

Deaths Related to Drug Poisoning in England and Wales, 2011



Coverage: **England and Wales**
Date: **29 August 2012**
Geographical Area: **Country**
Theme: **Health and Social Care**
Theme: **Population**

Key findings

- There were 1,772 male and 880 female drug poisoning deaths (involving both legal and illegal drugs) registered in 2011, a 6 per cent decrease since 2010 for males and a 3 per cent increase for females.
- In 2011 the drug poisoning mortality rate was 63.8 deaths per million population for males and 29.9 deaths per million population for females, both were unchanged compared with 2010.
- The number of male drug misuse deaths decreased by 14 per cent from 1,382 in 2010 to 1,192 in 2011; female deaths increased by 3 per cent from 402 in 2010 to 413 in 2011.
- The male mortality rate from drug misuse decreased significantly between 2010 and 2011 (from 50.8 to 43.4 deaths per million population), but remained stable for females (14.4 deaths per million population in 2011).
- Deaths involving heroin/morphine decreased by 25 per cent compared with 2010, but they were still the substances most commonly involved in drug poisoning deaths (596 deaths in 2011).
- The highest mortality rate from drug misuse was in 30 to 39-year-olds (110.0 and 30.2 deaths per million population for males and females respectively).

Summary

This bulletin presents the latest figures from the Office for National Statistics (ONS) on deaths related to drug poisoning (involving both legal and illegal drugs) and drug misuse (involving illegal drugs) in England and Wales for the last five years. [Data \(183.5 Kb Excel sheet\)](#) from 1993 are available to download from the website, and are discussed in the commentary to provide context to

the latest (2011) data. Figures are presented by cause of death, sex, age and substance(s) involved in the death.

The 2011 mortality rates presented in Figures 1 to 5 are provisional as they are based on population projections rather than population estimates. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin (see Background note 13).

Table 1 shows that there were 2,652 drug poisoning deaths registered in 2011, and as in previous years, the majority of these deaths were in males. There were 1,772 male deaths from drug poisoning in 2011, a decrease of 6 per cent since 2010, and the lowest since 2006. The equivalent number of female deaths rose to 880, an increase of 3 per cent since 2010, and the highest since 2004. In 2011 there were 1,605 drug misuse deaths. The number of male deaths decreased by 14 per cent from 1,382 in 2010 to 1,192 in 2011. However over the same period the number of female deaths rose by 3 per cent from 402 to 413.

Table 1 Number of deaths from drug-related poisoning and drug misuse: by sex, 2007–11

England and Wales

		Deaths				
		2007	2008	2009	2010	2011
All drug poisoning	Males	1,914	2,075	2,098	1,890	1,772
	Females	726	853	780	857	880
Drug misuse	Males	1,387	1,506	1,512	1,382	1,192
	Females	340	433	364	402	413

Table source: Office for National Statistics

Table notes:

1. Cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). The underlying cause of death codes used to select deaths related to drug poisoning and drug misuse are shown in Background notes 5 and 6.
2. Figures are for deaths registered in each calendar year.
3. Figures for England and Wales include deaths of non-residents.

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Introduction

Drug use and drug dependence are known causes of premature mortality, with drug poisoning accounting for nearly one in eight deaths among people in their 20s and 30s in 2011 (see Background note 7). Drug-related deaths occur in a variety of circumstances, each with different

social and policy implications. Consequently, there is considerable political, media and public interest in these figures.

This bulletin covers accidents and suicides involving drug poisonings, as well as deaths from drug abuse and drug dependence, but not other adverse effects of drugs (for example anaphylactic shock). Drug poisoning deaths involve a broad spectrum of substances, including legal and illegal drugs, prescription drugs (either prescribed to the deceased or obtained by other means) and over-the-counter medications. Some of these deaths may also be the result of complications of drug abuse, such as deep vein thrombosis or septicaemia resulting from intravenous drug use, rather than an acute drug overdose.

Almost all drug-related deaths are certified by a coroner, and due to the length of time it takes to hold an inquest, about half of drug-related deaths registered in 2011 will have actually occurred prior to 2011 – see section ‘Impact of registration delays on drug-related deaths’ below for more information.

Policy context

In December 2010 the Coalition Government launched a new drug strategy entitled 'Reducing demand, restricting supply, building recovery: supporting people to live a drug-free life' ([Home Office, 2010](#)). This strategy highlights preventing drug-related deaths as one of the key outcomes that recovery-oriented services should be focused on.

Patterns of drug use change over time. For instance, in recent years people have been taking new psychoactive substances, including so-called legal highs. In response to this, the 2010 drug strategy outlined the Government's plan to introduce a system of temporary 12-month bans on newly emerging substances. The Advisory Council on the Misuse of Drugs (ACMD) can then evaluate the harm caused by the substance and advise whether there should be a permanent ban.

Uses made of this data

The figures contained in this statistical bulletin are used by a range of public bodies, such as the National Treatment Agency for Substance Misuse (NTA), the Department of Health (DH) and the Welsh Government to evaluate the effectiveness of various drug strategies. For example, the NTA is linking ONS data on drug-related deaths with data from the National Drug Treatment Monitoring System (NDTMS), to investigate the timing of drug-related deaths in relation to treatment history. This research will also examine risk factors associated with these deaths and carry out area-based comparisons.

The European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) combines data for England and Wales from the ONS drug poisoning database with data from Scotland and Northern Ireland to publish UK figures, allowing comparisons to be made with other European countries. The latest EMCDDA report shows that the drug-related mortality rate in the UK was the fifth highest in Europe ([EMCDDA, 2012](#)). However, caution should be applied when making international comparisons, because of differences in definitions and the quality of reporting.

ONS drug poisoning data are also used by academic researchers. For example, analysis of this data by the Centre for Suicide Research at the University of Oxford revealed that there was a major

reduction in deaths involving co-proxamol following its withdrawal in 2005, with no evidence of an increase in deaths involving other analgesics, apart from oxycodone ([Hawton et al, 2012](#)). Updated data on deaths involving co-proxamol and other analgesics are shown below in Table 3.

ICD coding changes implemented in 2011

ONS use the International Classification of Diseases, Tenth Revision ([ICD-10](#), WHO, 2010) to code all conditions and events mentioned on the death certificate. The ICD contains a general principle and a range of selection and modification rules that are used to ascertain a causal sequence and consistently assign an underlying cause of death from the conditions recorded on the death certificate. The underlying cause is defined by the World Health Organisation (WHO) as:

- the disease or injury that initiated the train of events directly leading to death, or
- the circumstances of the accident or violence that produced the fatal injury.

In January 2011, ONS introduced a new version of ICD-10 (version 2010), which replaced the version introduced in 2001 (version 2001.2). This means that figures for 2011 will not be directly comparable with figures for 2001 to 2010.

To understand the impact of the introduction of ICD-10 v2010 on mortality statistics, ONS carried out a bridge coding study in which a sample of deaths that had previously been coded using v2001.2 were then independently recoded using the new version of ICD-10 ([Office for National Statistics, 2011](#)).

However, not all of the information provided by coroners at registration was available to use when recoding deaths, so the bridge coding study results for drug-related deaths should be treated with caution.

The impact of the new version of ICD-10 on drug-related deaths figures was not reported in the bridge coding study. However, new analysis presented below shows that the number of deaths coded as mental and behavioural disorders due to drug use (ICD-10 codes F11–F16 and F18–F19) decreased by 84 per cent in v2010, compared with v2001.2.

This decrease is due to these deaths being allocated to accidental poisonings by drugs (ICD-10 code X40–X44), which consequently increased by 44 per cent. The new version of ICD-10 caused very little change in the number of deaths being coded as intentional self-poisoning by drugs, or poisoning by drugs, undetermined intent.

The number of deaths from assault by drugs are very small and there were no deaths from this cause in the bridge coded sample, so the impact of the ICD coding change could not be examined.

The changes in the number of deaths coded to mental and behavioural disorders due to drug use and accidental poisonings by drugs are due to changes in the ICD selection rule 3, which states that:

- If a condition selected by the general principle or by rules 1 or 2 is obviously a direct consequence of another reported condition, whether in part I or part II of the death certificate, select this as the underlying cause.

In ICD-10 v2001.2, if both accidental poisoning by drugs (ICD-10 codes X40–X44) and drug dependence (ICD-10 codes F11.2, F12.2, F13.2, F14.2, F15.2, F16.2, F18.2 and F19.2) were mentioned on the death certificate, and accidental poisoning had been selected as the tentative underlying cause, then this would be considered a direct consequence of the drug dependence. Therefore selection rule 3 meant that the drug dependence would be chosen as the underlying cause.

However, in ICD-10 v2010, this causal sequence is no longer valid, so even if both accidental poisoning and drug dependence are mentioned, the underlying cause will normally be the accidental poisoning. More information about the [bridge coding study](#) can be found on the ONS website.

Number of deaths from drug-related poisoning

Table 1 shows that there were 2,652 drug poisoning deaths (involving both legal and illegal drugs) registered in 2011, and as in previous years, the majority (just over two-thirds) of these deaths were in males. There were 1,772 male deaths from drug poisoning in 2011, a decrease of 6 per cent since 2010, and the lowest since 2006. The equivalent number of female deaths rose to 880, an increase of 3 per cent since 2010, and the highest since 2004.

Number of drug-related deaths by underlying cause

In both males and females the largest proportion of drug-related deaths were from accidental poisonings (62 per cent of all drug poisoning deaths in males and 51 per cent in females). In males the number of accidental poisonings increased from 899 in 2010 to 1,107, a 23 per cent rise. In females, accidental poisonings increased from 369 to 445 deaths between 2010 and 2011, a 21 per cent rise. This increase is almost certainly due to the introduction of ICD-10 v2010. If the previous version of ICD-10 (v2001.2) had still been in use, accidental poisonings would have fallen in 2011.

In females just under half of all drug poisoning deaths were suicides (defined as intentional self-poisoning or poisoning of undetermined intent). In 2011, the number of female drug-related suicides increased by 7 per cent, from 391 deaths in 2010 to 418 deaths in 2011. In males, a third of all drug poisoning deaths were suicides. The number of deaths went up from 482 to 576 deaths between 2010 and 2011 – a 20 per cent increase, and the highest number since 2005. The bridge coding study showed very little change in the number of drug-related suicides, suggesting this increase is genuine and not simply an artefact of the coding change.

The greatest impact of the changes in ICD-10 was on figures for deaths where the underlying cause was a mental and behavioural disorder due to drug use. In males the number of deaths from this cause declined by 83 per cent, from 504 deaths in 2010 to 86 in 2011. In females, the equivalent number declined by 82 per cent, from 96 deaths in 2010 to 17 in 2011. This decline is fairly consistent with the new analysis of the bridge coding study data. It is therefore likely that under the old ICD-10 coding system deaths from mental and behavioural disorders due to drug use would have been slightly higher in 2011 than they were in 2010.

Table 2 Number of deaths from drug-related poisoning: by sex and underlying cause, 2007–11

England and Wales

		Deaths				
		2007	2008	2009	2010	2011
Mental and behavioural disorders due to drug use	Males	662	705	586	504	86
	Females	119	139	101	96	17
Accidental poisoning by drugs	Males	725	861	983	899	1,107
	Females	239	327	305	369	445
Intentional self-poisoning and poisoning of undetermined intent by drugs	Males	520	500	524	482	576
	Females	368	385	374	391	418
Assault by drugs	Males	7	9	5	5	3
	Females	0	2	0	1	0

Table source: Office for National Statistics**Table notes:**

1. Underlying cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10) codes given in Background note 5.
2. Figures are for deaths registered in each calendar year.
3. Figures for England and Wales include deaths of non-residents.

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Number of deaths related to drug misuse

The definition of this indicator is (a) deaths where the underlying cause is drug abuse or drug dependence or (b) deaths where the underlying cause is drug poisoning and where any of the substances controlled under the [Misuse of Drugs Act 1971](#) are involved. This definition has been adopted across the UK.

In 2011 there were 1,605 drug misuse deaths. The number of male deaths decreased by 14 per cent from 1,382 in 2010 to 1,192 in 2011. However over the same period the number of female deaths rose by 3 per cent from 402 to 413 (Table 1).

Since 1993 there has been an upward trend in the proportion of drug poisoning deaths that were related to drug misuse for both males and females. In males this proportion peaked in 2010 at 73 per cent, but went down to 67 per cent in 2011. In females, this proportion peaked in 2008 at 51 per cent, but has since dropped slightly, and remains stable at around 47 per cent.

Mortality rates for deaths related to drug poisoning and drug misuse

In 2011, as in previous years, mortality rates from all drug poisoning and drug misuse were significantly higher in males than in females. The British Crime Survey showed that men were more than twice as likely as women to have used illicit drugs in the last year ([Home Office, 2011](#)), which partly explains the higher mortality rate from drug misuse in males. However, this cannot be the only explanation, as less than two thirds of all drug poisoning deaths involve drug misuse.

The male mortality rate for all drug-related poisonings rose steeply between 1993 and 1999. Since then mortality rates have fallen, but there have been large annual fluctuations. The rate dropped significantly between 2009 and 2010 (see Background note 14 for an explanation of statistical significance), and fell again slightly in 2011 to 63.8 deaths per million population (Figure 1). This is the lowest male mortality rate for drug-related poisonings since 1994.

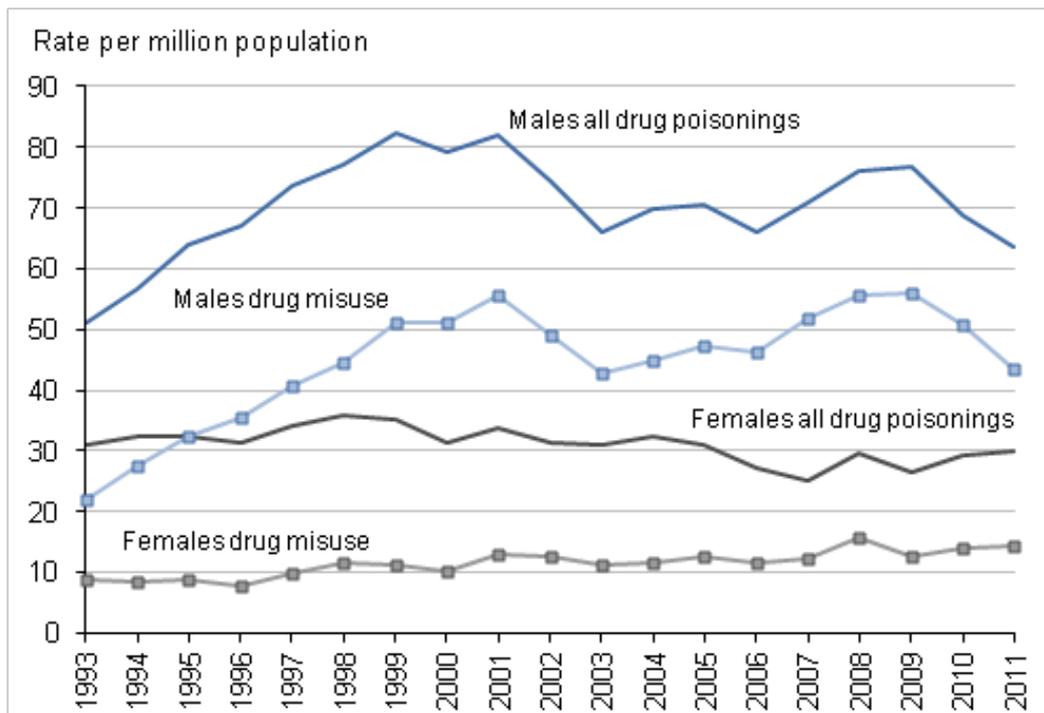
In contrast, between 1993 and 2004 trends in female mortality rates from drug poisoning were relatively stable. From 2004 rates began to decline, reaching their lowest level in 2007 (25.2 deaths per million population). Since 2007 mortality rates have increased significantly, reaching 29.9 deaths per million population in 2011.

The male mortality rate from drug misuse dropped significantly from its peak of 55.8 deaths per million population in 2009 to 43.4 deaths per million population in 2011 – the lowest rate since 2003.

Despite some annual fluctuations, the female mortality rate from drug misuse has tended to increase since 1993. The mortality rate peaked in 2008 at 15.6 deaths per million population, then dropped significantly in 2009, but increased slightly in 2010 and 2011, reaching 14.4 deaths per million population.

Figure 1 Age-standardised mortality rates for deaths related to drug poisoning and drug misuse: by sex, 1993–2011

England and Wales



Source: Office for National Statistics

Notes:

1. Age-standardised mortality rates per 1 million population, standardised to the European Standard Population. Age-standardised rates are used to allow comparison between populations which may contain different proportions of people of different ages.
2. Rates for 1993–2010 are based on population estimates and provisional rates for 2011 are based on population projections. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
3. Cause of death was defined using the International Classification of Diseases, Ninth Revision (ICD 9) for the years 1993 to 2000 and Tenth Revision (ICD-10) from 2001 onwards. The underlying cause of death codes used to select 'all drug poisonings' and 'drug misuse' deaths are shown in Background note 5. Drug misuse as defined by the current headline indicator shown in Background note 6. Deaths from drug misuse are included in the figures for all drug poisoning.
4. Figures are for deaths registered in each calendar year.
5. Figures for England and Wales include deaths of non-residents.

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Age-specific mortality rates for deaths related to drug misuse

Males

In 2011 males aged 30 to 39 had the highest mortality rate from drug misuse (110.0 deaths per million population), significantly higher than the rates for males in other age groups and much higher than females of any age. However, the male mortality rate in this age group did decline sharply in 2011 to its lowest level since 1998.

Males aged 40 to 49 now have the second highest mortality rate of all age groups, and were the only age group to show a slight increase in 2011 (89.7 deaths per million population compared with 84.2 in 2010).

Mortality rates in younger males continued their downward trend and are now at their lowest level since records began (3.3 and 54.5 deaths per million population in 2011 for under 20s and 20 to 29-year-olds respectively).

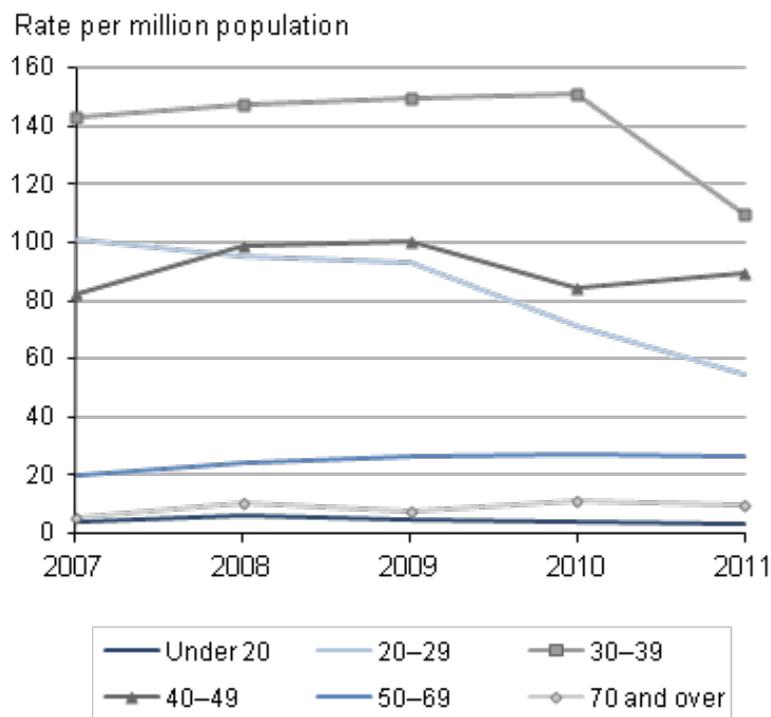
Mortality rates in males aged 50 to 69 significantly increased between 1999 and 2009, but have remained stable since then, with 26.6 deaths per million population in 2011.

Male mortality rates in the oldest age group (70 and over) have shown no consistent trends over time and remained low in 2011 with 9.9 deaths per million population.

This pattern of drug misuse deaths is broadly in line with treatment figures from the National Treatment Agency for Substance Misuse ([NTA, 2012](#)), which showed that as the drug-dependent population ages, the over 40s have become the largest age group starting treatment. In contrast, the number of 18 to 24-year-olds newly entering treatment for heroin and crack use has halved over the last five years.

Figure 2 Age-specific mortality rates for deaths related to drug misuse: males, 2007–11

England and Wales



Source: Office for National Statistics

Notes:

1. Age-specific mortality rates per 1 million population.
2. Rates for 2007–2010 are based on population estimates and provisional rates for 2011 are based on population projections. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
3. Cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). Deaths were included where the underlying cause was due to drug poisoning and where a drug controlled under the Misuse of Drugs Act 1971 was mentioned on the death certificate. More details on the definition of a death related to drug misuse can be found in Background notes 5 and 6.
4. Figures are for deaths registered in each calendar year.
5. Figures for England and Wales include deaths of non-residents.

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Females

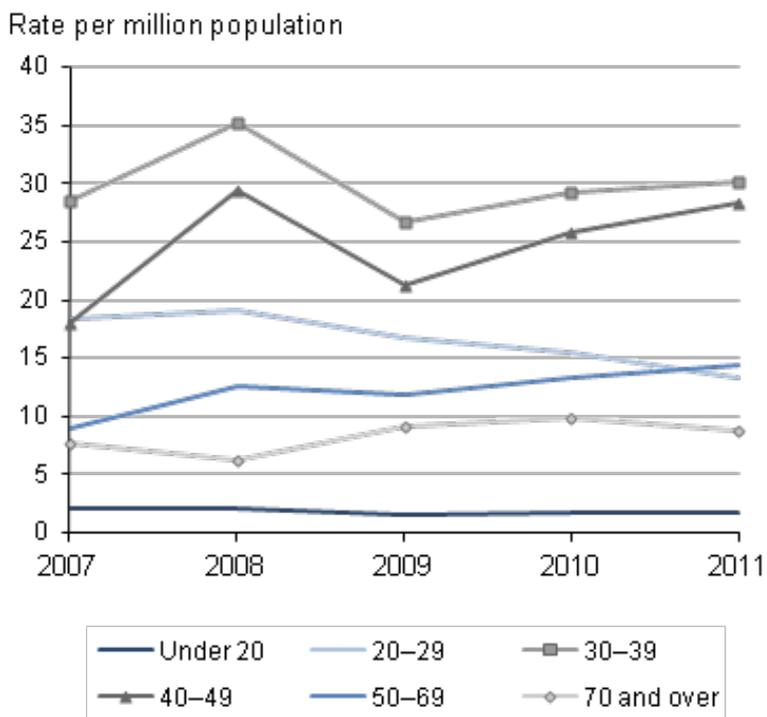
In 2011, mortality rates from drug misuse for females were lower than males in every age group. As with males, the highest rate was among those aged 30 to 39, but, unlike males, the female mortality rate in this age group increased slightly in 2011 to 30.2 deaths per million population.

In 2011, the mortality rate for females aged 40 to 49 was almost as high as for those aged 30 to 39, at 28.3 deaths per million population. The rate in 40 to 49-year-old females has continued to rise and was significantly higher than in 2007 (but not as high as the peak in 2008).

The female mortality rate for 50 to 69-year-olds has increased steadily over the last couple of years and is now 14.4 deaths per million population – its highest level since records began in 1993. Moreover, in 2011, for the first time the female mortality rate in this age group was higher than the rate for 20 to 29-year-olds (13.3 deaths per million population).

In 2011, as with males, the lowest rates were in those aged under 20 (1.7 deaths per million population) and 70 and over (8.7 deaths per million population).

Figure 3 Age-specific mortality rates for deaths related to drug misuse: females, 2007–11
England and Wales



Source: Office for National Statistics

Notes:

1. Age-specific mortality rates per 1 million population.
2. Rates for 2007–2010 are based on population estimates and provisional rates for 2011 are based on population projections. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
3. Cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). Deaths were included where the underlying cause was due to drug poisoning and where a drug controlled under the Misuse of Drugs Act 1971 was mentioned on the death certificate. More details on the definition of a death related to drug misuse can be found in Background notes 5 and 6.
4. Figures are for deaths registered in each calendar year.
5. Figures for England and Wales include deaths of non-residents.

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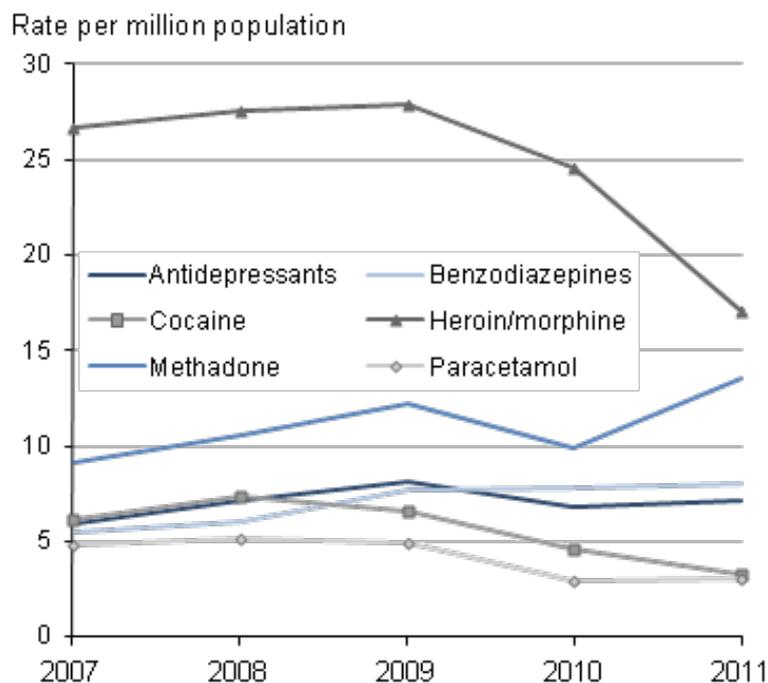
Drug-related deaths involving specific substances

Figures 4 and 5 give the age-standardised mortality rates where selected substances were mentioned on the death certificate for 2007 to 2011 and Table 3 gives the number of deaths from a wide range of substances. These figures need to be interpreted with caution for the following reasons:

- These figures are based only on information reported on the coroner's death certificate, and may not include every substance involved in the death.
- In around 11 per cent of drug poisoning deaths only a general description is recorded on the coroner's death certificate (such as drug overdose or multiple drug toxicity). Deaths where the certificate contains only non-specific information cannot contribute to the counts of deaths involving specific substances.
- In an additional 34 per cent of all drug poisoning deaths, the death certificate mentions more than one specific drug. Where more than one drug is mentioned, it is not possible to tell which was primarily responsible for the death.
- Where more than one drug is mentioned on a death certificate the death will be counted in more than one category in Table 3. For example, if both heroin and cannabis are mentioned, the death will be recorded once under heroin and once under cannabis. Therefore the numbers for different substances cannot be added together to give a total number of deaths.
- Approximately 30 per cent of all drug-related poisoning deaths also contain a mention of alcohol or long-term alcohol abuse (for example, cirrhosis) in addition to a drug.

Figure 4 Age-standardised mortality rates for selected substances: males, 2007–11

England and Wales



Source: Office for National Statistics

Notes:

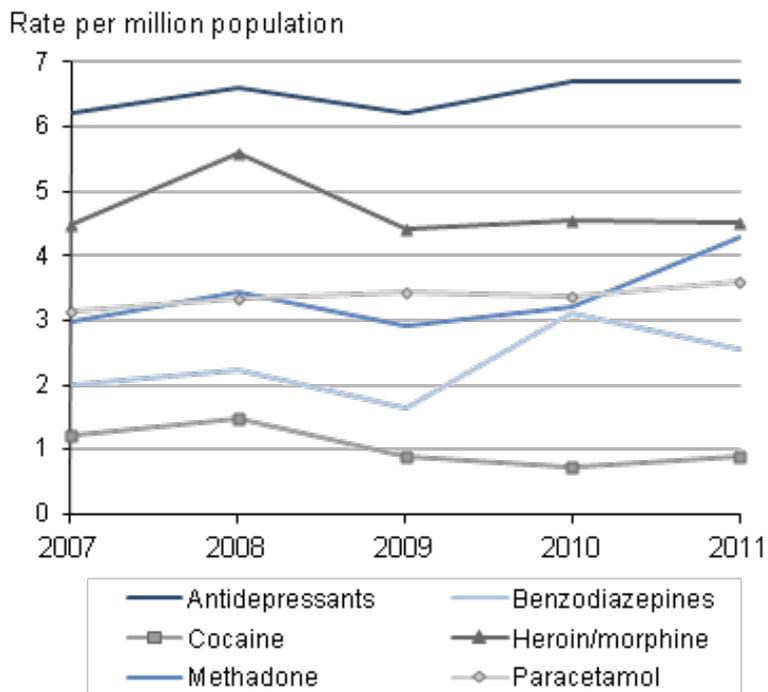
1. Age-standardised mortality rates per 1 million population, standardised to the European Standard Population. Age-standardised rates are used to allow comparison between populations which may contain different proportions of people of different ages.
2. Rates for 2007–2010 are based on population estimates and provisional rates for 2011 are based on population projections. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
3. Cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). The underlying cause of death codes used to select deaths related to drug poisoning are shown in Background note 5.
4. Figures are for deaths registered in each calendar year.
5. Figures for England and Wales include deaths of non-residents.

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Figure 5 Age-standardised mortality rates for selected substances: females, 2007–11

England and Wales



Source: Office for National Statistics

Notes:

1. Age-standardised mortality rates per 1 million population, standardised to the European Standard Population. Age-standardised rates are used to allow comparison between populations which may contain different proportions of people of different ages.
2. Rates for 2007–2010 are based on population estimates and provisional rates for 2011 are based on population projections. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.
3. Cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). The underlying cause of death codes used to select deaths related to drug poisoning are shown in Background note 5.
4. Figures are for deaths registered in each calendar year.
5. Figures for England and Wales include deaths of non-residents.

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Table 3 Number of deaths where selected substances were mentioned on the death certificate, 2007–11

England and Wales

	Deaths				
	2007	2008	2009	2010	2011
All drug poisonings	2,640	2,928	2,878	2,747	2,652
Heroin and Morphine	829	897	880	791	596
Methadone	325	378	408	355	486
Cocaine	196	235	202	144	112
All benzodiazepines	207	230	261	307	293
Diazepam	123	133	160	186	179
All antidepressants	335	381	405	381	393
Tricyclic antidepressants (BNF 4.3.1)	203	227	218	194	200
Amitriptyline	113	144	138	128	133
Selective serotonin re-uptake inhibitors (BNF 4.3.3)	80	116	113	136	127
Citalopram	41	78	79	96	84
Monoamine-oxidase inhibitors and other antidepressants (BNF 4.3.2 and 4.3.4)	63	49	81	71	84
Antipsychotics (BNF 4.2.1)	82	87	83	87	104
Paracetamol ⁴	242	260	255	199	207
Paracetamol & dextropropoxyphene compound formulation ⁴	72	48	32	13	18

	2007	2008	2009	2010	2011
Paracetamol & codeine compound formulation	49	57	53	43	55
Paracetamol & dihydrocodeine compound formulation	9	12	13	4	8
Paracetamol not from compound formulation	115	147	160	139	127
Tramadol	79	83	87	132	154
Helium	2	12	21	33	42
Barbiturates	6	13	13	17	37

Table source: Office for National Statistics

Table notes:

1. Underlying cause of death was defined using the International Classification of Diseases, Tenth Revision (ICD-10). The ICD-10 codes used to select deaths related to drug poisoning are shown in Background note 5.
2. Figures are for deaths registered in each calendar year.
3. Figures for England and Wales include deaths of non-residents.
4. Dextropropoxyphene is very rarely ingested except in combination with paracetamol, therefore figures include dextropropoxyphene mentioned without paracetamol.

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Heroin and Morphine

Over half (57 per cent) of all deaths related to drug poisoning involved an opiate drug. In 2011, as in previous years, the most commonly mentioned opiates were heroin and/or morphine, which were involved in 596 deaths (see Background note 8). For males, heroin/morphine was involved in more deaths than any other substance.

However, the mortality rate for males has fallen sharply in the last two years, down from 27.9 deaths per million population in 2009 to 17.1 in 2011. This is a 39 per cent fall and is the lowest rate since 1997. The corresponding rate in females was much lower at 4.5 deaths per million population

in 2011, and has not changed significantly since 1997, when the rate was 2.2 deaths per million population.

Evidence suggests that from October 2010 there has been a 'heroin drought' in the UK, with shortages in the availability of heroin continuing in some areas in 2011/12. This heroin drought has resulted in typical street heroin purity falling from 46 per cent in September 2009 to around 32 per cent in September 2010, and down again to 19 per cent in July to September 2011 (SOCA, [2011](#) and [2012](#) and [Simonson and Daly, 2011](#)).

Drugs workers were concerned that the heroin drought may result in more drug-related deaths, as users who had developed a reduced tolerance could overdose if they used a high quality batch of heroin ([Simonson and Daly, 2011](#)). However, ONS data show the opposite trend with deaths involving heroin falling in recent years.

Results from the British Crime Survey ([Home Office, 2011](#)) suggest there was a significant decline in the proportion of 16 to 59-year-olds reporting use of heroin in the last month between 2009/10 and 2010/11. Moreover, the [NTA](#) (2012) report that the number of adults newly entering treatment for heroin and crack use has fallen by 15 per cent in two years.

They suggest that this decline is probably due to reduced demand rather than any shortfall in services. These factors may explain the decline in deaths involving heroin/morphine that has been seen over the last couple of years.

Methadone

In 2011 there were 486 deaths involving methadone (an opiate substance used to treat heroin addiction, which is sometimes abused). The male mortality rate for deaths involving methadone increased significantly from 9.9 deaths per million population in 2010 to 13.5 in 2011. This is a 36 per cent increase and is the highest rate since 1997. The equivalent rate for females increased slightly in 2011 to 4.3 deaths per million population.

The increase in deaths involving methadone correlates with findings from the British Crime Survey ([Home Office, 2011](#)) showing the proportion of 16 to 59-year-olds using methadone in the last year increased significantly in 2010/11. In addition, the latest Druglink Street Drug Trends Survey ([Daly and Simonson, 2011](#)) found there had been an increase in the use of methadone (and other substances) by primary heroin users, possibly as a result of the heroin drought.

Cocaine

There were 112 deaths involving cocaine in 2011. The male mortality rate was 3.2 deaths per million population in 2011, which continues a significant downward trend since the peak in 2008. The equivalent rates for females were lower than for males, rising slightly from 0.7 deaths per million population in 2010 to 0.9 in 2011 (see Background note 9).

Other recreational drugs

Over the past few years a number of new drugs have been controlled under the [Misuse of Drugs Act 1971](#), including synthetic cannabinoid receptor agonists (for example, 'spice'), gamma-hydroxybutyrate (GHB) and its precursor gamma-butyrolactone (GBL), piperazines (benzylpiperazine – BZP and trifluoromethylphenylpiperazine – TFMPP), cathinones such as mephedrone, and pipradrols such as desoxypipradrol.

The number of deaths involving so-called 'legal highs' are low compared with the number of deaths from heroin/morphine, and have been relatively stable over the last few years (see Background notes 10 and 11). Deaths involving cannabis were also very low (seven deaths in 2011) and usually involved more than one substance.

Benzodiazepines

There were 293 drug poisoning deaths involving benzodiazepines in 2011. Mortality rates in males have increased significantly from an all-time low of 4.5 deaths per million population in 2006 to an all-time high of 8.0 deaths per million population in 2011.

Equivalent mortality rates in females were significantly lower than in males at 2.6 deaths per million population in 2011, and have fallen slightly since 2010. Diazepam was the most common type of benzodiazepine mentioned on deaths certificates in 2011, and was involved in 179 deaths.

This increase in male deaths is consistent with a recent survey that suggested illicit diazepam use has continued to rise, almost certainly as a result of the heroin drought ([Daly and Simonson, 2011](#)). However, the role of diazepam and other benzodiazepines in drug-related deaths is unclear, as more than 9 out of 10 deaths involving benzodiazepines also mentioned another drug.

Antidepressants

There were 393 deaths involving antidepressants in 2011. Mortality rates were similar in males and females in 2011 (7.1 and 6.7 deaths per million population respectively), and have not changed significantly since 2010. There were 200 deaths involving tricyclic antidepressants (TCAs) in 2011, and the majority of these deaths involved amitriptyline (133 deaths in 2011).

Although TCAs are still involved in more deaths than other types of antidepressant, the number of deaths from TCA poisoning have been relatively stable since 2006 and are much lower than their peak of 490 deaths in 1998.

Deaths involving Selective Serotonin Re-uptake Inhibitors (SSRIs) have been steadily increasing, although the number of deaths were down slightly to 127 in 2011, from a peak of 136 in 2010. The majority of these deaths involve the SSRI citalopram (84 deaths in 2011).

Studies show that SSRIs are less toxic in overdose than TCAs ([Hawton et al, 2010](#)), but SSRIs are prescribed more frequently. Moreover, in the last five years prescriptions for SSRIs have increased more rapidly than prescriptions for TCAs (NHS Information Centre, [2008](#) and [2012](#)), which may explain the rise in deaths involving SSRIs.

In 2011 deaths involving 'other antidepressants' (British National Formulary section 4.3.4, [BMA and Royal Pharmaceutical Society, 2012](#)) such as venlafaxine and mirtazapine, reached a record high, at 84 deaths. National Institute for Health and Clinical Excellence guidelines ([NICE, 2009](#)) suggest that these drugs should not be used as a first-line treatment for depression, and should only be prescribed to people who have not responded to SSRIs.

Venlafaxine in particular is associated with a greater risk of death from overdose. Therefore prescriptions for 'other antidepressants' accounted for only 16 per cent of all antidepressant prescriptions in 2011. However, prescriptions for this type of antidepressant are increasing more quickly than SSRIs or TCAs (NHS Information Centre, [2008](#) and [2012](#)), which may partly explain the rise in deaths.

Antipsychotics

The number of deaths involving antipsychotic medication reached a record high of 104 deaths in 2011, which is a 20 per cent increase since 2010. The antipsychotics most commonly involved in deaths are quetiapine and olanzapine. More detailed analysis of the data showed that about half of deaths involving antipsychotics are accidents and half are suicides.

Paracetamol and other analgesics

There were 207 deaths involving paracetamol and its compounds in 2011. The mortality rates for males and females were similar, and both increased slightly between 2010 and 2011. During this period the male mortality rate increased from 3.0 to 3.1 deaths per million population. In females, the equivalent rate went up from 3.4 to 3.6 deaths per million population.

Deaths involving paracetamol not from a compound dropped slightly in 2011, so the small increase in overall paracetamol deaths is the result of an increase in deaths involving paracetamol compounds such as co-codamol (paracetamol and codeine), co-dydramol (paracetamol and dihydrocodeine) and co-proxamol (paracetamol and dextropropoxyphene).

Although deaths involving paracetamol increased slightly between 2010 and 2011, overall there has been a declining trend since the peak in 1997. This decline is largely because of a fall in deaths mentioning co-proxamol, which fell dramatically from 388 deaths in 1999 to 18 deaths in 2011 (up slightly from 13 deaths in 2010). This can be explained by the withdrawal of co-proxamol in 2005 ([Hawton et al, 2012](#)).

Despite the decrease in deaths involving co-proxamol [Hawton et al \(2012\)](#) suggested that there was little observed change in deaths involving other analgesics. However, Hawton's analysis was restricted to deaths mentioning only one substance (see [Reference Table 6b \(183.5 Kb Excel sheet\)](#)), and when deaths mentioning more than one substance are included, deaths involving some types of analgesics have increased.

Most notably, the number of deaths mentioning tramadol (a synthetic opioid analgesic) have increased steadily from the first recorded death in 1996 to 154 deaths in 2011. This increase in deaths may be partly explained by a 42 per cent increase in prescriptions for tramadol over the last five years (NHS Information Centre, [2008](#) and [2012](#)).

In addition, there is evidence that recreational use of tramadol increased over the last year ([Daly and Simonson, 2011](#)). It is interesting to note that, unlike most other opioid analgesics, tramadol is not controlled under the [Misuse of Drugs Act 1971](#).

Emerging trends

Deaths involving two substances – barbiturates and helium – have increased consistently over the last five years. Deaths mentioning barbiturates increased from six deaths in 2007 to 37 deaths in 2011, the highest number since 1996, despite the number of prescriptions for barbiturates more than halving over this period (NHS Information Centre, [2008](#) and [2012](#)).

Over the same period deaths mentioning helium have risen from two to 42 deaths (see Background note 12 for further information on helium deaths). Although the number of deaths involving these substances is still relatively small, the large increases may be of particular interest to suicide prevention researchers, as almost all of these deaths were suicides.

Comparisons with the rest of the UK

Figures on drug-related deaths in Scotland are available on the [National Records of Scotland](#) website.

Figures for Northern Ireland are available on the [Northern Ireland Statistics and Research Agency](#) website.

Figures for Europe are available on the European Monitoring Centre for Drugs and Drug Addiction ([EMCDDA](#)) website.

Figures for other countries may not be comparable with figures presented above for England and Wales, due to differences in data collection methods and in the death registration system.

Impact of registration delays on drug-related deaths

In England and Wales almost all drug-related deaths are certified by a coroner following an inquest. The death cannot be registered until the inquest is completed, which can take many months or even years, and ONS is not notified that a death has occurred until it is registered.

If someone is to be charged in relation to the death, the coroner must adjourn the inquest, and they may carry out an accelerated registration. However, the full details are not recorded until the inquest is completed, and these accelerated registration deaths are not included in the drug-related deaths figures.

In common with most other mortality statistics, figures for drug-related deaths are presented for deaths registered in a particular calendar year, which enables figures to be published in a timely manner. The alternative would be to publish statistics based on the year in which the death occurred.

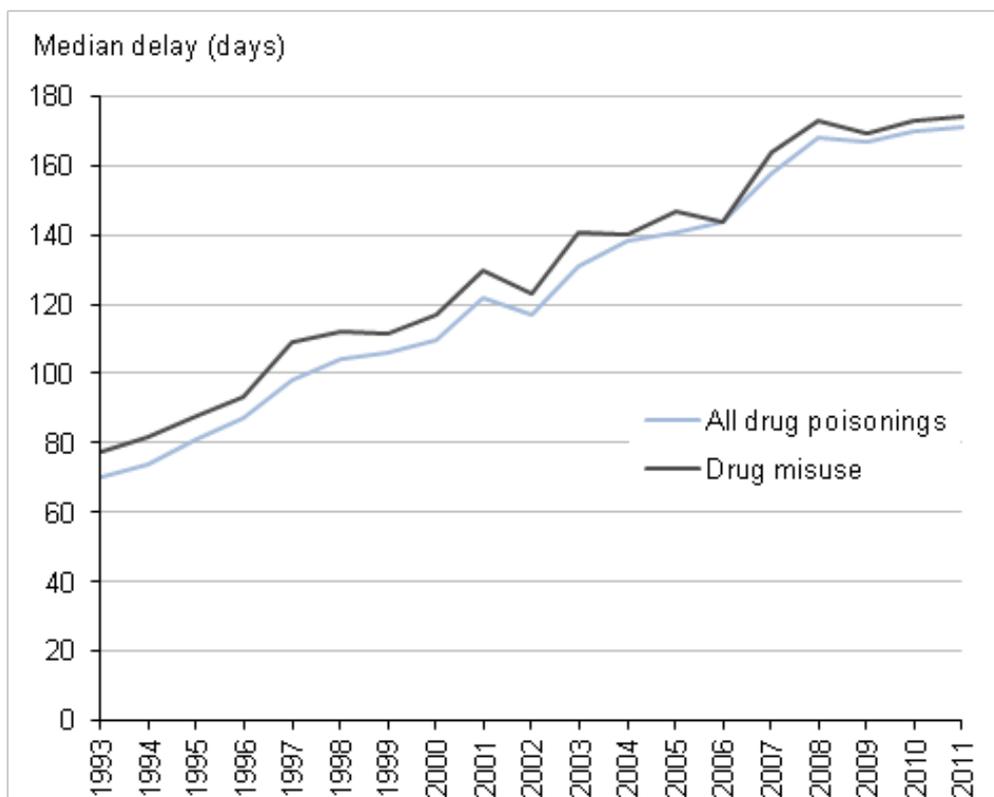
However, if ONS were to do this the publication would be delayed by at least six months to allow enough time for the majority of the deaths that occurred in a given year to be registered. If it was produced any earlier the data would be incomplete, and hence inaccurate.

Due to the length of time it takes to hold an inquest, this bulletin actually presents information on deaths that may have occurred months or even years ago. So out of the 2,652 drug-related deaths registered in 2011, 1,343 (just over 50 per cent) occurred in years prior to 2011.

This makes it more difficult to evaluate how changes such as the heroin drought or the banning of certain so-called legal highs have affected drug-related deaths. ONS is carrying out research on the impact of registration delays on mortality statistics, and initial findings for drug-related deaths are presented below.

Figure 6 Average registration delay for all drug poisoning deaths and deaths related to drug misuse: deaths registered in 1993–2011

England and Wales



Source: Office for National Statistics

Notes:

1. The registration delay is calculated as the difference between the date each death occurred and the date it was registered, measured in days. The average delay is represented using the median. Additional information on the calculation of registration delays is provided Background note 15.
2. Cause of death was defined using the International Classification of Diseases, Ninth Revision (ICD-9) for the years 1993 to 2000 and Tenth Revision (ICD-10) from 2001 onwards. The underlying cause of death codes used to select 'all drug poisonings' and 'drug misuse' deaths are shown in Background note 5. Drug misuse as defined by the

current headline indicator shown in Background note 6. Deaths from drug misuse are included in the figures for all drug poisoning.

3. Figures are for deaths registered in each calendar year.
4. Figures for England and Wales include deaths of non-residents.

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Figure 6 shows that the average registration delay has gradually increased over time. In 1993 the average delay was 70 days for all drug-related deaths, and this had more than doubled to 171 days in 2011.

However, registration delays have increased more slowly in the last three years, suggesting the upward trend is levelling off. Over the same period the number of deaths from all causes that are referred to coroners has increased by over 50 per cent, and in 2011 nearly 40 per cent of all deaths were referred to coroners. This increase may have contributed to the lengthening registration delays.

Figure 6 also shows that deaths related to drug misuse took slightly longer to register than other types of drug poisoning deaths, but this gap is getting smaller. In 1993, deaths related to drug misuse took eight days longer to register, compared with all drug poisonings, but by 2011 this had narrowed to three days.

Additional data showing the number of deaths related to drug poisoning and drug misuse that **occurred** each year in England and Wales between 1993 and 2011 are available to download from [Reference Table 7 \(183.5 Kb Excel sheet\)](#).

For the years 1993 to 2008, Table 7 shows the actual number of deaths that occurred in those years, and were registered by the end of 2011. The number of deaths occurring between 2009 and 2011 have been estimated, based on the number of late registrations which we predict are missing from the data.

All years of data will be revised in next year's statistical bulletin, but as almost 99 per cent of drug related deaths are registered within two years, we do not expect data for 1993 to 2008 to change substantially. Estimated data for 2009 to 2011 have been rounded to the nearest 10, and should be treated with caution as it may change significantly.

Data tables

A back series of [data \(183.5 Kb Excel sheet\)](#) on deaths related to drug poisoning in England and Wales between 1993 and 2011 are available to download in a Microsoft Excel workbook from the ONS website. The workbook contains the following tables:

- Table 1 – Number of deaths from drug-related poisoning and drug misuse, by sex and country, England and Wales, 1993–2011.
- Table 2 – Number of deaths from drug-related poisoning by sex and underlying cause, England and Wales, 1993–2011.

- Table 3 – Number of deaths related to drug misuse by sex and underlying cause, England and Wales, 1993–2011.
- Table 4 – Number of deaths from drug-related poisoning by sex and age, England and Wales, 1993–2011.
- Table 5 – Number of deaths related to drug misuse by sex and age, England and Wales, 1993–2011.
- Table 6a – Number of drug-related deaths where selected substances were mentioned on the death certificate, England and Wales, 1993–2011.
- Table 6b – Number of drug-related deaths where selected substances were mentioned without other drugs, England and Wales, 1993–2011.
- Table 6c – Number of drug-related deaths where selected substances were mentioned with alcohol, England and Wales, 1993–2011.
- Table 7 – Number of deaths from drug-related poisoning and drug misuse, by year of occurrence, England and Wales, 1993–2011.
- Figure 1 – Age-standardised mortality rates for deaths related to drug poisoning and drug misuse, by sex, England and Wales, 1993–2011.
- Figure 2 – Age-specific mortality rates for deaths related to drug misuse, males, England and Wales, 1993–2011.
- Figure 3 – Age-specific mortality rates for deaths related to drug misuse, females, England and Wales, 1993–2011.
- Figure 4 – Age-standardised mortality rates for selected substances, males, England and Wales 1993–2011.
- Figure 5 – Age-standardised mortality rates for selected substances, females, England and Wales 1993–2011.
- Figure 6 – Average registration delay for all drug poisoning deaths and deaths related to drug misuse, by sex, England and Wales, deaths registered in 1993–2011.
- Annotated example showing how estimated death occurrences in Table 7 are calculated.

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Background notes

1. Quality information

Further information about the quality of drug-related deaths data can be found in the [Quality and Methodology Information \(QMI\) paper](#).

2. Mortality metadata

Information about the underlying mortality data, including details on how the data is collected and coded are available in the [mortality metadata](#).

3. Drug poisoning database

The figures presented in this bulletin have been produced using a special database of deaths related to drug poisoning, which has been developed to facilitate research into these deaths and to aid the identification of specific substances involved. The database is extracted from

the national mortality database for England and Wales. Deaths are included if the underlying cause of death is regarded as drug-related, according to the National Statistics definition. More information on this definition and issues relating to the interpretation of drug-related deaths data can be found in [Christophersen et al \(1998\)](#).

4. Almost all deaths on the drug poisoning database had a coroner's inquest. For each death the database includes information about the causes of death and substances involved in addition to other information about the deceased. For each death the database of drug related poisonings includes:
 - The ICD codes for underlying cause of death and other causes mentioned on the death certificate.
 - Every mention of a substance recorded by the coroner in the cause of death section or elsewhere on the coroner's certificate after inquest (Form 99(REV)).
 - An indicator to show if alcohol is mentioned. This includes a wide variety of scenarios ranging from evidence of alcohol consumption around the time of death (for example an empty vodka bottle found at the scene or alcohol found after toxicology tests) to long-term alcohol abuse and cirrhosis of the liver.
 - Other information recorded at death registration such as age, sex, marital status, occupation and place of usual residence.
5. **Definition of a drug-related death**

International Classification of Diseases, Ninth Revision (ICD-9) and Tenth Revision (ICD-10) codes used to define deaths related to drug poisoning

Description	ICD-9 Codes	ICD-10 Codes
Mental and behavioural disorders due to drug use (excluding alcohol and tobacco)	292, 304, 305.2–305.9	F11–F16, F18–F19
Accidental poisoning by drugs, medicaments and biological substances	E850–E858	X40–X44
Intentional self-poisoning by drugs, medicaments and biological substances	E950.0–E950.5	X60–X64
Assault by drugs, medicaments and biological substances	E962.0	X85
Poisoning by drugs, medicaments and biological substances, undetermined intent	E980.0–E980.5	Y10–Y14

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(17.5 Kb)

6. Definition of a death related to drug misuse

In 2000 the Advisory Council on the Misuse of Drugs published a report called 'Reducing Drug Related Deaths' (The Advisory Council on the Misuse of Drugs, 2000). In response to this report's recommendations on improving the present system for collecting data on drug-related deaths, a technical working group was set up. This group, consisting of experts across government, the devolved administrations, coroners, toxicologists and drugs agencies, proposed a headline indicator for drug misuse deaths as part of the government's action plan ([Department of Health, 2001](#)) to reduce the number of these deaths. This indicator also takes into account the information needs of the European Monitoring Centre for Drugs and Drug Addiction. The baseline year for monitoring deaths related to drug misuse was set as 1999. The definition of the headline indicator using ICD-10 is shown below. The definition using ICD-9 was published in a previous annual report ([Office for National Statistics, 2002](#)).

Cause of death categories included in the headline indicator of drug misuse deaths (the relevant ICD-10 codes are given in brackets):

a) Deaths where the underlying cause of death has been coded to the following categories of mental and behavioural disorders due to psychoactive substance use (excluding alcohol, tobacco and volatile solvents):

- Opioids (F11).
- Cannabinoids (F12).
- Sedatives or hypnotics (F13).
- Cocaine (F14).
- Other stimulants, including caffeine (F15).
- Hallucinogens (F16).
- Multiple drug use and use of other psychoactive substances (F19).

b) Deaths coded to the following categories and where a drug controlled under the [Misuse of Drugs Act 1971](#) was mentioned on the death record:

- Accidental poisoning by drugs, medicaments and biological substances (X40–X44).
- Intentional self-poisoning by drugs, medicaments and biological substances (X60–X64).
- Poisoning by drugs, medicaments and biological substances, undetermined intent (Y10–Y14).
- Assault by drugs, medicaments and biological substances (X85).
- Mental and behavioural disorders due to use of volatile solvents (F18).

Notes

1. Specific rules were adopted for dealing with compound analgesics which contain relatively small quantities of drugs listed under the Misuse of Drugs Act, the major ones being dextropropoxyphene, dihydrocodeine and codeine. Where these drugs are mentioned on a death record, they have been excluded from the drug misuse indicator if they are part of a compound analgesic (such as co-proxamol, co-dydramol or co-codamol) or cold remedy. Dextropropoxyphene has been excluded on all occasions, whether or not paracetamol or a compound analgesic was mentioned. This is because dextropropoxyphene is rarely, if ever, available other than as part of a paracetamol compound. However, codeine or dihydrocodeine mentioned without paracetamol or ibuprofen were included in the indicator. This is because they are routinely available and known to be abused in this form. This approach is the same as that taken by National Records of Scotland (NRS).
2. Drugs controlled under the Misuse of Drugs Act 1971 include class A, B and C drugs.

7. Deaths among people in their 20s and 30s

Nearly one in eight deaths among people in their 20s and 30s were drug-related. This figure has been calculated from the number of deaths from all drug poisonings of people aged 20 to 39, (1,069 deaths) and the number of deaths from all causes in this age group (7,739 deaths) for England and Wales in 2011. The number of deaths from all causes, by sex and age is available on the [ONS website](#).

8. Heroin and morphine

As heroin (diamorphine) breaks down in the body into morphine, either heroin and/or morphine may be detected at post mortem and recorded on the death certificate. Therefore a combined figure for deaths where heroin or morphine was mentioned on the death certificate is included in Table 3.

9. Cocaine

The figure for cocaine in Table 3 includes deaths where cocaine was taken in the form of crack cocaine. It is not possible to separately identify crack cocaine from other forms of cocaine at post mortem. Other evidence to distinguish the form of cocaine taken is rarely provided on death certificates.

10. GHB and GBL

The figure for GHB (gamma-hydroxybutyrate) in Table 3 includes deaths where GBL (gamma-butyrolactone) was taken. It is not possible to separately identify GBL and GHB at post mortem as GBL is rapidly converted to GHB when ingested into the human body.

11. BZP

Before 2009 benzylpiperazine (BZP) was being recorded simply as 'piperazine' and was not included in figures for BZP. This error has now been corrected and updated figures for 2008 are shown in Table 3 above.

12. Helium

The number of deaths mentioning helium reported in this statistical bulletin is likely to be an underestimate, as some deaths involving helium have an underlying cause of death of hanging, strangulation and suffocation (ICD-10 codes X70 and Y20), and are not included in the drug poisoning database.

13. Calculation of mortality rates

Mortality rates are presented as deaths per million population, directly age-standardised to the European standard population. Rates based on population estimates are available for 1993 to 2010 and provisional rates based on population projections are available for 2011. Revised mortality rates for 2002 to 2011, calculated using census-based mid-year population estimates, will be published in next year's bulletin.

14. Confidence intervals

Excel workbooks containing the data used to produce [Figures 1 to 6 \(183.5 Kb Excel sheet\)](#) are available to download from the ONS website. These tables contain both the mortality rate and the upper and lower confidence limits. These limits form a confidence interval, which is a measure of the statistical precision of an estimate and shows the range of uncertainty around the estimated figure. Calculations based on small numbers of events are often subject to random fluctuations. As a general rule, if the confidence interval around one figure overlaps with the interval around another, we cannot say with certainty that there is more than a chance difference between the two figures. Within this statistical bulletin, a difference which is described as 'significant', means 'statistically significant', assessed by examining the confidence intervals.

15. Calculation of registration delays

Figure 6 presents data on the length of time taken to register a death (also known as the registration delay) for drug-related deaths. This is calculated as the difference between the date each death occurred and the date it was registered, measured in days. Data where the exact date of death was unknown or the date of death was more than 25 years before date of registration or where either the date of death or date of registration was clearly recorded incorrectly (that is, the death appeared to have been registered before it occurred) were excluded from this analysis. Approximately 0.2 per cent of the data were excluded for these reasons. Analysis showed that the data was positively skewed, and contains some deaths with very long registration delays (for example, more than eight years). Therefore the average registration delay has been presented using the median value, as this is not influenced by extreme values. The median is defined as the value that is halfway through the ordered data set, below and above which there lies an equal number of data values.

16. Revisions

The [ONS revisions policy](#) is available on our website.

17. Special extracts of data

Special extracts and tabulations of drug poisoning deaths data are available to order for a charge (subject to legal frameworks, disclosure control and agreement of costs, where appropriate). Such requests or enquiries should be made to:

Mortality Analysis Team, Health and Life Events Division

Office for National Statistics

Government Buildings

Cardiff Road

Newport

Gwent NP10 8XG

Tel: 01633 455341

E-mail: mortality@ons.gov.uk

The [ONS charging policy](#) is available on the ONS website.

18. Health and Life Events user engagement strategy

As a valued user of our statistics, we would welcome feedback on this release. In particular, the content, format and structure. This is in line with the [Health and Life Events user engagement strategy](#), available to download from the ONS website. Please send feedback to the postal or e-mail address above.

19. Pre-release access

A list of the names of those given pre-publication access to the statistics and written commentary is available in this [pre-release access list \(32.3 Kb Pdf\)](#) for deaths related to drug poisoning in England and Wales in 2011. The rules and principles which govern pre-release access are featured within the [Pre-release Access to Official Statistics Order 2008](#).

20. National Statistics

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