

in October 1999 and a full report is expected to be published in Spring 2000. Interim figures released in February 1998 showed a presence of illegal drugs in 16% of the victims and medicinal drugs in 6% – it also showed a presence of alcohol in 34% (23% over the legal limit).⁸

- 4.42 There are various problems involved in collecting and interpreting these data. For example, cannabis, which is by far the most common illicit drug to be detected in the victims of road traffic accidents, may remain in the body for up to four weeks, and therefore even where it is detected it may not have played a role in an accident (see 2.28). Moreover, the results do not represent comprehensive figures on road traffic accidents due to drugs because only the deceased is tested for the presence of drugs. Where a driver under the influence of drugs causes a fatal accident but survives, this would not be included in the figures of drug-related traffic accidents presented in this study.
- 4.43 Nevertheless, the results revealed a considerable increase in the proportion of fatalities where drugs were detected in road traffic accident victims compared with a similar study in 1985–87, suggesting there is an increasing need for routine testing for the presence of drugs following road traffic accidents.

COMMUNICABLE DISEASE SURVEILLANCE CENTRE (CDSC)

- 4.44 Data on HIV/AIDS deaths produced by CDSC and SCIEH, are known to be more comprehensive than those published in routine mortality statistics because HIV/AIDS is not always declared as a cause of death on the death certificate. CDSC receives copies of death certificates mentioning HIV/AIDS from ONS on a monthly basis. They also received reports of HIV/AIDS cases in England and Wales from laboratories and clinicians and they are notified of the deaths of these cases by clinicians, whether or not the cause of death was directly related to HIV/AIDS. The information on risk factors for most of these cases is believed to be fairly accurate.
- 4.45 The incidence of acute hepatitis B was once a reliable indicator of heroin dependence in the UK but this association is now less firm. Surveillance of hepatitis B and C is less comprehensive than for HIV/AIDS. Cases of acute hepatitis B and chronic hepatitis B and C are received from laboratories, but high completeness of reporting only exists for hepatitis B. Risk factors for hepatitis B cases are often given but there is a substantial proportion of cases for which the risk exposures are unknown. Where an individual has died from hepatitis this may be indicated on the laboratory reports but this is not necessarily the case. Comprehensive information on risk factors among individuals dying from hepatitis B is therefore not available.
- 4.46 In the case of hepatitis C, most reported infections are found by screening risk groups. CDSC are establishing surveillance of end-stage liver disease due to

hepatitis B and C which will incorporate deaths, although this will not be comprehensive for the whole country owing to lack of funding. Data on how hepatitis C was acquired is requested but is missing in a high proportion of cases.

- 4.47 We return later to this worrying incompleteness in data reporting on drug-related hepatitis deaths, and this is certainly a further problem that needs to be flagged up.

INTERNATIONAL DATA

- 4.48 There have been various developments at an international level to improve the quality and comparability of statistics on drug-related deaths. At the European level, two major studies have been commissioned by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) in recent years. The first of these was co-ordinated by the National Board of Health in Denmark⁹, and the second by the Trimbos Institute (the Netherlands Institute of Mental Health and Addiction) (van Laar and de Zwart, 1998). These studies have confirmed that there is considerable variation between countries in methods of collecting, recording, coding and quantifying information on drug-related deaths.

- 4.49 One of the key outcomes from these studies is the development of a draft standard set of criteria, for extracting data on drug-related deaths from general mortality registers and from special registers, 'the DRD-Standard' (EMCDDA, 1999)¹⁰. The feasibility of implementing this standard in EU member states has been assessed by the Trimbos Institute on behalf of the EMCDDA, based on information collected via a questionnaire to each country (EMCDDA 1999). The second stage of this exercise will be to collect data according to these codes from member states and analyse them. We refer in Chapter 6 to analysis of British data conducted within the DRD system.

DATA SYSTEM ON DRUG MISUSE : CONCLUSION

- 4.50 We conclude that the current system for collecting and reporting on drug-related deaths in the UK stands in need of considerable strengthening, particularly so in England, Wales and Northern Ireland. However, such a judgement should not be seen as negative. In working toward the needed improvements there is valuable experience on which to build. The Coroner's Courts and the Procurator Fiscal system represent a remarkably strong, experienced and community based device which although constituted with other formal responsibilities, is already giving considerable support to public health interests. The Government statistical offices have given a great deal of thought to data collection in this area and are cognisant of the problems. Potentially valuable international collaboration is developing. But

the fact remains that at present the system for generating data on drug-related deaths cannot provide information of the quality needed.

