Annex A: The definition of drug-related deaths used for these statistics (the National Records of Scotland (NRS) implementation of the 'baseline' definition for the UK Drugs Strategy)

A1. Background

The definition of a 'drug-related death' is not straightforward. Useful discussions on definitional problems may be found in articles in the Office for National Statistics (ONS) publication 'Population Trends' and in the journal 'Drugs and Alcohol Today' (please see the References at the end of this Annex). 'Reducing drug related deaths', a report by the Advisory Council on the Misuse of Drugs (ACMD, also mentioned in the References), considered (what were, at that time) the current systems used in the United Kingdom to collect and analyse data on drug related deaths. In its report, the ACMD recommended that 'a short life technical working group should be brought together to reach agreement on a consistent coding framework to be used in future across England, Wales, Scotland and Northern Ireland'. A predecessor of National Records of Scotland (NRS), the then General Register Office for Scotland (GROS), was represented on this group, and this publication presents information on drug-related deaths using the approach that was agreed, on the basis of the definition as it was implemented by GROS and, now, NRS. The Office for National Statistics uses this definition to produce figures for what are described as 'drug misuse' deaths in England and Wales.

A2. The definition

The 'baseline' definition for the UK Drugs Strategy covers the following cause of death categories (the relevant codes from the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision [ICD10], are given in brackets):

a) deaths where the underlying cause of death has been coded to the following sub-categories of 'mental and behavioural disorders due to psychoactive substance use':
   (i) opioids (F11);
   (ii) cannabinoids (F12);
   (iii) sedatives or hypnotics (F13);
   (iv) cocaine (F14);
   (v) other stimulants, including caffeine (F15);
   (vi) hallucinogens (F16); and
   (vii) multiple drug use and use of other psychoactive substances (F19).

b) deaths coded to the following categories and where a drug listed under the Misuse of Drugs Act (1971) was known to be present in the body at the time of death (even if the pathologist did not consider the drug to have had any direct contribution to the death):
   (i) accidental poisoning by and exposure to drugs, medicaments and biological substances (X40 – X44);
   (ii) intentional self-poisoning by and exposure to drugs, medicaments and biological substances (X60 – X64);
   (iii) assault by drugs, medicaments and biological substances (X85); and
   (iv) poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent (Y10 – Y14).

A3. Deaths which are excluded from the NRS implementation of the definition

The NRS implementation of the definition excludes a small proportion of the deaths which were coded to one of the ICD10 codes listed in Section A2, specifically:

- deaths coded to drug abuse where the direct cause of death was secondary infections or later complications of drug use. The statistics therefore exclude deaths from:
    - secondary infections such as clostridium or anthrax infection resulting from the injection of contaminated drugs:
    - conditions which could be regarded as later complications of drug use, such as bronchopneumonia, lobar pneumonia, bilateral pneumonia, septicaemia or organ failure where drug misuse was not specified as the direct and immediate cause of death (even though it may have damaged greatly the person's health over the years - so reference to, for example, ‘chronic’ or ‘long-term’ drug abuse does not necessarily mean that it was the direct and immediate cause of death).

- deaths where a drug listed under the Misuse of Drugs Act was likely to be present only as part of a compound analgesic or cold remedy. For this purpose, NRS identified the following compound analgesics and cold remedies when producing its statistics:
    - for 2018 and earlier years:
        - Co-codamol (paracetamol and codeine sulphate);
        - Co-dydramol (paracetamol and dihydrocodeine);
        - Co-proxamol (paracetamol and dextropropoxyphene); and
        - Dextropropoxyphene alone (as explained below).
    - for 2019 onwards:
        - Codeine and aspirin (co-codaprin);
        - Codeine and brompheniramine maleate;
        - Codeine and dextropropoxyphene;
        - Codeine and diphenhydramine hydrochloride;
        - Codeine and ibuprofen;
        - Codeine and paracetamol (co-codamol, as before);
        - Dextropropoxyphene and paracetamol (co-proxamol, as before);
        - Dextropropoxyphene alone (as before, as explained below);
        - Dihydrocodeine and aspirin;
        - Dihydrocodeine and dextropropoxyphene;
        - Dihydrocodeine and paracetamol (co-dydramol, as before);
        - Pholcodine;
        - Tramadol and paracetamol;.

    Three points should be noted on these matters:
    - Such deaths are excluded because compound analgesics and cold remedies contain relatively small quantities of drugs that are listed under the Misuse of Drugs Act. It would not be appropriate to count as ‘drug-related’ a death for which a controlled substance was present only because the deceased had taken a compound analgesic or cold remedy.
    - The list of compound analgesics and cold remedies was expanded for the production of the statistics for 2019 after a Public Health Scotland (PHS) National Drug-Related Deaths Database local data co-ordinator queried NRS counting as ‘drug-related’ a death, in 2018, from an overdose of aspirin and codeine. NRS sought advice from PHS and the Office of National Statistics (ONS, which later consulted Public Health England and Public Health Wales). It was agreed that NRS and ONS should both use the above longer list of compound analgesics and cold remedies when producing their statistics for 2019 onwards. NRS’s historical data included at most a dozen

deaths, in almost 20 years, which might have been counted differently had NRS been using that longer list: far too few to warrant revising previous years' numbers. ONS also had only a small number of such cases in its historical data, and agreed that the cost of updating the back series would outweigh the benefits. Therefore, the introduction of the longer list has increased only slightly the accuracy of the statistics for 2019 onwards, and caused only a slight break, between 2018 and 2019, in the time-series.

- As it is believed that dextropropoxyphene has rarely, if ever, been available other than as a constituent of a paracetamol compound, deaths caused by dextropropoxyphene have been excluded even if there is no mention of a compound analgesic or paracetamol. However, deaths for which other controlled substances (such as codeine or dihydrocodeine) were reported without any mention of (e.g.) aspirin or paracetamol have been included, as these drugs are available on their own and are known to be abused in that form.

A4. Exclusions do not apply to the immediate or short-term effects of drugs (provided that the drugs are ones that are counted for these statistics)

The exclusions described in the first paragraph of Section A3 do not apply in the case of conditions which could be regarded as the immediate or short-term effects of drugs (provided that the drugs are ones that are counted for these statistics – that is, they are listed under the Misuse of Drugs Act and are not likely to be present only as part of a compound analgesic or cold remedy) and where terms such as 'intoxication', 'poisoning', 'toxicity', 'overdose', 'acute drug misuse', 'adverse effects of', 'combined effects of', 'possible intoxication' or 'suspected drug overdose' appear. For example, deaths for which the cause was given as

- complications of acute and chronic drug misuse or
- bronchopneumonia [due to] heroin intoxication or
- hypoxic brain injury [due to] morphine and methadone intoxication or
- multi-organ failure [due to] cardiac arrest [due to] multi-drug intoxication

would be included in these statistics. It would be assumed either that the death was due to the effects of the drugs (rather than the medical condition) or that the medical condition was an immediate consequence of the drug-taking.

In cases where there is a reference to (for example) drug intoxication, deaths caused by (e.g.) the inhalation of gastric contents, aspiration pneumonia or choking on food are counted in these figures, as they are regarded as immediate consequences of drug intoxication. Similarly, hypothermia may be an immediate consequence of drug intoxication. The statistics also include deaths for which the cause was given as 'cocaine-related cardiac arrhythmia' and 'acute intracerebral haemorrhage [due to] amphetamine use', unless it is clear that the drugs were not used recently.

A5. Some other points on the definition

Under the ICD10 rules, if a death was reported as being due to the joint effects of two (or more) conditions, the first-mentioned condition should be selected as the underlying cause of the death for the purpose of mortality statistics. Therefore, deaths for which the cause was given as, for example:

- Adverse effects of methadone, etizolam, gabapentin and benzodiazepines and chronic bronchitis and emphysema
- Amphetamine toxicity and coronary artery atheroma
- Cocaine intoxication and cardiac enlargement
- Cocaine toxicity and chronic obstructive pulmonary disease

- Cocaine toxicity and left ventricular hypertrophy
- Combined drug intoxication (morphine, etizolam and pregabalin) and ketoacidosis
- Etizolam and codeine intoxication with fatty change of the liver
- Heroin, cocaine and alcohol intoxication and hypertensive heart disease
- Methadone and etizolam intoxication and bicuspid aortic valve stenosis
- Methadone, etizolam and pregabalin intoxication and cirrhosis of the liver
- Methadone intoxication and acute myocardial infarction
- Morphine and tramadol intoxication, pulmonary adenocarcinoma and ischaemic heart disease
- Morphine (heroin) intoxication with severe pulmonary emphysema
- Multi-drug toxicity and ischaemic heart disease
- Tramadol toxicity with atherosclerotic cardiovascular disease

are included in these statistics, because (in each case) it is the toxic effect of the drugs that is selected as the underlying cause of death (for the purpose of mortality statistics), as it was mentioned first, rather than the medical condition.

However, deaths for which the cause was given as, for example:

- Coronary artery thrombosis and morphine, etizolam and diclazepam intoxication
- Ischaemic heart disease and methadone and etizolam intoxication
- Probable hypoglycaemia (insulin dependent diabetes mellitus and suspected insulin overdose) and etizolam intoxication

are not included in these statistics, because (in each case) it is the medical condition that is selected as the underlying cause of death (for the purpose of mortality statistics), as it was mentioned first, rather than the toxic effect of the drugs.

If a drug's legal status changes, NRS aims to count it on the basis of its classification on the day the person died (as NRS does not know when the drug was taken). For example, mephedrone was banned under the Misuse of Drugs Act with effect from 00.01 on 16 April 2010. Therefore, if mephedrone was the only drug found to be present in the body, a death coded to one of the categories listed under (b) in Section A2 would not be counted in NRS's implementation of the Drugs Strategy ‘baseline’ definition if it occurred before 16 April 2010.

Examples of deaths which were not counted because they were due to a secondary infections are deaths caused by clostridium novyi infection: Annex A of ‘Drug-related Deaths in Scotland in 2000’ explained that 22 such cases had been identified when the 2000 deaths data file was closed in May 2001, adding that it was not clear whether additional deaths had subsequently been identified. Similarly, these figures exclude the 13 deaths which were caused by the outbreak of anthrax that was associated with contaminated heroin and started in December 2009.

A number of categories of what some might think should be counted as ‘drug-related’ deaths do not come within the scope of the definition because the underlying cause of death was not coded to one of the ICD10 codes listed above. Examples of deaths which are not counted for this reason are:

- deaths coded to mental and behavioural disorders due to the use of volatile substances;
- deaths from AIDS where the risk factor was believed to be the sharing of needles;
- deaths from drowning, falls, road traffic and other accidents which occurred under the influence of drugs; and
- deaths due to assault by a person who was under the influence of drugs, or as a result of being involved in drug-related criminal activities.

A6. Identifying deaths which are drug-related, and why there are slight discrepancies in the figures for a few years between 2000 and 2006

There are a few minor discrepancies between the figures for 2006 and earlier years that were published at the time and those which were produced more recently. This is due to a change in the way in which 'drug-related' deaths are identified using the data held by NRS. This process has two stages:

- first, extract all the records of deaths which satisfy the ONS 'wide' definition (Annex B). The method used for this stage has not been changed; and
- second, scrutinise the extracted records and set a 'flag' to identify the ones which should be counted under NRS's implementation of the Drugs Strategy 'baseline' definition. The method used for this stage was changed with effect from June 2008.

Previously, the data were examined by the former GROS Vital Events Statistician, who had considerable knowledge and experience of dealing with information about drug-related deaths. He used Excel's facilities to set a number of indicators, and so identified the cases which should be counted under GROS's implementation of the Drugs Strategy 'baseline' definition. This method clearly relied greatly on the Statistician's personal expertise. He retired in Spring 2008.

Now, most of this work is done by SAS computer programs, using a look-up table to identify particular types of drugs (John Corkery of the University of Hertfordshire and, prior to that, the Programme Manager of the National Programme on Substance Abuse Deaths supplied most of the content of the first version of the look-up table). However, manual scrutiny is still required to identify deaths which should be excluded for the kinds of reasons that are described in Section A3. The work involved is reduced by using computer programs to produce separate lists of deaths which may be drug-related and which have certain details in common that are relevant to decisions on whether to count them. An example is a list of cases which would be excluded if it were found that controlled substances were present only as part of compound analgesics or cold remedies. That list is of cases which fall within the definition in Section A2, for which compound analgesics or cold remedies were reported, and for which the controlled substances that were present did not include any of the most commonly reported ones that are not found in compound analgesics and cold remedies (such as heroin/morphine, methadone, diazepam and cocaine - as a death would normally be counted as drug-related if any of them were present). An NRS Statistician and the Head of Public Health Scotland's Drugs Team (who is a consultant in public health medicine) look through those lists and decide which deaths to exclude for the reasons given in Section A3 (and taking account of the points set out in the other sections).

The database starts with data for 2000 because that was the first year for which NRS used ICD10. NRS used the classification's previous version (ICD9) for 1979 to 1999. Because the data are coded differently for the years up to 1999 and the years from 2000, NRS's current database starts with the data for 2000. It contains one record for every death which is counted by the ONS 'wide' definition. The database is not limited only to records for deaths which are counted by the standard (Drugs Strategy 'baseline') definition: NRS produces figures on the latter basis by selecting the records which have been 'flagged' appropriately.

The new method was tested by using it to prepare figures for each year for 2000 to 2006, inclusive. The results were the same as, or within just 1-2 of, the figures which had been published previously. After examining the cases which were being counted differently by the old and the new methods, it was concluded that any flaws in the new method were not significant, and that it should be used henceforth. However, to avoid confusing users

of these statistics with minor changes to the figures, the tables which appeared in the editions of this publication which were produced before the method was changed give figures for 2006 and earlier years which were extracted from the database produced by the old method, and so are as published previously. However, new analyses of the data for 2000 onwards now use the database produced by the new method, and so may include some totals or sub-totals (for the years from 2000 to 2006, inclusive) that differ slightly from the figures which were published previously, because the new method was used to produce the database of relevant cases for those years.

A7. Revisions to figures for previous years

When a new edition of this publication is produced, some of the figures that were published in the previous edition may be revised slightly, following a correction to the substance name 'look-up table' (referred to in the previous section) that is used to determine (for example) whether each substance that has been reported as being found in a body is one that should be counted as a controlled substance for the purpose of the standard (Drugs Strategy 'baseline') definition that is used to produce these statistics. For example:

- after the "… in 2014" edition was prepared, it was found that an error in the look-up table entry for one drug led to one death wrongly not being counted as drug-related. Correcting the error raised the total number of drug-related deaths registered in 2013 by one. Some of the other figures (e.g. the number of females, the number aged 25-34) also increased as a result.
- after the "… in 2015" edition was prepared, it was found that an error in the look-up table entry for one drug led to one death wrongly not being counted as drug related. Correcting the error raised the total number of drug-related deaths registered in 2014 by one. Some of the other figures (e.g. the number of males, the number aged 55-64) also increased as result. It was also found that an error in the look-up table entry for another drug had led to some deaths wrongly being counted as ones for which diazepam was implicated in, or contributed to, the cause of the death (one death in 2013, two in 2014 and seven in 2015), and as ones for which diazepam was found to be present in the body. The latter error did not affect the number of drug-related deaths, or any of the other figures for those years.
- after the "… in 2016" edition was prepared, it was found that an error in the look-up table entry for one drug led to one death, registered in 2016, wrongly not being counted as drug-related. Correcting the error raised the total number of drug-related deaths registered in 2016 by one. Some of the other figures (for example, the number of males, and the number aged 45-54) also increased as result.
- after the "… in 2017" edition was prepared, it was found that an error in the look-up table entry for one drug led to one death, registered in 2016, wrongly being counted as involving a New Psychoactive Substance. It was also found that two substances had wrongly been classified as being controlled, and that two other substances each had an incorrect value for one of their indicators. Correcting these errors did not change the number of drug-related deaths registered in any year, nor how they are broken down by (for example) age and sex. However, it reduced by one the number of 'New Psychoactive Substance' deaths for 2016, and led to (for example) Table Y showing fewer 'phenazepam' deaths in some years.
- after the "…in 2019" edition was prepared, it was found that an error in the look-up table entry for one drug led to one death, registered in 2019, wrongly not being counted as drug-related. Correcting the error raised the total number of drug-related deaths registered in 2019 by one. Some of the other figures also increased as result.

In addition, very occasionally, some of the figures that were published in a previous edition may have to be revised for another reason. This happened after the figures for 2019 were published, when NRS was sent (much later than it should have been) information about the substances involved in some Highland deaths, without which it had been unable to classify some of them as being drug-related. Adding the extra information to the NRS drug-death database increased by 15 the number of drug-related deaths that were registered in 2019. With the correction of the error in the look-up table (referred to in the previous paragraph), this increased the total number of drug-related deaths registered in 2019 by 16. The total for Highland was 15 higher than before, and several of the other numbers (e.g. by age and sex) were revised.

A8. References

Arrundale J and Cole S K	**Collection of information on drug related deaths by the General Register Office for Scotland**	General Register Office for Scotland 1995
Christophersen O, Rooney C and Kelly S	**Drug related mortality: methods and trends**	'Population Trends' 93, Office for National Statistics, 1998
Corkery, J	**UK drug-related mortality – issues in definition and classification**	'Drugs and Alcohol Today' volume 8 issue 2, Pavilion Journals, 2008
The Advisory Council on the Misuse of Drugs	**Reducing drug related deaths**	Home Office, 2000