

Mortality statistics

Deaths registered in 2009

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DR_09

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deaths in England and Wales, 2009

Series DR

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1 Introduction

DR_09 presents mortality statistics on deaths registered in 2009 for England and Wales, classified by sex and age and by other selected information collected at the time of registration. This is the fourth of the DR (Death registration) series which started with the publication¹ released in March 2008.

This publication is produced by the Office for National Statistics (ONS). On 1 April 2008, ONS became the executive office of the UK Statistics Authority, a non-ministerial department which reports directly to Parliament. The overall objective of the UK Statistics Authority is to promote and safeguard the quality of official statistics that serve the public good. It is published under the National Statistics logo, the designation guaranteeing that those outputs have been produced to high professional standards set out in the Code of Practice for Official Statistics, and have been produced free of political influence.

A product and data summary for this publication can be found on the Office for National Statistics (ONS) website (www.ons.gov.uk) at www.statistics.gov.uk/StatBase/Product.asp?vlnk=15096.

The registration of life events (births, deaths, marriages and civil partnerships) is carried out by the Local Registration Service in partnership with the General Register Office (GRO) in Southport which, prior to April 2008, was part of ONS and is now part of the Identity and Passport Service. ONS was formed on 1 April 1996, bringing together the Office of Population, Censuses and Surveys (OPCS) and the Central Statistical Office. OPCS is referred to in this volume, as appropriate, for historic events and publications.

The Tenth Revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10)² has been used to classify cause of death in this publication. ICD-10 was implemented for coding cause of death in England and Wales in January 2001. The ICD is used to translate diagnoses of diseases and other health problems from words into alphanumeric code to permit easier storage, retrieval and analysis.

Further information about this publication can be obtained from the Vital Statistics Outputs Branch, ONS – see section 2.17.

1.1 Tables in this publication

There are two broad types of table in this publication. The first, text tables, are within sections 1 and 2 and have letter suffixes from A to F. The main mortality data tables are numbered from 1 to 14. The specific content of the tables can be found by referring to the entries listed on the contents page. Further definitions and descriptions of terminology are given in section 2. Information on ICD-10 is provided in sections 3.2 and 3.5. Other specific points to note are shown as footnotes on each table.

In this publication:

- 0 denotes a value that is too small to appear at the level of detail present in this table
- denotes nil, and
- .. denotes not applicable/not available

Percentages and rates that are calculated from fewer than 20 deaths are distinguished by italic type as a warning to the user that their reliability as a measure can be affected by the small number of events.

Other contextual information that should be noted, in connection with interpreting data within the tables, is listed below.

- In most cause of death tables, numbers and rates are shown for the underlying cause of death. **Table 6**, however, shows numbers of deaths by secondary cause for external cause deaths, that is, injuries resulting from deaths due to accidental or violent means. Sections 2.6 and 2.8 give further explanation
- Age groupings: various age categories are used and these are summarised in **Table A**. **Tables 4a and 4b** give the number of deaths by single year of age up to 109 years and the total for those aged 110 years and over. A breakdown of the numbers of deaths by single year of age for those aged 110 and over is given in **Table B** for each year from 2007 to 2009. The table also shows the numbers in this group whose ages were verified from the birth entry
- **Table 9** illustrates recent mortality trends using age-standardised rates (per million population) using the European Standard Population for both men and women for selected causes of death of particular interest for the years 1971, 1981 and 1991 to 2009. Cause of death data prior to 2001 that have been coded to ICD-9 have been grouped to reflect ICD-10 categories. To achieve this broad comparability, the ranges of ICD-9 codes used for some of the groupings differ from those published in annual volumes prior to 2001. Particular causes affected and shown in **Table 9**, include leukaemia, diseases of the liver and land transport accidents

Table A Presentation of main tables by age

Table	Areas	Numbers/rates	Age detail
3	E&W	rates	single years
4	E&W	numbers	single years
5	E&W	numbers	5-year groups
6	E&W	numbers	5-year groups
8	E&W	rates	10-year groups
11	E&W	numbers and rates	10-year groups
12	E&W	numbers	5, 10, 20 and 30-year groups

Overall, the vast majority of deaths in ICD-9 remain in comparable chapters in ICD-10.³ However; there are some discontinuities in the data due to the application of new rules for assigning underlying cause in ICD-10, most notably for deaths due to pneumonia. See section 3.5 for further details about sources of information on the changes to ICD-10.

**Table B Deaths at ages 110 and over 2007–09
England and Wales**

Age		Total deaths			Deaths with verified ages		
		2007	2008	2009	2007	2008	2009
110	M	-	-	-	-	-	-
	F	3	6	2	3	6	2
111	M	-	-	1	-	-	1
	F	1	-	-	1	-	-
112	M	-	-	-	-	-	-
	F	-	-	1	-	-	1
113	M	-	-	1	-	-	1
	F	-	-	1	-	-	-
114	M	-	-	-	-	-	-
	F	-	-	-	-	-	-
115	M	1	-	-	1	-	-
	F	-	-	-	-	-	-

Source: Office for National Statistics

1.2 Changes in this volume

Following guidance from the World Health Organisation (WHO), the ICD-10 code J09 'Influenza due to identified avian influenza virus' has been used to record H1N1 swine influenza. Figures in Tables 5, 5.10, 8 and 12 include deaths where the underlying cause of death is either H1N1 swine influenza or avian flu. For ease of use J09 has been renamed to 'Influenza due to identified avian or swine influenza virus' in the tables. There was one death due to avian flu. See section 2.6 for information on coding of the underlying cause of death.

The number of deaths shown under J09 differs from the figures reported by the Chief Medical Officer (CMO). The CMO reported deaths as related to pandemic A/H1N1 using information from either the death certificate or from laboratory testing or both.^{4, 5}

1.3 Data analysed in this publication

The information used in this publication is based on the details collected when deaths are certified and registered. Most deaths are certified by a medical practitioner, using the Medical Certificate of Cause of Death (MCCD) shown in **Annex A**. This certificate is then usually taken to a registrar of births and deaths by a person known as an informant – usually a near relative of the deceased. Deaths should be registered within 5 days of the date of death, although there are a number of situations when the registration of a death will be delayed, as described fully in section 2.5. In certain cases deaths are referred to, and sometimes then investigated by, a coroner. The coroner sends information to the registrar, and this is used instead of that on the MCCD to register the

death. In some cases additional information provided on Part B of the coroner's certificate (**Annex C**) is forwarded to ONS by the registrar. Accordingly, the information used in ONS mortality statistics normally comes from one of four sources.

1. Details supplied by the **doctor** when certifying a death, for example, whether the body was seen after death, cause of death, when the deceased was last seen alive, whether a post-mortem was carried out
2. Details supplied by the **informant** to the registrar, for example, occupation of deceased, sex, usual address, date and place of birth, marital status, date of death, place of death
3. Details supplied by a **coroner** to the registrar following investigation, for example, cause of death (following post-mortem), place of accident (following inquest). In the case of deaths certified after inquest, the coroner supplies the registrar with all the particulars that would have been supplied by the informant
4. Details derived from information supplied by one or other of the above, for example, calculated age of deceased, interval since last seen alive, coded cause of death, coded occupation

The mortality data used in this publication are summarised below.

- **Usual residence of deceased** is supplied by the informant and is the place where the deceased was normally resident (see section 2.4). Deaths occurring in England and Wales of those usually resident outside England and Wales are included in all tables in this publication. However, such deaths are excluded from sub-national areas such as Government Office Regions or health authority areas (**Table 11**). In **Table 13** deaths of people usually resident outside England and Wales are presented separately
- **Age** is derived from the date of birth and from the date of death supplied by the informant, except after inquest, where the coroner supplies this information
- **Sex** is as given by the informant (or coroner)
- **Marital status** is supplied by the informant in confidence, under the Population (Statistics) Acts, and is not entered in the public register
- **Death registrations** refer to the number of deaths registered in a period (see section 2.2)
- **Place of occurrence** is given by the informant, except after inquest. This may be a hospital or some other establishment, in which case a unique code is assigned to it by the registrar. These codes are then classified by ONS to give the type of establishment and then grouped to the categories shown in **Tables 12 and 13**. The place of occurrence could also be the deceased's own home, or elsewhere – possibly another private residence or not in a building. These deaths are summarised as 'home' or 'elsewhere' respectively – section 2.4 provides further information

- **Years of life lost** denote the number of years lost due to death at a 'premature' age. The assumption is made here that there are suitable cut-off ages from which the age at death is subtracted. **Years of working life lost** are the number of years lost if death takes place before the end of the assumed working life; this is conventionally taken as 65. Section 2.15 provides more information; see also **Table 14**
- The **underlying cause of death** is selected from the medical condition or conditions mentioned on the MCCD or on the coroner's certificate. More information can be found in section 2.6

1.4 Associated publications and the ONS website

The ONS website (www.ons.gov.uk) provides a comprehensive source of freely available vital statistics and ONS products.

Historic data and figures for UK countries

England and Wales: from 1974 to 2005, in the annual reference volumes, Mortality statistics. The annual reference volumes DH1, DH2 and DH4 were replaced by a single publication in 2006, Mortality statistics: Deaths registered in 2006 (DR_06)¹ which is part of the DR series based on deaths registered in a reference year.

The annual reference volume Mortality statistics: childhood, infant and perinatal (series DH3) and from the 2008 data year Child mortality statistics published in 2010 contains data on stillbirths, infant deaths and childhood deaths. It includes figures on infant deaths linked to their corresponding birth records.

Scotland: in the Annual Report of the Registrar General for Scotland.

Northern Ireland: in the Annual Report of the Registrar General for Northern Ireland.

A summary of mortality statistics for the constituent countries of the United Kingdom appears in the Annual Abstract of Statistics, issued by ONS. Similar data also appear in the WHO World Health Statistics Annual and World Health Report.

Other ONS annual volumes

- United Kingdom Health Statistics brings together up-to-date information on health and care for the United Kingdom and its constituent countries

Population Trends and Health Statistics Quarterly publications

ONS publishes two quarterly journals:

- Health Statistics Quarterly (HSQ), which contains commentary on the latest health findings, topical articles illustrated with colour charts and diagrams, and regularly updated statistical graphs and tables (since 1999), and
- Population Trends, with an emphasis on population and demography, but including some mortality data (since 1975)

There are a large number of articles in Population Trends and Health Statistics Quarterly which provide additional information on death certification and present analyses of mortality data. Many of these articles are available on the ONS website. These can be found here www.statistics.gov.uk/StatBase/Product.asp?vlnk=6725 for HSQ and www.statistics.gov.uk/statbase/product.asp?vlnk=15368 for Population Trends.

2 Notes and definitions

2.1 Base populations

The population figures used to calculate death rates for 2009 in this publication are mid-2009 estimates of the resident population of England and Wales based on the 2001 Census of Population. These estimates include members of HM and non-UK armed forces stationed in England and Wales, but exclude those stationed outside. ONS mid-year population estimates are based on updates from the most recent census, allowing for births, deaths, net migration and ageing of the population.

Whenever results become available from a census, ONS creates a new base for the population estimates and following the 2001 Census, ONS revised the mid-year population estimates from 1982 to 2000. Further revisions were made to the estimates from 1992 because further information became available from research following the 2001 Census. The research was carried out to understand the reasons for differences between the 2001 Census-based estimates and the mid-year estimates rolled forward from earlier censuses.

Population estimates for 2009 were published on 24 June 2010. Revised population estimates for 2002 to 2008 were published on 13 May 2010 as a result of final improvements to methodology following user engagement on improved methods.

These population estimates were the most up-to-date when mortality rates in this publication were calculated. Further information on population estimates, and their methodology, can be found at: www.statistics.gov.uk/popest

In **Table 3** the base populations used historically are defined as follows:

- **Home population:** the population usually resident in England and Wales. This included the civilian population resident in England and Wales; members of HM armed forces stationed in England and Wales; and members of foreign armed forces stationed temporarily in England and Wales. This definition was used from 1950 to 1970
- **Total population:** the home population but including also HM forces stationed outside England and Wales, while deducting foreign armed forces stationed temporarily in England and Wales. This definition was used between 1915 and 1920, and also between 1940 and 1950
- **Resident population:** the population resident in England and Wales, including members of HM and foreign forces stationed in England and Wales and residents who were outside the country on census night, but excluding HM and foreign forces stationed outside the country and overseas visitors. This definition has been used since 1971

2.2 Occurrences and registrations and the standard dataset

Up to 1992, OPCS publications gave numbers of deaths registered in the period concerned. From 1993 to 2005 the figures in annual reference volumes relate to the number of deaths that occurred in the reference period. From 2006 onwards, all tables in

the DR series are based on deaths registered in a calendar period. More details on these changes can be found in the publication DR_06.¹

Most tables presented in this publication use data taken from the standard dataset created from the deaths database on 1 April 2010; see section 3.1 for more details. Although the number of deaths remains the same as that reported on 25 May 2010, a small number of records have been updated with improved information. The tables in this publication reflect this, resulting in minor differences from figures in the provisional release however; figures match the final release of deaths data published on 21 July 2010.

Although the majority of mortality publications will be based on registrations, ONS will continue to take an annual extract of death occurrences in the autumn following the data year, which will therefore be available for seasonal analysis of mortality data.

2.3 Areal coverage

The deaths recorded in this publication are those registered in England and Wales. No distinction is made between deaths of civilians and deaths of non-civilians. The deaths of those whose usual residence is outside England and Wales are included in total figures for England and Wales but excluded from any sub-division of England and Wales. **Table C** gives recent numbers of deaths of non-residents for deaths from all causes and for those from external causes of injury and poisoning.

Table C Deaths of non-residents, 2005–2009

	2005	2006	2007	2008	2009
Deaths from all causes	512,993	502,599	504,052	509,090	491,348
of which, deaths of residents outside England and Wales	1,153	1,190	1,183	1,261	1,101
Per cent of total	0.22	0.24	0.23	0.25	0.22
Deaths from external causes of injury and poisoning	17,632	17,509	17,420	18,048	17,878
<i>of which</i> , deaths of residents outside England and Wales	118	126	123	152	105
Per cent of total	0.67	0.72	0.71	0.84	0.59

Source: Office for National Statistics

2.4 Usual residence of deceased, and place of occurrence

Usual residence of deceased

Details of the usual residence of the deceased are supplied by the informant to the registrar. Prior to 1993 there were 'rules' determining the validity of one competing address over another for the purpose of registering the usual place of residence of the deceased. Previous annual reference volumes contain details of these rules. Since 1993 the informant can decide what address to give if more than one might be applicable. For example, a parent registering the death of a student in term time may give the parental home, or the university hall of residence, or the lodgings as the student's address. Another example might be where an informant considers that the deceased was not resident in a communal establishment (such as residential homes for the elderly) where the death took place, so instead they provide a private home address to the registrar, even where the deceased had lived at the communal establishment for many months.

Place of occurrence

The groups of establishments used for the place where death occurred (**Tables 12 and 13**) are defined below. Those described as NHS establishments are under NHS management, while 'non-NHS' refers to establishments not under NHS management, even if care of the deceased was funded through the NHS.

- NHS hospitals and communal establishments for the care of the sick (excluding psychiatric hospitals and hospices) cover nursing homes; general hospitals; convalescent homes; hospitals and units for the elderly; establishments for the chronic sick; homes or hostels for people with learning disabilities; maternity hospitals; and multi-function sites such as large hospitals
- Non-NHS hospitals and communal establishments for the care of the sick (excluding psychiatric hospitals and hospices) cover private nursing homes (including those for the aged); general hospitals; establishments for the elderly and chronic sick; homes or hostels for people with learning disabilities; maternity hospitals; military hospitals; and multi-function sites such as large hospitals
- Hospices include Sue Ryder Homes; Marie Curie Centres; oncology centres; voluntary hospice units; and palliative care centres
- NHS psychiatric hospitals include psychiatric hospitals and units; nursing homes for people with mental health problems; and special security psychiatric hospitals
- Non-NHS psychiatric hospitals include nursing homes for people with mental health problems; special security psychiatric hospitals; psychiatric hospitals; care and rehabilitation homes for elderly people with mental health problems
- Other communal establishments include schools for people with learning disabilities; holiday homes and hotels; common lodging houses; aged persons' accommodation; assessment centres; schools; homes for physically disabled people; rehabilitation centres; convents and monasteries; nurses' homes; university and college halls of residence; young offender institutions; secure training centres; detention centres; prisons; remand homes; YMCA and YWCA hostels
- Deaths at home are those at the usual residence of the deceased (according to the informant), where this is not a communal establishment
- Other private houses and other places include all places not covered above, such as deaths on a motorway; at the beach; climbing a mountain; walking down the street;

at the cinema; at a football match; while out shopping; or in someone else's home. This category also includes people who are pronounced dead on arrival at hospital

For each Strategic Health Authority in England and Local Health Board in Wales, **Table 13** shows the place where a death occurred, that is, the physical location, as summarised in the groups described above.

Deaths in hospices

Of approximately 200 hospices, most are separately located or 'free standing'. A small number of hospices are found within NHS hospitals but, as these are not identified separately at death registration, ONS is unable to include deaths that occurred in them with deaths in free-standing hospices and they are therefore included as hospital deaths.

2.5 Certification of cause of death

When a death occurs, the attending doctor completes a medical certificate of cause of death (MCCD) (**Annex A**). This should normally be taken to the local registrar of births and deaths for the district in which the death occurred.^{6,7} Since April 1997, though, information may be provided to a registrar in a different district. This is known as the registration of deaths by declaration and is mostly used for the deaths of infants. Further details about deaths by declaration are provided below.

The certifying doctor must have been in attendance during the last illness of the deceased in order to complete an MCCD. Once it has been completed, it is normally delivered to the registrar by a person known as the informant, often a relative of the deceased. The majority of deaths are handled in this way and the death is registered without further ado within five days of the date of death, as required by law. A specimen of the Medical Certificate of Cause of Death (MCCD) for ages 28 days and over is reproduced at **Annex A** and a specimen of the draft death entry completed by the registrar at the time of registration is reproduced at **Annex B** or **Annex I**.

However, there are circumstances when a MCCD cannot be issued immediately, such as those deaths reported to a coroner, and the registration is consequently delayed. Some examples of these situations are given in the following paragraphs.

Referral to the coroner

For some deaths the doctor may certify the cause and report the case to the coroner, or the registrar may report it. Deaths that should be referred to a coroner⁸ include those where:

- the cause is unknown
- the deceased was not seen by the certifying doctor either after death, or within the 14 days before death
- the death was violent, or unnatural, or suspicious
- the death may have been due to an accident (whenever it occurred)
- the death may have been due to self-neglect or neglect by others
- the death may have been due to an industrial disease, or related to the deceased's employment

- the death occurred during an operation or before recovery from the effects of an anaesthetic
- the death may have been a suicide
- the death occurred during or shortly after detention in police or prison custody
- there was no doctor available who was legally qualified to certify the death

Coroners have a number of possible courses of action once a death has been referred. When they are satisfied that the death is due to natural causes and the cause is correctly certified, the local registrar is notified (Form 100A – **Annex D**) and they can then register the death using the cause given on the MCCD. In rare cases where no medical certificate is available, the death will be registered as uncertified and the cause taken from Form 100A.

Alternatively, the coroner may order a post-mortem examination, particularly where the death was sudden and the cause unknown, or for deaths where there was no doctor in attendance, which may have been referred directly by the police. If the post-mortem shows unequivocally that the death was due to natural causes, the coroner notifies the registrar that they do not intend to hold an inquest (Form 100B – **Annex E**). The cause of death given by the coroner on the Form 100B is based on the information from the post-mortem held by the pathologist.

Coroners' inquests

If an inquest is necessary, the death can usually be registered only after the inquest has taken place. In a very few cases the coroner holds an inquest without a post-mortem. In most cases the inquest concludes the investigation and the death is then certified by the coroner (Form 99(REV) – **Annex C**). This provides the registrar with details of the deceased and the inquest findings as to cause of death.

If it appears that someone is to be charged with an offence in relation to the death, the coroner must adjourn the inquest until legal proceedings are completed. Since 1978 (see section 2.10) it has been possible to register these deaths at the time of adjournment, when the coroner issues Form 120 (**Annex F**). This form includes details of injuries that led to the death, but no verdict. In the case of motor vehicle incidents, there is enough information to code the cause of death. Other deaths, such as possible homicides, are given a temporary code for underlying cause of death until final information becomes available. This is supplied by the coroner to the registrar on Form 121 (**Annex G**).

Legally uncertified deaths⁹

A very small proportion (0.2 per cent in 2009) of deaths remains legally 'uncertified'. ONS receives copies of at least one certificate of cause of death for these cases, which are registered and coded as normal. This group includes deaths for which the doctor, who completed the medical certificate, did not fulfil all the legal requirements for doing so. For example, where the doctor was not in attendance with the deceased during the last illness, or did not see the body, and the coroner did not order a post-mortem but issued Form 100A. It also includes deaths of foreign military personnel in England and Wales where the certifying doctor was not a registered medical practitioner for the purpose of issuing medical certificates.

Table D gives relevant numbers of deaths by type of certification for the years 2006 to 2009. **Figure A** illustrates the processes in certification and registration, with numbers for 2009.

**Table D Deaths by method of certification and registration, 2006–09
England and Wales**

	2006		2007		2008		2009	
	number	%	number	%	number	%	number	%
Total deaths	502,599	100	504,052	100	509,090	100	491,348	100
Certified by doctor:	391,638	77.9	394,799	78.3	400,149	78.6	384,338	78.2
With coroner not involved without post-mortem, or post mortem information missing	314,365	62.5	312,835	62.1	312,672	61.4	296,446	60.3
with post-mortem.	1,733	0.3	1,880	0.4	1,856	0.4	1,665	0.3
After referral to coroner, registered with no post- mortem or inquest, or post- mortem information missing	77,273	15.4	81,964	16.3	87,477	17.2	87,892	17.9
with post-mortem	76,670	15.3	81,407	16.2	86,875	17.1	87,383	17.8
	603	0.1	557	0.1	602	0.1	509	0.1
Certified by coroner:	109,911	21.9	108,322	21.5	108,002	21.2	105,974	21.6
Coroner's post-mortem held, with no inquest	82,595	16.4	80,690	16.0	78,642	15.4	76,071	15.5
Coroner's inquest completed, with or without post-mortem, or post- mortem information missing	26,268	5.2	26,512	5.3	28,344	5.6	28,874	5.9
Coroner's inquest adjourned	1,048	0.2	1,120	0.2	1,016	0.2	1,029	0.2
Uncertified	1,050	0.2	931	0.2	939	0.2	1,036	0.2

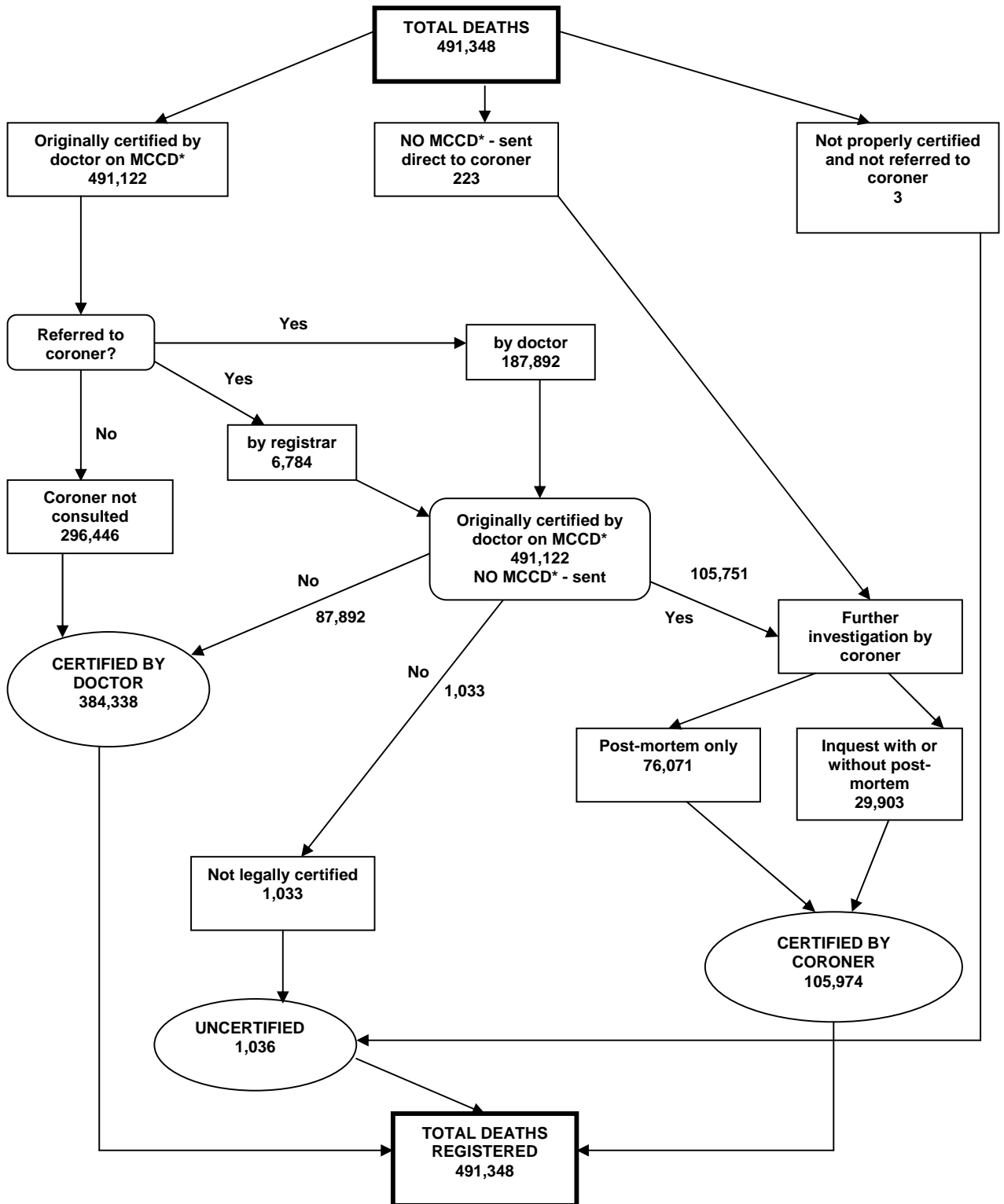
Source: Office for National Statistics

Registration of deaths by declaration

For most deaths there is a legal requirement for an informant to visit the registrar's office in the district within which the death occurred in order to supply certain information about the deceased. However, since April 1997 it has been possible for relatives to provide this information to a registrar in a different district from that in which the death occurred. This is known as registration of a death by declaration and is similar to the arrangement already in place for births. The registrar completes a Form 400 (**Annex H**), as well as the usual Form 310 (**Annex B** or **Annex I**), and sends them to a registrar in the district where the death took place; the second registrar must carry out the actual registration.

There had been a gradual increase in the use of registration by declaration until 2006. Since then these have started to slowly decline although the percentage of these against total deaths registered has been stable at 0.8 per cent since 2007: in 1999, 3,173 deaths, 0.6 per cent of all deaths, were registered by this means; in 2006 these figures

Figure A: Certification and registration of deaths registered in 2009



* Medical Certificate of Cause of Death
Source: Office for National Statistics

were 4,434 and 0.9 per cent respectively. In 2009 the numbers reduced to 3,791 and 0.8 per cent respectively. Analysis of these deaths shows that they are most likely for infants, especially neonates: about six per cent of all neonatal deaths are registered by declaration. Linked to this is the fact that the most common cause for deaths registered by declaration is a congenital anomaly, with 1.7 per cent of deaths from such a cause registered in this way. The greater frequency for infant deaths is explained by the practice of referring infants or pregnant women with serious or unusual health problems to regional care units where appropriate, which may often be some distance from the parents' home.

2.6 Coding the underlying cause of death

As noted in the introduction to this publication, ICD-10 has been used since 1 January 2001 to code cause of death. Deaths from 1979 to 2000, which appear in tables containing historical data, are coded to ICD-9. It is important to note that there are some significant differences between ICD-9 and ICD-10.³

The main ones are:

- a change in the format of the code and expansion in the number of codes used
- a movement of some diseases and conditions between broad groups called ICD Chapters
- changes to the rules governing the selection of the underlying cause of death, especially Rule 3, which has had a large effect

The death certificate (**Annex A**) used in England and Wales accords with that recommended by the World Health Organisation (WHO).² It is set out in two parts. Part I gives the condition or sequence of conditions leading directly to death, while Part II gives details of any associated conditions that contributed to the death, but are not part of the causal sequence.

The selection of the **underlying cause of death** is based on ICD rules and is made from the condition or conditions reported by the certifier, as recorded on the certificate. The underlying cause of death is defined by WHO as:

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

Deaths attributed to accidents, poisonings and violence are examined, firstly, according to the **underlying cause of death (external cause)** and, secondly, by the **nature of injury, or main injury**. External cause of injury codes are taken from Chapter XX of the ICD (prefixes V01 to Y89) and nature of injury codes are from Chapter XIX (prefixes S00 to T98), or from a smaller number of other post procedural codes not within Chapter XIX.

Selection and modification rules

The selection of the underlying cause of death is generally made from the condition or conditions entered in the lowest completed line of Part I of the MCCD. If the death certificate has not been completed correctly – for example, if there is more than one cause on a single line with no indication of sequence, or the conditions entered are not

an acceptable causal sequence – it becomes necessary to apply one or more of the **selection rules** in the ICD-10. Even where the certificate has been completed properly, there are particular conditions, combinations or circumstances when **modification rules** have to be applied to select the correct underlying cause of death. On some death certificates, for example, it may happen that two or more causes are given that, when linked together, point to another cause (not mentioned directly on the certificate) as underlying. These cases of ‘inferred’ underlying causes, though, are few and are most common among diseases of the circulatory system and late effects of cerebrovascular disease. However, in some cases the underlying cause of death can be selected from Part II of the MCCD.

The purpose behind the selection and modification rules, therefore, is to derive the most useful information from the death certificate and to do it uniformly so that:

- data will be comparable between places and times
- each death certificate produces one, and only one, underlying cause of death

Routine tables in this publication analyse the underlying cause of death. Ad hoc studies of all causes entered on death certificates – ‘mentioned causes’ – have also been carried out in the past.¹⁰ Coding rules ensure that each recorded item on the certificate is coded independently of all others on the same certificate. All mentioned causes have been coded routinely since 1993.

Note on coding of acute rheumatic fever (ICD-9 390-392, ICD-10 I00-I02)

In 1999 ONS found that, in some circumstances, deaths from rheumatic and valvular heart diseases were wrongly coded to acute rheumatic fever by the automated cause coding system introduced in 1993. All deaths in 1998 and 1999 with any mention of acute rheumatic fever were checked and recoded manually if necessary. From 2000 routine checks were set in place to correct any deaths mis-coded to acute rheumatic fever. Therefore, published data on deaths between 1993 and 1997 assigned to acute rheumatic fever should be regarded as highly unreliable.

2.7 Causes of death listed in this publication

The codes shown in the majority of tables in this publication are those where at least one death was coded to that underlying cause during the relevant reference period.

ONS short list

The conditions listed in **Table 8** are based on a standard tabulation list developed by ONS, in consultation with the Department of Health. This list of over 100 conditions is based on the following:

- all conditions given in the WHO basic tabulation list; with the exception of a few conditions that are so rare as certified causes of death in England and Wales that they could safely be excluded from the list
- totals for each ICD-10 Chapter
- conditions used in monitoring public health targets
- other conditions often referred to by ONS

The aim was to provide a standard listing for tables of mortality statistics containing conditions frequently referred to by all users of the data. In this way, users could find the same conditions in different tables and in different annual reference volumes and reports. Many tables also contain statistics for conditions in the standard list as well as others of particular interest. The standard listing is given in **Table E**. Note that from 1993 to 2000, conditions related to HIV infection were coded to ICD-9 042-044, as used by the National Center for Health Statistics (NCHS) in the USA, which developed the software on which the ONS automated cause coding system is based. This replaced the use of ICD-9 279.1 (deficiency of cell-mediated immunity) for these conditions. In ICD-10, conditions related to HIV infection are coded to B20–B24.

From 1 January 2007, a new ICD-10 code (U50.9) has been used by ONS for deaths involving adjourned inquests that would previously have been coded to Y33.9. This has made the tabulation of deaths from undetermined intent, and estimates of suicide, easier to produce (see section 2.10 for more details).

Table E ONS short list of cause of death codes, using ICD-10

A00–R99, U50.9 V01–Y89	All causes
A00–B99	I Certain infectious and parasitic diseases
A00–A09	Intestinal infectious diseases
A15–A16	Respiratory tuberculosis
A17–A19	Other tuberculosis
A39	Meningococcal infection
A40–A41	Septicaemia
B15–B19	Viral hepatitis
B20–B24	Human immunodeficiency virus [HIV] disease
B90	Sequelae of tuberculosis
C00–D48	II Neoplasms
C00–C97	Malignant neoplasms
C00–C14	Malignant neoplasms of lip, oral cavity and pharynx
C15	Malignant neoplasm of oesophagus
C16	Malignant neoplasm of stomach
C18	Malignant neoplasm of colon
C19–C21	Malignant neoplasm of rectosigmoid junction, rectum and anus
C22	Malignant neoplasm of liver and intrahepatic bile ducts
C23–C24	Malignant neoplasm of gallbladder and biliary tract
C25	Malignant neoplasm of pancreas
C32	Malignant neoplasm of larynx
C33–C34	Malignant neoplasm of trachea, bronchus and lung
C43	Malignant melanoma of skin
C44	Other malignant neoplasms of skin
C45	Mesothelioma
C46	Kaposi's sarcoma
C50	Malignant neoplasm of breast

C53	Malignant neoplasm of cervix uteri
C54–C55	Malignant neoplasm of other and unspecified parts of uterus
C56	Malignant neoplasm of ovary
C61	Malignant neoplasm of prostate
C62	Malignant neoplasm of testis
C64	Malignant neoplasm of kidney, except renal pelvis
C67	Malignant neoplasm of bladder
C71	Malignant neoplasm of brain
C81	Hodgkin's disease
C82–C85	Non-Hodgkin's lymphoma
C90	Multiple myeloma and malignant plasma cell neoplasms
C91–C95	Leukaemia
C97	Malignant neoplasms of independent (primary) multiple sites
D00–D48	In situ and benign neoplasms, and neoplasms of uncertain or unknown behaviour
D50–D89	III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
D50–D64	Anaemias
E00–E90	IV Endocrine, nutritional and metabolic diseases
E10–E14	Diabetes mellitus
F00–F99	V Mental and behavioural disorders
F01, F03	Vascular and unspecified dementia
F10–F19	Mental and behavioural disorders due to psychoactive substance use
G00–G99	VI Diseases of the nervous system
G00–G03	Meningitis (excluding meningococcal)
G12.2	Motor neuron disease
G20	Parkinson's disease
G30	Alzheimer's disease
G35	Multiple sclerosis
H00–H59	VII Diseases of the eye and adnexa
H60–H95	VIII Diseases of the ear and mastoid process
I00–I99	IX Diseases of the circulatory system
I05–I09	Chronic rheumatic heart diseases
I10–I15	Hypertensive diseases
I20–I25	Ischaemic heart diseases
I21–I22	Acute myocardial infarction
I26–I51	Other heart diseases
I60–I69	Cerebrovascular diseases
I60–I62	Intracranial haemorrhage

I63	Cerebral infarction
I64	Stroke, not specified as haemorrhage or infarction
I70	Atherosclerosis
I71	Aortic aneurysm and dissection
J00–J99	X Diseases of the respiratory system
J10–J11	Influenza
J12–J18	Pneumonia
J40–J44	Bronchitis, emphysema and other chronic obstructive pulmonary disease
J45–J46	Asthma
K00–K93	XI Diseases of the digestive system
K25–K27	Gastric and duodenal ulcer
K40–K46	Hernia
K57	Diverticular disease of intestine
K70–K76	Diseases of the liver
L00–L99	XII Diseases of the skin and subcutaneous tissue
M00–M99	XIII Diseases of the musculoskeletal system and connective tissue
M05–M06, M08	Rheumatoid arthritis and juvenile arthritis
M80–M81	Osteoporosis
N00–N99	XIV Diseases of the genitourinary system
N00–N15	Glomerular and renal tubulo-interstitial diseases
N17–N19	Renal failure
N40	Hyperplasia of prostate
O00–O99	XV Pregnancy, childbirth and the puerperium
P00–P96	XVI Certain conditions originating in the perinatal period
Q00–Q99	XVII Congenital malformations, deformations and chromosomal abnormalities
Q20–Q28	Congenital malformations of the circulatory system
R00–R99	XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
R54	Senility without mention of psychosis
R95	Sudden infant death syndrome
R99	Other ill-defined and unspecified causes of mortality

S00–T98 XIX Injury, poisoning and certain other consequences of external causes

S00–S19	Injuries to the head and the neck
S20–S29	Injuries to the thorax
S30–S39	Injuries to the abdomen, lower back, lumbar spine and pelvis
S72	Fracture of femur
T20–T32	Burns and corrosions
T39.1	Poisoning by 4-Aminophenol derivatives
T40	Poisoning by narcotics and psychodysleptics [hallucinogens]
T42	Poisoning by antiepileptic, sedative-hypnotic and antiparkinsonism drugs
T43	Poisoning by psychotropic drugs, not elsewhere classified
T50.9	Poisoning by other and unspecified drugs, medicaments and biological substances
T51–T65	Toxic effects of substances chiefly nonmedicinal as to source
T58	Toxic effect of carbon monoxide
T71	Asphyxiation
T75.1	Drowning and nonfatal submersion

U50.9, V01–Y89 XX External causes of morbidity and mortality

V01–X59	Accidents
V01–V99, Y85	Transport accidents including sequelae of transport accidents
V01–V89	Land transport accidents
W00–W19	Falls
W65–W74	Accidental drowning and submersion
X00–X09	Exposure to smoke, fire and flames
X40–X49	Accidental poisoning by and exposure to noxious substances
X41	Accidental poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism and psychotropic drugs, not elsewhere classified
X42	Accidental poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified
X44	Accidental poisoning by and exposure to other and unspecified drugs, medicaments and biological substances
X59	Accidental exposure to unspecified factor
X60–X84	Intentional self-harm
X85–Y09	Assault
Y10–Y34	Event of undetermined intent
X60–X84, Y10–Y34 ¹	Intentional self-harm; and event of undetermined intent
U50.9, X85–Y09 ⁱ	Assault; death from injury or poisoning, event awaiting determination of intent (inquest adjourned)

ⁱ The production of statistics on numbers of assault and intentional self-harm deaths occurring in a particular year is complicated by matters of definition and delay resulting from legal proceedings. Further details can be found in section 2.11.

2.8 Two codes for certain conditions

The ‘dagger and asterisk’ system

ICD-10 has continued the system introduced in ICD-9 whereby there are two codes for diagnostic descriptions that contain information about both an underlying generalised disease and a local manifestation in a particular organ or site that is a clinical problem in its own right. In such cases the underlying disease is given a dagger (†) code and the manifestation an asterisk (*) code. Conditions with dagger codes are used in assigning underlying causes. Conditions with asterisk codes are never used in this way so will not appear in tables.

Secondary causes

Deaths where the underlying cause is assigned to an external cause (ICD-10 Chapter XX, U50 to Y89) are also assigned at least one nature of injury code (Chapter XIX, S00 to T98) or a post-procedural code not within Chapter XIX (see **Table 6**). This means, it is possible to have more than one nature of injury code for a single death. For example, a car occupant injured in a transport accident (V40–V49) may have suffered a fracture to the skull (S02) and femur (S72), as well as injuries of the spleen (S36). However, it is necessary to select which one of the nature of injury codes is to be identified as the one causing death. This **one** cause code is referred to by ONS as the **secondary cause**. To do this, WHO provides guidelines or ‘rules’ to ensure that the most useful information is derived from the death certificate and that it is done uniformly.

The move from ICD-9 to ICD-10 has had an impact on the allocation of secondary causes. ONS published an assessment of this impact in *Health Statistics Quarterly* 19.¹¹ In ICD-10, when more than one body region is involved, coding is made to the relevant category of injuries involving multiple body regions (T00–T07). Therefore, in the above example of an occupant injured in a transport accident, under ICD-10 the secondary cause would be classified as ‘other specified injuries involving multiple body regions’ (T06.8), whereas under ICD-9 the secondary cause would be more specifically classified as a fracture of the skull (ICD-9 800).

Information on injuries is derived from the coroners’ forms supplied to ONS, in particular the coroner’s certificate of cause of death after inquest (Form 99 (Rev) A – **Annex C**). This form was revised in May 1993 to bring it into line with the MCCD and with WHO recommendations. Because the revised form no longer includes specific questions about type of injury and parts of body injured, some coroners now often provide less detail than before. The result is that some deaths are assigned to residual codes for nature of injury. For example, in ICD-10 the statement ‘head injury’ is coded to ‘unspecified injury of head’ (S09.9), whereas with more detail it might be assigned to ‘fracture of skull and facial bones’ (S02.n).

2.9 Final cause of death

The conditions mentioned on the death certificate are used to derive an underlying cause of death. In some cases, more information on cause of death may become available at a later stage after the death has been registered, such that the underlying cause may be subsequently amended. Around 0.2 per cent of deaths have their underlying cause amended. This amended or final cause is used in this publication.

Sometimes the later information becomes available only after the annual extract has been taken. Users with access to individual records of deaths as shown in the public record (which is never amended) may consequently find some differences with published statistics.

In summary, further details on the causes of death can be obtained in one or other of the following ways;

- Deaths certified by doctors may have their cause amended as a result of a post-mortem, or of tests initiated ante-mortem. When the doctor indicates there has been a post-mortem or ticks box B on the back of the certificate, the registrar automatically sends a letter to the certifier asking for this additional information. The certifier sends this information directly to the cause coding team at ONS. The additional information is only used for statistical purposes and does not appear in the public record. Less than 1 per cent of deaths certified by a doctor have a post-mortem, and in the majority of cases, the post-mortem does not change the certified cause. In addition, ONS coders of cause of death may contact the certifier for more information if the certificate is unclear or they cannot code the underlying cause. This is very rare.
- When a death has been certified by a coroner after post-mortem (with no inquest), further information may be available once they have results of bacteriology or histopathology. This is also very rare.
- Following an inquest, coroners may submit to ONS details of how a fatal accident occurred. However, this happens rarely, as coroners normally only certify cause of death after their investigations are completed, so the first and only information ONS receives from them is the final underlying cause.
- Coroners may also provide a final underlying cause of death and verdict much later for an accelerated registration following an adjourned inquest (see section 2.10).

2.10 Accelerated registrations

On 1 January 1978, certain provisions of the Criminal Law Act 1977, the Coroners (Amendment) Rules 1977, and the Registration of Births, Deaths and Marriages (Amendment) Regulations 1977 came into force. Two principal changes arose from the legislation. Firstly, the duty of a coroner's jury to name a person it finds guilty of causing a death, and of a coroner to commit that person for trial, was abolished. Secondly, in cases where there was an inquest adjournment, provision was made for the death to be registered at the time of adjournment instead of having to await the outcome of criminal proceedings, as previously. This provision is referred to as accelerated registration.

Accelerated registrations that are not transport incidents are assigned to code U50.9 (event awaiting determination of event) for events registered from 1 January 2007, or to code Y33.9 (other specified events, undetermined intent) for events registered up to the end of 2006. Most of these are eventually reassigned to assault (X85–Y09), but the delays before this happens can affect the published figures in the under estimation of deaths from assault.¹² Accelerated registrations that are motor vehicle incidents are assigned to a code in the range V01–V89 (land transport accidents) if sufficient data are available on the coroner's certificate of adjournment.

2.11 Assault and intentional self-harm

Numbers of deaths from assault (homicide in ICD-9)

It is possible to make alternative assessments about the number of deaths that may be attributed to assault. Different estimates have been used, both in the past and presently, within any publication and even within a single table of data. The two main estimates used in the main tables are as follows:

- (i) The number coded to X85–Y09. This is the basic ICD classification to which all assaults should eventually be assigned.
- (ii) The number coded to X85–Y09, plus those coded to U50.9. This takes account of accelerated registrations, most of which are eventually coded to an assault code (see section 2.10).

Numbers of deaths from intentional self-harm (suicide in ICD-9)

As with assault, it is possible to make two separate estimates of the number of deaths annually from intentional self-harm:

- (i) The number coded to X60–X84. This is the basic ICD classification to which all definite intentional self-harm verdicts are assigned
- (ii) The number coded to X60–X84, plus those coded to Y10–Y34. This takes account of most deaths where an open inquest verdict was returned, but excludes all deaths that are pending investigation

2.12 Stillbirths

The Stillbirth (Definition) Act 1992 defines a stillbirth as

‘a child which has issued forth from its mother after the twenty-fourth week of pregnancy, and which did not at anytime after becoming completely expelled from its mother breathe or show other signs of life’.

This definition has been in use since 1 October 1992. Prior to this, the Births and Deaths Registration Act 1953 defined a stillbirth as above, but at 28 or more weeks completed gestation. Figures for stillbirths from 1993 are, therefore, not comparable with those for previous years.

2.13 Infant deaths

Infant deaths used in this publication are defined as below:

Perinatal deaths	stillbirths plus early neonatal deaths (deaths at ages up to 6 completed days of life)
Infant deaths	deaths at ages under one year

Linked data in **Table 10** refers to infant death records that have been successfully matched to their corresponding birth record; see the annual Child Mortality Statistics publication¹³ for further details.

2.14 Death rates, ratios and standardisation

The death rates shown in **Table 8** of this publication are derived from total deaths registered in England and Wales in 2009 and corresponding mid-year resident population from **Table 1**.

Crude death rate is defined as total deaths per 1,000 population, or:

$$(\text{Total deaths} / \text{Total population}) \times 1,000$$

This rate is used in **Table 3**.

Age-specific death rates may be calculated for each age group and these are defined as the number of deaths in the age group per 1,000 population in the same age group, or:

$$M_k = (d_k/p_k) \times 1,000$$

where M_k = age-specific death rate for age group k
 d_k = deaths in age group k
 p_k = population in age group k
 k = age

Age-specific rates may be calculated separately for males and females, or for both sexes combined. In this publication they are used in **Table 3**.

Tables 8 and 9 present **age-standardised rates which allow for differences in the age structure of populations**. Using the direct method, the age-standardised rate for a particular condition is that which would have occurred if the observed age-specific rates for the condition had applied in a given standard population.

Thus: age-standardised rate = $\{\sum P_k m_k\} / \sum P_k$

where P_k = standard population in sex/age group k
 m_k = observed mortality rate (deaths per million persons) in sex/age group k
 k = age/sex group 0, 1-4, 5-9,, 80-84, 85 years and over

The age-standardised rate for 'all causes' includes deaths at all ages, while the same rates for specific causes exclude neonatal deaths (infants aged under 28 days). Classification by underlying cause is not possible for neonatal deaths (see section 2.16). The standard population used here is the European Standard Population. It is the same for both males and females, so standardised rates may be compared for each sex, and between males and females. The European standard (**Table F**) is a hypothetical population but is particularly useful for comparisons between different countries, over time and between sexes.

Perinatal mortality rate is the number of deaths at ages under seven days (early neonatal deaths) plus stillbirths per 1,000 live births and stillbirths in the same period.

Infant mortality rate is the number of deaths at ages under one year per 1,000 live births.

In **Table 10** infant mortality rates for years up to 1974 are based on unlinked data. For each year from 1975 to 1980 (and the aggregated five year group 1976–1980) the rates in brackets are based on linked data, while those not in brackets are based on unlinked data. From 1981 onwards these rates are based on linked data.

Table 10 also includes the live birth rate (as the number of live births per 1,000 population per year) and the stillbirth rate (the number of stillbirths per 1,000 live births and stillbirths in the same period).

Table F Distribution of the European Standard Population

Age	Population	Age	Population
0	1,600	45–49	7,000
1–4	6,400	50–54	7,000
5–9	7,000	55–59	6,000
10–14	7,000	60–64	5,000
15–19	7,000	65–69	4,000
20–24	7,000	70–74	3,000
25–29	7,000	75–79	2,000
30–34	7,000	80–84	1,000
35–39	7,000	85+	1,000
40–44	7,000		
Total		100,000	

Source: Waterhouse J, Muir C, Correa P and Powell J (eds) (1976) Cancer incidence in five continents, vol III. IARC Scientific Publications No. 15. International Agency for Research on Cancer: Lyon.

Standardised mortality ratios

Table 10 contains indirect standardised mortality ratios (SMRs). These ratios compare mortality in one population with mortality in a 'standard' population, while allowing for differences in age structure. The ratio is of 'observed' to 'expected' deaths. 'Expected' deaths are the number that would have occurred if the sex and age-specific mortality rates of the standard year had applied to the population of interest. SMRs for males and females separately are calculated using the appropriate sex- and age-specific standard rates. For persons, the SMRs are based on age-specific standard rates for males and females combined.

Thus: $SMR = (\text{observed deaths/expected deaths}) \times 100$

where expected deaths = $\sum P_k M_k$

and P_k = population in age/sex group k in population of interest (e.g. an area, or period of time)

M_k = age-specific death rate for age group k for the standard population

k = age group (various groupings – see below)

The standard mortality rates used are those for England and Wales, 1950–52. The age groups used in the calculation are 0–4, 5–14, 15–24, ..., 65–74, 75 and over.

2.15 Years of life lost

Analyses of the effects of premature death assume that everyone may live to some arbitrarily chosen age and that death at a younger age means that some future years of life have been lost. Calculations of years of life lost are made for deaths from selected causes with the aim of illustrating the relative effects from different diseases. The ‘cut-off’ ages used in this publication are 65, 75 and 85. These exclude deaths at high ages where the cause may be uncertain. This approach, but with a ‘cut-off’ age of 65, is also used to calculate years of working life lost due to premature death. The period of working life covers ages 15 to 64, for both males and females.

Total years of life lost = $\sum (A - a_i) d_i$

Years of working life lost = $[\sum (65 - a_j) d_j] + 50 \sum d_k$

where d_i, d_j, d_k = number of deaths in age group i/j/k

a_i, a_j, a_k = age i/j/k + 0.5

$A = 65 \text{ or } 75 \text{ or } 85$

$i = 0 \text{ to } 64 \text{ or } 0 \text{ to } 74 \text{ or } 0 \text{ to } 84$

$j = 15 \text{ to } 64$

$k = 1 \text{ to } 14$

Since there is no information on underlying cause of death when the deceased was aged under 28 days, the only category including both neonatal and non-neonatal deaths is that for ‘all causes’.

The mean age at death is included in **Table 14** as a further indicator of the relative effects of premature death. It is based on the sum of ages at death for each person.

Mean age at death = $\frac{\sum (a_i d_i)}{d}$

where a_i = age + 0.5

d_i = number of deaths at age i

i = single years of age 0 to 119, 120 and over

d = total number of deaths

2.16 Neonatal deaths

In this publication the tabulations of deaths by cause exclude neonatal deaths (deaths of infants aged under 28 days). In January 1986 a neonatal death certificate was introduced, from which it is not possible to assign an underlying cause of death. This certificate follows recommendations of the WHO in the ICD², whereby causes of death are given separately in the following categories:

- a. main diseases or conditions in fetus or infant
- b. other diseases or conditions in fetus or infant
- c. main maternal diseases or conditions affecting fetus or infant
- d. other maternal diseases or conditions affecting fetus or infant, and
- e. other relevant causes

While conditions arising in the mother that affected the fetus or infant could be mentioned on certificates prior to 1986, no provision was made for those cases in which the certifier considered that both maternal and fetal conditions contributed to the death. The new certificate overcomes this problem. However, since equal weighting is given to main conditions in the fetus and in the mother, it is no longer possible to identify a single underlying cause of death for neonatal deaths (and stillbirths). For this reason ONS, together with a team of experts in the field, developed a hierarchical classification for classifying causes of neonatal deaths and stillbirths in ICD-10. This classification is known as 'ONS cause groups'. More details can be found in *Health Statistics Quarterly*¹⁴ and the latest Child Mortality Statistics publication.¹³

2.17 Further information

Requests for further information should be made to the address below.

Vital Statistics Outputs Branch
Centre for Health Analysis and Life Events
Office for National Statistics
Segensworth Road
Titchfield
Fareham
Hants PO15 5RR

Telephone: 01329 444110
E-mail: vsob@ons.gsi.gov.uk

3 Background to mortality data

3.1 Redevelopment of mortality statistics

In the early 1990s, OPCS carried out an extensive redevelopment of its collection and processing systems for population, health and registration data – in particular, for births and deaths. For deaths this included: the progressive computerisation of registration in local offices; the move to a large deaths database to hold all deaths data from 1993; and the introduction of automated coding of cause of death. Further information about these changes is given below, with more details in the annual volume in the DH2 series for 1993 and 1994.¹⁵ Changes to the rules for selecting and coding cause of death brought England and Wales into line with international practice in 1993.

Registration practice

Until the late 1980s the registrar carried out the registration by filling out a form by hand but from 1987 the registration service gradually became computerised. The details from the Medical Certificate of Cause of Death (MCCD) and other particulars supplied by the informant are entered into a computer by the registrar. A copy of the entry in the death register (**Annex B** or **Annex I**) is then printed automatically and the information is stored and sent electronically to ONS for processing.

The deaths databases

In the deaths processing system there are two deaths databases, one for **register** information and the other for **statistical** data. The registration database contains mainly textual information that appears on the death certificate. This corresponds to most of the details supplied by informants to a registrar, available to applicants requesting a copy of the death certificate. The deaths statistical database contains only coded details of each death. When outputs are required, the statistical database can supply information on individual deaths or provide datasets for tabulation. The statistical database is continually updated and amended as further information becomes available.

In 1999, ONS developed a database to facilitate research into deaths related to drug poisoning and to aid the identification of specific substances involved in these deaths. The database currently contains data on all deaths on the annual data files for England and Wales between 1993 and the latest available year, where the underlying cause of death is regarded as resulting from drug-related poisoning, according to the current National Statistics definition. The database covers accidents and suicides involving drug poisoning, as well as poisonings due to drug abuse and drug dependence, but not other adverse effects of drugs.

Two other databases for England and Wales have been compiled by ONS. The first, which contains details of deaths where meticillin-resistant staphylococcus aureus (MRSA) was reported as a contributory factor, provides data from 1993 to the latest available year. The second comprises deaths involving Clostridium difficile (C. difficile) and contains data for 1999 to the latest available year.

Automated cause coding

Since 1993, the majority of ONS mortality data have been coded automatically using the Medical Mortality Data Software (MMDS) developed by the NCHS in the USA. The version in use since January 2002 to date is 2001.02. Specific text terms from the death certificate are converted to ICD codes and then selection and modification rules are assigned to apply the underlying cause of death. Using computer algorithms to apply rules increases the consistency and improves the international and temporal comparability of mortality statistics. The cause coding of deaths certified after inquest is still done manually by experienced coders. This is because the software cannot readily cope with the free format text used by coroners when describing the circumstances of death.

3.2 Use of WHO Rule 3

ICD-9

In general, the main change in introducing automated cause coding was in the interpretation of WHO Rule 3, one of the rules used to select the underlying cause of death. The interpretation of Rule 3 was broadened by OPCS in 1984, so that certain conditions that are often terminal, such as bronchopneumonia (ICD-9 485) or pulmonary embolism (ICD-9 415.1), could be considered a direct consequence of any more specific condition reported. The more specific condition would then be regarded as the underlying cause.

This change in interpretation meant that deaths from certain conditions such as pneumonia declined in 1984, while deaths from conditions often mentioned in part II of the death certificate increased. The change in 1993 was, therefore, to move back to the internationally accepted interpretation of Rule 3 operating in England and Wales before 1984. The effects of moving back to this earlier interpretation of Rule 3 have been discussed elsewhere.^{15, 16, 17}

Deaths assigned to external causes were excluded from the Rule 3 change in 1984 because the procedures for assigning underlying cause of death based on coroners' verdict were unaffected by WHO rules. From 1993 the numbers of deaths from external causes that were certified without inquest rose; these were largely falls and fractures in the elderly (ICD-9 E880-E888). This happened because of the reversion to international practice by following ICD-9 rules, which do not allow external cause deaths to be due to diseases except in a few very specific circumstances, such as drowning due to epilepsy. Before this, and in England and Wales only, deaths from falls were allowed to be certified and coded as due to osteoporosis (ICD-9 733.0).

ICD-10 implementation

The rule that changes cause of death statistics most is Rule 3. In ICD-10 the list of conditions affected by Rule 3 is more clearly defined than in ICD-9 and is also broader in scope. Its impact is to reduce the number of deaths assigned to certain conditions such as pneumonia and to increase the number of deaths assigned to chronic debilitating diseases. In England and Wales, about 20 per cent of deaths mention pneumonia so the effect of the change in Rule 3 is large. However, Rule 3 has very little impact upon those deaths from injury and poisoning and those deaths that are manually coded. Therefore,

the clerical coding of deaths after inquest should be consistent with past practice and so intentional self-harm (suicide), assault and undetermined intent, which are coded based on the verdict of the coroner, do not change as a result of the move to ICD-10.¹¹

3.3 Using cause of death data from 1993 to 2000

The previous sections discuss the effect of two main changes in 1993 in the collective processing of mortality statistics. Other changes affected the way cause of death was coded; these have mainly affected deaths from external causes of injury and poisoning (ICD-9 E800–E999).

Following the introduction of a revised two-page coroner's certificate of cause of death after inquest in May 1993, problems were identified relating to the processing of deaths certified after inquest due to the non-receipt of some data from the second page of the new form that contained additional detail about some accidental deaths. This resulted in more deaths being assigned to residual categories such as 'other and unspecified causes' (ICD-9 E928.9). For this reason the number of deaths coded to suicide and self-inflicted poisoning by motor vehicle gas exhaust (ICD-9 E952.0) declined substantially, while those from suicide and self-inflicted poisoning by other carbon monoxide (ICD-9 E952.1) rose. To resolve this problem, ONS amended its systems and manually coded all deaths that resulted in a coroner's inquest or adjourned inquest. Data were re-coded where necessary for 1993 and 1994. Changes were concentrated in the external causes of the ICD, while the effect on other causes was limited.

Another change which has affected the way cause of death is coded has been the ending of medical enquiries in 1993. When coding the underlying cause of death, certain conditions reported on the death certificate can sometimes only be assigned to very broad categories, for example cancer. Prior to 1993, these cases were followed up with a medical enquiry to the certifier requesting further information in order to assign a more accurate cause classification.

3.4 Legislation

The existing provisions for the registration of deaths and the processing, reporting and analysis of mortality data appear in different legislation that reflects the distinct and separate roles of the Registrar General for England and Wales and the UK Statistics Authority (the preferred name for the Statistics Board). The Registrar General is guided by the following:

- **Population (Statistics) Act 1938:** deals with the statistical information collected at registration
- **Births and Deaths Registration Act 1953:** covers all aspects of the registration of births, stillbirths and deaths
- **Population (Statistics) Act 1960:** makes further provision for collecting statistical detail at registration
- **Registration of Births and Deaths Regulations 1987:** cover further aspects of the registration of births and deaths;

- **Coroners Act 1988:** sets out the procedures to be followed by coroners in handling deaths
- **Stillbirth (Definition) Act 1992:** which altered the definition of a stillbirth to 24 or more weeks completed gestation, instead of the previous definition of 28 or more weeks
- **Deregulation (Stillbirth and Death Registration) Order 1996:** allows for the registration of deaths by declaration
- **National Health Service Act 2006 and National Health Service (Wales) Act 2006** consolidate legislation relating to the health service and separate provision of the health service in Wales from that in England. The Acts require notification of a birth or death to the local Primary Care Trust (Local Health Board in Wales) where the birth or death occurred. Both Acts include provision for the supply of information on individual deaths to the National Health Service by the Registrar General

The UK Statistics Authority is guided by the following:-

- **Registration Service Act 1953:** section 19 requires the UK Statistics Authority to produce annual abstracts of the number of live births, stillbirths and deaths
- **Statistics and Registration Service Act 2007:** (the 2007 Act) transfers some of the statistical functions of the Registrar General, including the production of an annual abstract, to the UK Statistics Authority and the Office for National Statistics (ONS) becomes the executive office of the UK Statistics Authority. The 2007 Act also provides the Registrar General with a power to allow them to disclose any information about a birth, death or a stillbirth to the UK Statistics Authority for statistical purposes. It also enables the UK Statistics Authority to produce and publish statistics relating to any matter

The coming into force of **the Statistics and Registration Service Act 2007** on 1 April 2008 and accompanying machinery of government changes ended the arrangement whereby the National Statistician was concurrently the Registrar General for England and Wales. At the same time the General Register Office (GRO) ceased being part of the Office for National Statistics (ONS) and was moved to the Identity and Passport Service. The National Health Service Central Register (NHSCR) formerly part of ONS also transferred to the NHS Information Centre for Health and Social Care (IC).

The Statistics Board is the legal successor to ONS and inter alia undertakes the former statistical functions of the Registrar General. The responsibility for the production of mortality statistics is now a function of the UK Statistics Authority (the preferred name for the Statistics Board) which is required to produce an annual abstract of mortality statistics in order that the Minister for the Cabinet Office can lay it before Parliament.

3.5 Historical changes in mortality data

Users of this publication should note certain changes to the collection and coding of deaths data over the years, which may affect their interpretation of trends in mortality. These changes include:

- 1979** **Introduction of the Ninth Revision of the International Classification of Diseases.** This replaced the Eighth Revision, which was used from 1968 to 1978. OPCS selected a 25 per cent sample of death certificates for 1978, and coded these to both the Eighth and Ninth Revisions to give a guide to the effect of these changes on specific categories.
- 1981–82** **Industrial action taken by registration officers** affected the quality of information about deaths from injury and poisoning. This action meant that details normally supplied by coroners were not available and the statistics were significantly affected. Figures on injury and poisoning for 1981, with the exception of suicides, must therefore be treated with caution. Categories such as ‘transport accidents’ and ‘homicide’ were significantly understated whereas ‘non-specific accidents’ and ‘undetermined injuries’ were overstated. Statistics relating to nature of injury were less affected by the absence of the coroners’ information. Although industrial action extended into 1982 the coroners’ information was collected retrospectively for that year, so enabling more accurate figures to be produced. However, complete details to help code the cause of death were still unavailable in 1982. This resulted in more deaths than usual being assigned to ‘unspecified’ categories.
- 1984** OPCS decided to amend its **interpretation of WHO Rule 3** in the assignment of underlying cause of death. This amendment is covered in more detail in section 3.2. It resulted in a decrease in the numbers of deaths coded to pneumonia and a few other causes, and an increase in deaths from many other conditions – most of the latter being small increases. The background to this change is given in the annual volume for 1984 in the DH2 series,¹⁷ which includes a table assessing the numerical effects of changes, by underlying cause. Deaths from injury and poisoning were excluded from this exercise.
- 1986** Since January 1986, registrars have recorded the following information on the draft entry form:
- the date when the certifying doctor last saw the deceased alive
 - whether the deceased was seen after death by a medical practitioner
 - whether the death was reported to a coroner, and by whom, and
 - whether the certifying practitioner indicated that death might have been linked to the deceased’s employment
- The first three items had been recorded on the medical certificate for many years for legal and administrative purposes. The fourth resulted from legislation passed in 1985, although it is not well reported or recorded.¹⁸
- 1986** **New stillbirth and neonatal death certificates** were introduced in January 1986. The new neonatal certificate included both maternal and fetal conditions. This means that it is not possible to assign an underlying cause for deaths under 28 days. From 1986, therefore, tables of deaths by cause and age do not include neonates, although the all cause total for neonates is often given. Details of neonatal deaths by cause can be

found in the annual volume on childhood, infant and perinatal mortality statistics, from 2010 Child Mortality Statistics.¹³

- 1993** OPCS decided to **revert to the internationally accepted interpretation of Rule 3** operating in England and Wales before 1984 (see section 3.2).
- 1993** **Redevelopment of OPCS collection and processing systems**, which took effect on published mortality data from January 1993. Changes included:
- the computerisation of registration, with registrars in most local offices entering details on computers and supplying data to ONS on floppy disk
 - the automation of cause of death coding, so that procedures for assigning codes to underlying cause are now automatic for about 80 per cent of all deaths but not used for deaths certified after inquest
 - the use of a dynamic database to hold all deaths data, for easy retrieval of up-to-date information. These and other changes are described in section 4 and (in more detail) in a *Population Trends* article¹⁶
- 1993** **A revised coroner's certificate of cause of death after inquest** was introduced in May 1993, which resulted in less detail for many deaths from injury and poisoning – both for the description of injury sustained and for the classification of some suicides. More information can be found in section 2.8.
- 1993** Ending of **medical enquiries** to obtain more precise information on the underlying cause of death.
- 1997** Provision for **registration of a death by declaration** was introduced in April 1997, whereby details of a death could be supplied to a registrar in a district other than that where the death took place. Analysis shows that this provision is most likely to be used for deaths of infants and for neonatal deaths in particular (see section 2.5).
- 2001** **Introduction of the Tenth Revision of the International Statistical Classification of Diseases** for coding cause of death on 1 January 2001. This replaced the Ninth Revision used from 1979 to 2000. There are some significant differences between the ICD versions. The main differences are:
- a change in format of the code and an expansion in the number of codes used
 - a movement of some diseases and conditions between broad groups called ICD chapters, and
 - changes to the rules governing the selection and coding of the underlying cause of death, especially Rule 3, which has had a large effect (see section 3.2)

ONS coded the 1999 registration dataset to both the Ninth and Tenth Revisions to give a guide to the effect of changes on specific categories of cause of death. The results of this bridge-coding exercise were published in 2002.³ Research specifically examining the effect on injury and poisoning of moving to ICD-10 was published in **Health Statistics Quarterly** 19.¹¹

- 2002** Introduction of the **General Register Office Network (GRONET)** to Register Offices began, allowing for births and deaths registration details to be sent directly to ONS via email.
- 2006** Introduction of **Registration online (RON)** pilot areas enabling registrars to record births, stillbirths, deaths and civil partnerships online instead of using **Registration Service Software (RSS)**.
- 2007** RON was implemented and due to significant performance problems suspended resulting in around half the registrars reverting back to using the previous electronic system, RSS. (see section 4.3)
- 2009** RON was fully implemented on 1 July, 83 per cent of registrations in 2009 were recorded on RON.

4 Quality of mortality data

Mortality statistics in England and Wales are derived from the registration of deaths certified by a doctor or a coroner. The data pass through a number of processes before becoming usable for analysis. These processes are complex, and involve a wide range of people, organisations and computer systems.

Sections 4.1 to 4.10 describe briefly the quality checks and validations carried out in the creation of mortality statistics. They are arranged in chronological order – from the certifier completing a death certificate and the death being registered to the production of routine statistics. To achieve these routine outputs, annual extracts are taken from the deaths database, as described in sections 2.2 and 3.1. These extracts are then used to produce annual tables and files of individual death records for other government departments and health authorities, as provided for by relevant legislation.

4.1 Completing medical certificates of cause of death

For around three-quarters of deaths, one of the doctors involved in the patient's care for the illness from which they died completes a medical certificate of cause of death (MCCD). Many thousands of general practitioners (GPs), hospital consultants, junior doctors in training and doctors in other clinical posts all complete MCCDs. The nature and amount of training they have had in death certification vary greatly. Not all medical schools in the UK include questions on death certification in their exams. However, 'issuing death certificates' is included as a competency that newly qualified doctors should be able to demonstrate during their training in Foundation Years 1 and 2.¹⁹ Doctors already in practice are required to keep their knowledge and skills up to date through continuous professional education. However, there are constant changes in clinical knowledge, practice and guidelines to keep abreast of, so death certification may not often be a priority.

Training materials on death certification developed by ONS in the late 1990s with the help and oversight of a wide range of stakeholders through the ONS Death Certification Advisory Group (DCAG) in the 1990s are available from ONS Titchfield (see section 2.17 for address). These include a short video, '*Death Counts*', an associated training pack including test histories, and pocket cards for distribution to GPs and hospital doctors.

There have been several well publicised proposals for reform of death certification since the Shipman case in 1998.^{20, 21, 22} Legislation implementing the reform of the process of death certification in England and Wales is included in the Coroners and Justice Act 2009, which received Royal Assent on 12 November 2009. This will reform the process of death certification by introducing a single unified system for both burials and cremations and appointing medical examiners to provide an independent scrutiny of the cause of death.

Guidance to doctors completing MCCDs in England and Wales was updated by the ONS Death Certification Advisory Group in June 2005 and again in November 2007. It is available on the General Register Office website (www.gro.gov.uk/Images/B0521%20ONS%20DCAG%20Certifiers%20guidance%20as%20at%2018%20August%2008_tcm69-69976.pdf). The guidance explains best

practice under current legislation, and sets out numerous examples based on recent queries from certifiers and samples of good certification. In 2005 the Department of Health notified all registered doctors of the existence of the new guidance through Chief Medical Officer's (CMO) Update.²³ In 2007 CMO again drew the attention of doctors and senior NHS managers to the guidance in a letter about deaths involving health care associated infections.

Coroners certify about a quarter of all deaths. Coroners can only certify cause of death following a post-mortem by a pathologist, an inquest or both. Training for coroners is organised through the Ministry of Justice. The process of referral to a coroner and how referred deaths are dealt with varies between coroners' areas.

4.2 Registration of the death

As noted in section 1.3, data items other than the cause of death depend largely on information supplied by the informant. For deaths certified after inquest, police officers or other witnesses may supply this information, which cannot later be checked by the registrar. For some items of information, for example occupation, there may be no absolute way of checking its accuracy. For others, validity (age and date of birth), or 'reasonableness' (age and cause of death) may be checked. Some details may also be verified later, for example date of birth, with records held at health service data sources.

4.3 Entry of data

Registration Service Software (RSS)

RSS was rewritten in 1998 and issued to Register Offices in 1999. It was replaced by the RON system on 1 July 2009. The deaths statistical fields used in RSS were validated in three respects:

- a) range:** checking that codes fall into an expected range of values
- b) data type:** checking that text appears where it should, and numeric values appear where they should, and
- c) logic:** cross-checking with values in one or more other fields

Cross-validations are carried out by checking logical consistency between various items recorded by the registrar. These include information collected on type of certification, referral to coroner, and whether a post-mortem was carried out.

Registration Online (RON)

In November 2006, a pilot for an online system of registering life events (RON) commenced in five registration districts. Following the success of this pilot, RON was implemented in most register offices on 26 March 2007. However, as a result of significant performance problems, the system was suspended on 10 April 2007 resulting in around half of registrars reverting back to using the previous electronic system, RSS. From 8 May 2007 almost all register offices were submitting data electronically using either RON or RSS. Any remaining death registrations that were held only on paper at

register offices were later entered onto the RON system by GRO, or by the local registration service. RON was fully implemented in register offices on 1 July 2009. With the introduction of RON, it has become possible to carry out some additional validation checks at the point of registration, for example, validation of address and postcode.

4.4 Other checks made by the Registration Service

Checks are also made on death registration details at various times by registrars, superintendent registrars, and account managers from GRO. They are made on death registration data 'in the field', prior to Quarterly Certified Copies (QCCs) being received at GRO in Southport. QCCs are copies of all entries made in each register and the QCC is used to maintain a central register of events. Prior to July 2009 a number of districts submitted their copies in this historic way, however since then all districts have been required to submit their certified QCCs electronically to GRO, with the electronic copy used to form the central record.

At the time of registration

When someone attends to register a death, the registrar is instructed to make the following checks:

- the death is in their area
- the death occurred within the last 12 months
- the informant is qualified to give information
- the correct medical certificate has been used
- the certificate relates to the correct person
- the certificate has been filled in properly – that is, it is signed, not amended in any way, the doctor's qualifications filled in, the last date seen alive and whether or not the certifier saw the deceased after death is shown
- the death does not need to be referred to the coroner

The registrar then carries out the registration and reviews the recorded detail with the informant before the register page is signed by the informant and registrar. The signed register page is normally a computer generated print, replicating the detail held on computer, but when the computerised system is unavailable it is a handwritten page.

By superintendent registrars and account managers

Superintendent registrars carry out the following quarterly checks:

- the QCC entries agree with each register entry
- the entries appear to be in sequence
- there is a medical certificate/coroner's form to accompany each death entry, as appropriate
- each entry has been signed by an informant (if required) and by the registrar, and
- a general check on any apparent erasure, illegibility etc

Account managers visit registration districts on a cyclical basis and as part of the process will typically include the following inspection activity:

- sitting in on actual registrations to check questioning technique
- examining a sample of register entries and supporting documentation and draft entries
- checking some QCCs against the register
- examination of computerised records held

4.5 Receipt of death registration data at ONS Titchfield

Details of deaths are received from register offices electronically. Routine and automated checks are carried out on each file and the combined data are then loaded on to the deaths database. Regular receipt and diagnostic reports are produced, resulting in weekly contacts with the identified registrars to resolve any problems.

Examples of checks include:

- identification of missing entries, so that death registration details are received in sequence
- checks for duplicate records
- checking for misplaced records, for example, verifying that each registrar is using the register allocated
- for paper records – that date of death and date of registration are in the correct range
- for paper records – records are checked for completeness prior to keying
- checks on registrars whose returns have not been received by the fourth working day after the end of each week

4.6 Validation processes

Once on the database, the data are passed through a series of validation processes which are carried out automatically with any inconsistencies highlighted. Simple validations include examination of dates or employment status to ensure that they are likely. More complicated validations include checks for consistency between dates of birth, death and registration, or between age and marital status.

4.7 Routine checks in Titchfield

All deaths accepted onto the database that need routine coding are identified and coded as required by the Vital Events and Morbidity Processing Branch. The detailed routine coding falls into five main areas:

- postcoding to give usual residence of deceased
- occupation, that is, the occupation of deceased/spouse/civil partner, where age of deceased is under 75; the occupation of the mother and/or father, where age of deceased is under 16
- communal establishment coding for place of death of deceased
- place of birth of deceased, and
- cause of death (see below)

Causes of death are coded either through ACCS (see below) or by a manual process (for example, coroners' inquests). There are also routine checks of cause of death data. Those carried out monthly include:

- checking cause fields against inquest verdict fields for compatibility
- the presence or absence of original and final cause of death fields
- codes for ONS cause groups are present for neonatal deaths, and absent for non-neonatal (see section 2.16)
- validity of suicides at very young ages
- mentioned conditions on death certificate are compatible with sex

Once coding of the cause of death is complete, checks are carried out on variables such as date of death, sex, year of birth, marital status and communal establishments. These checks evolve continuously during exploratory surveillance of data quality, and some of these are later incorporated as routine checks.

4.8 Automated Cause Coding System (ACCS)

ACCS processes data for most deaths (see section 3.1) to derive codes for each medical condition on the certificate and to identify the underlying cause. The accuracy of automated coding is checked regularly within data quality check requirements. Periodical reports on persistent coding problems are referred to a medical epidemiologist. They also provide feedback to NCHS (USA) and authors of the software to highlight areas of concern for the new releases.

4.9 Checks before and after extraction of data for analysis

The first of these are carried out as a final check of what is held on the deaths database before an annual extract of data is taken. These comprise frequency checks for a range of fields, covering age, sex, underlying cause, and area of residence. Also checked are possibly incorrect combinations of fields. Any apparent errors or inconsistencies result in checks of individual cases by coders who make amendments, as required. Some of these checks are also carried out routinely every month.

Further examinations are carried out once the data extract has been taken. They include checks similar to those done before extraction, to ensure that corrections made at that stage were properly carried out. After the annual extract used for mortality analyses has been produced as a dataset in a statistical computing package, a further set of frequency counts and two-way tables are prepared to ensure that no new errors have been introduced at this stage. These checks are to ensure that the frequency distributions are both valid and plausible and broadly similar to those for the previous year's data.

4.10 Checks on routine outputs

At present these include:

- systematic checks of totals (row, column, and other) against known correct figures, such as frequency counts mentioned above or other outputs already accepted, based on similar data. The 'known correct' figures are those extracted from the database and from a SAS dataset. These are checked against each other and against 'accepted as correct' figures from previous years. Staff also refer back to original table specifications, where necessary

- checks of individual cells against correct figures, as above
- checking figures are consistent and plausible, that is, that they are what would be expected compared to the previous year's tables

These checks are carried out by the Primary Mortality Outputs team in Vital Statistics Outputs Branch in consultation with a medical epidemiologist.

References

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Glossary

Accelerated registrations	The process by which a death can be registered at the time of adjournment of an inquest instead of having to await the outcome of criminal proceedings. The late extract is used to analyse these registrations.
ACCS	Automated cause coding system software developed by the National Center for Health Statistics (NCHS).
Age-standardised rates	A statistical measure to allow more precise comparisons between two or more populations by eliminating the effects in age structure by using a 'standard population'.
Annual extract	The dataset taken from the main deaths database from which most of the tabulations in this publication are derived. Sometimes it is referred to as the 'standard' extract; see Late extract.
Assault	The ICD-10 terminology referring to homicide and injuries inflicted by another person with intent to injure or kill, by any means (excluding deaths from legal intervention and operations of war).
Bridge coding	An exercise in which the same group of deaths are independently classified according to two different classifications or coding methods.
Comparability ratios	A measure, expressed as a ratio, ratios indicating the net effect of the change in classification (from ICD-9 to ICD-10) on a particular cause of death.
Coroner	Public official responsible for the investigation of violent, sudden or suspicious deaths.
DCAG	Death Certification Advisory Group.
Declaration	The method by which an informant can register a death in a different district from that in which the death occurred.
Dual coding	The coding of the same data twice, using different methods of coding in order to assess inconsistencies.
Early neonatal deaths	Deaths at ages up to 6 completed days of life.
Epidemiologist	A person concerned with the incidence and distribution of diseases and other factors, including the environment, relating to health.

External cause	Death resulting from accident or violence. An alternative term for the underlying cause of death. ICD codes from Chapter XX; see Secondary causes.
GRO	General Register Office, located in Southport, England.
Hierarchical classification	ONS's method for classifying the causes of neonatal deaths and stillbirths using groups of ICD codes referred to as 'ONS cause groups'.
HSQ	Health Statistics Quarterly (An ONS quarterly publication).
IC	The Information Centre for Health and Social Care.
ICD	International Classification of Diseases.
Inquest	Inquiry into the cause of an unexplained, sudden or violent death held by a coroner.
IPS	Identity Passport Service
Late extract	The dataset taken from the main deaths database sometime after the annual extract in order to capture the many delayed registrations that arise from deaths due to injury and poisoning. It provides the most complete dataset from which analyses are made; see Annual extract.
MCCD	Medical Certificate of Cause of Death.
Modification rules	Rules used in ICD-10 applied rules to select the correct underlying cause of death.
MMDS	Medical Mortality Data Software.
NCHS	National Center for Health Statistics, USA, who developed ACCS.
Neonatal	Relating to infants aged under 28 days.
NHSCR	National Health Service Central Register.
NHSIC	The Information Centre for Health and Social Care.
ONS	Office for National Statistics.
OPCS	Office of Population Censuses and Surveys – joined with the Central Statistical Office to become ONS in 1996.
Population Trends	An ONS quarterly publication.
QCC	Quarterly Certified Copy. Copies made of each Register, sent to the GRO at Southport.

Registrar	Statutory officer responsible for the registration of births, deaths and marriages.
Registrar General	Statutory appointment with responsibility for the administration of the registration Acts in England and Wales, and other related functions as specified by the relevant legislation.
Registration officer	Generic term for registrar, superintendent registrar and additional registrars.
Reports	Short articles on cause of death using registration data soon after they are available (in HSQ and Population Trends).
RON	Registration Online. A web-based system which enables registrars to record births, stillbirths, deaths and civil partnerships online.
RSS	Registration Service Software.
Rule 3	One of the rules used to select the correct underlying cause of death; its different use in ICD-10 results in significant differences from ICD-9 for some causes; see Selection rules.
SAS	Statistics software package used for tabulation.
Secondary cause	The nature of injury, or main injury, that caused death (where the underlying cause is assigned to an external cause from Chapter XX in ICD-10, V01 to Y89). Nature of injury codes are taken mostly from Chapter XIX (prefixes S and T).
Selection rules	Rules used in the ICD to determine the correct selection of the underlying cause of death; see Rule 3.
Sequela (sequelae)	A condition (or conditions) reported as the result of a previous injury – a 'late effect' (under ICD-9) or that occurs as a late effect one year or more after the originating event.
Standard population	Used in the calculation of the age-standardised death rates; an element of the population (such as age and sex) is 'held constant' to control its effect, e.g. the European Standard.
Stillbirth	Refer to the Stillbirth (Definition) Act 1992; a child born after 24 or more weeks completed gestation who did not show any signs of life at any time after being born.
Superintendent registrar	Statutory officer with responsibilities relating to births, deaths, marriage and other registration functions, as specified in the relevant legislation.

UK Statistics Authority's Code of Practice for Official Statistics	The principles and protocols followed and upheld by all those involved in producing National Statistics. Replaces the NS Code of Practice.
Underlying cause of death	The cause of death selected for primary tabulation based on ICD rules.
VEMP	Vital Events and Morbidity Processing (at the ONS).
VSOB	Vital Statistics Outputs Branch (at the ONS).
WHO	World Health Organisation.

BIRTHS AND DEATHS REGISTRATION ACT 1953
 (Form prescribed by Registration of Births and Deaths Regulations 1987)
MEDICAL CERTIFICATE OF CAUSE OF DEATH
 For use only by a Registered Medical Practitioner WHO HAS BEEN IN ATTENDANCE during the deceased's last illness, and to be delivered by him forthwith to the Registrar of Births and Deaths.

Registrar to enter
No. of Death Entry
.....

Name of deceased
 Date of death as stated to me day of Age as stated to me
 Place of death
 Last seen alive by me day of

- 1 The certified cause of death takes account of information obtained from post-mortem.
 - 2 Information from post-mortem may be available later
 - 3 Post mortem not being held.
 - 4 I have reported this death to the Coroner for further action.
(See overleaf)
- Please rip across here
appropriately
digitally and either
a b c*
- Seen after death by me.
 Seen after death by another medical practitioner but not by me
 Not seen after death by a medical practitioner.

<p>CAUSE OF DEATH</p> <p><i>The condition the right to the underlying Cause of Death should appear in the lower completed line of Part I.</i></p>	
<p>I (a) Disease or condition directly leading to death†</p> <p>(b) Other disease or condition, if any, leading to: I(a)</p> <p>(c) Other disease or condition, if any, leading to: I(b)</p> <p>II Other significant conditions CONTRIBUTING TO THE DEATH but not related to the disease or condition causing it</p>	<p><i>These particulars not to be entered in death register</i></p> <p>Approximate interval between onset and death</p> <p>.....</p> <p>.....</p>

The death might have been due to or contributed to by the employment followed at some time by the deceased Please tick where applicable

† *This does not mean the mode of dying, such as heart failure, asphyxia, asthenia, etc: it means the disease, injury, or complication which caused death.*

I hereby certify that I was in medical attendance during the above named deceased's last illness, and that the particulars and cause of death above written are true to the best of my knowledge and belief.

Signature..... Qualifications as registered by General Medical Council.....
 Residence Date.....

For deaths in hospital: Please give the name of the consultant responsible for the above-named as a patient

Draft entry form used in the current system for registering deaths (Form 310Rev)

DEATH		Register No.	Entry No.
Registration district	District & S. Dist. Nos.	Administrative area	
Sub-district			
1. Date and place of death (date)	: : .		
2. Name and surname	3. Sex	4. Maiden surname of woman who has married	
5. Date and place of birth (date)			
6. Occupation and usual address			
7. (a) Name and surname of informant	(b) Qualification		
(c) Usual address			
8. Cause of death I(a)	II (b) (c)		
Certified by		Signature of Informant	
9. I certify that the particulars given by me above are true to the best of my knowledge and belief		Signature of Informant	
10. Date of registration	11. Signature of registrar		
O NHS No.	Q (age)		

DEATH		District & SD Nos.	Register No.
D	(i)		Date of registration
E	<input type="checkbox"/> * 6 months or over	<input type="checkbox"/> * Under 6 months	(ii)
(iii)	(iv)		
Z	CONFIDENTIAL PARTICULARS		
The particulars below, required under the Population (Statistics) Acts, will not be entered in the register. This confidential information will be used only for the preparation and supply of statistical information by the Registrar General.			
At date of death deceased was*			
Single			
(If married insert date of birth of spouse)			
Married <input type="checkbox"/> Day <input type="checkbox"/> Month <input type="checkbox"/> Year <input type="checkbox"/>			
Widowed <input type="checkbox"/>			
Divorced <input type="checkbox"/>			
Not known <input type="checkbox"/>			
G(a) Deceased or \dagger Mother	POSTCODE		
H(a)* 1 2 3 4 5			
G(b) Husband or \dagger father	F* title		
H(b)* 1 2 3 4 5	(vii) (viii)		
(iv)	R Last Seen alive Day Month Year		
S * Seen or Not Seen after death a b c			
T Referred to Coroner by 1 Doctor 2 Registrar			
B SD * Enq * Yes No (viii)			
3 4 5 ME 2			
N Post Mortem a b c z e			
W * Employment <input type="checkbox"/>			
M (k) Edit control			

\dagger If deceased is under 16 years of age
* Tick as appropriate

Annex C Coroner's certificate after inquest (Form 99(REV) A &B - white)

CORONER'S CERTIFICATE AFTER INQUEST
furnished under section 11(7) of the Coroner's Act 1988

To be completed by Registrar	
Register No.	
Entry No.	

To the

Registrar of Births and Deaths

Inquest held on _____
at _____
Was a post-mortem held? _____

PART I PARTICULARS OF DECEASED (Not still born - see separate Form 99A)

1 Date and place of death	
2 Name and surname	3 Sex
	4 Maiden surname of woman who has married
5 Date and place of birth	
6 Occupation and usual address	
Cause of death	I(a) (b) (c) II Verdict

SPECIMEN

PART II VISITING FORCES { *under section 7 of the Visiting Forces Act 1952
The inquest was adjourned on _____ *and has not been resumed

PART III BURIAL/CREMATION †Enter Order for Burial/Certificate E for Cremation
I have issued †
on _____
to _____
of _____

PART IV MARITAL CONDITION etc. All persons aged 16 and over
Insert appropriate number in box. 1 Single 2 Married 3 Widowed 4 Divorced 5 Not Known

Day	Month	Year
<input type="text"/>	<input type="text"/>	<input type="text"/>

If married enter date of birth of surviving spouse

I certify that the findings of the inquest were as above.

Date _____ Signed _____

Name _____

Appointment _____

Jurisdiction _____

*Delete as necessary

Annex C – continued

Name and surname of deceased 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">To be completed by Registrar</th> </tr> <tr> <td style="width: 80%;">District & SD Nos.</td> <td></td> </tr> <tr> <td>Register No.</td> <td></td> </tr> <tr> <td>Entry No.</td> <td></td> </tr> </table>	To be completed by Registrar		District & SD Nos.		Register No.		Entry No.	
To be completed by Registrar									
District & SD Nos.									
Register No.									
Entry No.									
PART V ACCIDENT OR MISADVENTURE (including deaths from neglect or from anaesthetics)									
<p>1. Place where accident occurred†</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> 0. Home 1. Farm 2. Mine or quarry 3. Industrial place or premises 4. Place of recreation or sport </td> <td style="width: 50%; border: none;"> 5. Street or highway 6. Public building 7. Resident institution 8. Other specified place 9. Place not known </td> </tr> </table>		0. Home 1. Farm 2. Mine or quarry 3. Industrial place or premises 4. Place of recreation or sport	5. Street or highway 6. Public building 7. Resident institution 8. Other specified place 9. Place not known						
0. Home 1. Farm 2. Mine or quarry 3. Industrial place or premises 4. Place of recreation or sport	5. Street or highway 6. Public building 7. Resident institution 8. Other specified place 9. Place not known								
<p>2. To be completed for all persons aged 16 and over When injury was received deceased was†</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 80%; border: none;"> 1. On way to, or from work 2. At work 3. Elsewhere </td> <td style="width: 20%; border: none; text-align: center;"> <input type="checkbox"/> </td> </tr> </table>		1. On way to, or from work 2. At work 3. Elsewhere	<input type="checkbox"/>						
1. On way to, or from work 2. At work 3. Elsewhere	<input type="checkbox"/>								
<p>3. Details of how accident happened:</p> <div style="text-align: center; font-size: 48px; transform: rotate(-45deg); opacity: 0.5;"> SPECIMEN </div>									
<p>4. If motor vehicle incident, deceased was†</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> 0. Driver of motor vehicle other than motor cycle 1. Passenger in motor vehicle other than motor cycle 2. Motor cyclist 3. Passenger on motor cycle 4. Occupant of tram car </td> <td style="width: 50%; border: none;"> 5. Rider of animal; occupant of animal-drawn vehicle 6. Pedal cyclist 7. Pedestrian 8. Other specified person 9. Not known </td> </tr> </table>		0. Driver of motor vehicle other than motor cycle 1. Passenger in motor vehicle other than motor cycle 2. Motor cyclist 3. Passenger on motor cycle 4. Occupant of tram car	5. Rider of animal; occupant of animal-drawn vehicle 6. Pedal cyclist 7. Pedestrian 8. Other specified person 9. Not known						
0. Driver of motor vehicle other than motor cycle 1. Passenger in motor vehicle other than motor cycle 2. Motor cyclist 3. Passenger on motor cycle 4. Occupant of tram car	5. Rider of animal; occupant of animal-drawn vehicle 6. Pedal cyclist 7. Pedestrian 8. Other specified person 9. Not known								
<p>5. Interval between injury and death†</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> 1. Less than one year </td> <td style="width: 50%; border: none;"> 2. One year or more </td> </tr> </table>		1. Less than one year	2. One year or more						
1. Less than one year	2. One year or more								

†Please insert appropriate number in box

Annex D

Notification to the registrar by the coroner that he does not consider it necessary to hold an inquest - no post-mortem held (Form 100A - salmon pink)

NOTIFICATION TO THE REGISTRAR BY THE CORONER that he does not consider it necessary to hold an inquest	To be completed by Registrar	
	Register No.	
FORM A - NO POST-MORTEM HELD	Entry No.	

To the Registrar of Births and Deaths

PARTICULARS OF THE DECEASED

Name and Surname	SPECIMEN	
Sex		
Age (or Date of Birth)		
Date of Death		
Place of Death		
Cause of Death		I (a)
		(b)
		(c)
		II
(Where this notification relates to a stillborn child, this should be stated)		

CORONER'S CERTIFICATE

	The circumstances connected with the death of the above person have been reported to me and I do not consider it necessary to hold an inquest
Date	
Signed	
Name	
Appointment	
Jurisdiction	

Annex E Notification to the registrar by the coroner that he does not consider it necessary to hold an inquest - post-mortem held (Form 100B - pink)

NOTIFICATION TO THE REGISTRAR BY THE CORONER that he does not consider it necessary to hold an inquest FORM B - POST-MORTEM held under Section 19 of the Coroner's Act 1988	To be completed by Registrar	
	Register No.	
	Entry No.	

To the Registrar of Births and Deaths

PARTICULARS OF THE DECEASED

Name and Surname	
Sex	
Age (or Date of Birth)	
Date of Death	
Place of Death	

CORONER'S CERTIFICATE

Cause of Death	<p>I certify that a post-mortem examination of the body of the above person was made by the pathologist named below, whose report disclosed that the cause of death was:</p> <p>I (a)</p> <p>(b)</p> <p>(c)</p> <p>II</p>
Pathologist	<p>and I am satisfied that an inquest is unnecessary (Where this notification relates to a stillborn child, this should be stated)</p>

SPECIMEN

CERTIFICATE FOR CREMATION (Details to be entered if Certificate issued)

Issued on	
To	
Address	

Is a histological or bacteriological examination to be made?
--

Date	
Signed	
Name	
Appointment	

Annex F Coroner's certificate after inquest adjourned (Form 120A&B - yellow)

CORONER'S CERTIFICATE AFTER INQUEST ADJOURNED
furnished under section 16(4) of the Coroner's Act 1988

To be completed by Registrar	
Register No.	
Entry No.	

To the Registrar of Births and Deaths

Inquest held on
at
Was a post-mortem held?

PART I PARTICULARS OF DECEASED (Not still born - see separate Form 99A)

1 Date and place of death	
2 Name and surname	3 Sex
	4 Maiden surname of woman who has married
5 Date and place of birth	
6 Occupation and usual address	
Cause of death	I(a)
	(b)
	(c)
	II

SPECIMEN

PART III BURIAL/CREMATION †Enter Order for Burial/Certificate E for Cremation

I have issued†
on
to
of

PART IV MARITAL CONDITION etc. All persons aged 16 and over

Insert appropriate number in box. 1 Single 2 Married 3 Widowed 4 Divorced 5 Not Known

Day	Month	Year

If married enter date of birth of surviving spouse

I certify that the findings of the inquest were as above.

Date
Name
Appointment
Jurisdiction

Signed

*Delete as necessary

Annex F – continued

Name and surname of deceased

To be completed by Registrar	
District & SD Nos.	
Register No.	
Entry No.	

PART V INCIDENT LEADING TO DEATH (Information for the statistical purposes of ONS only)	
If motor vehicle incident, deceased was†	
0. Driver of motor vehicle other than motor cycle 1. Passenger in motor vehicle other than motor cycle 2. Motor cyclist 3. Passenger on motor cycle 4. Occupant of tram car	5. Rider of animal; occupant of animal-drawn vehicle 6. Pedal cyclist 7. Pedestrian 8. Other specified person 9. Not known
	<input style="width: 40px; height: 20px;" type="checkbox"/>

†Please insert appropriate number in box

SPECIMEN

Annex G Coroner's certificate (reporting on action subsequent to an adjourned inquest) (Form 121 - blue)

Certificate sent to registrar on *by post/otherwise than by post

CORONERS' CERTIFICATE
furnished under section 16(5) or 16(7)(b) of the Coroners Act 1988

To be completed by Registrar	
Registrar	
Dist & Sub. Dist. Nos.	
Register No.	

To the registrar of births and deaths for the sub-district of
in respect of the inquest touching the death of
at (place of death).....

which was adjourned under Section 16(1) of the Coroners Act 1988 on the.....

I hereby certify as follows:

***Part A**
The inquest has not been resumed.

* (1) No criminal proceedings were instituted in respect of this death.
*(But criminal proceedings were instituted in the case of the associated death on
of)
OR

* (2) Criminal proceedings were instituted on a charge of
.....
As a result of these proceedings the defendant was
.....
OR

* (3) Criminal proceedings were terminated by
.....

***Part B**
The inquest was resumed on

(1) The finding of the inquest as to the cause of death:
*(a) was as stated in my certificate furnished under Section 16(4) of the Coroners Act 1988, OR
*(b) was.....
.....
.....
(please state cause of death as found at resumed inquest)

* (2) No criminal proceedings were instituted in respect of this death.
*(But criminal proceedings were instituted in the case of the associated death on
of)
OR

* (3) Criminal proceedings were instituted on a charge of
.....
and the outcome was
.....
.....

Date Signature

HM Coroner for
*Delete as necessary

Annex H Declaration of Particulars for the Registration of a Death

BIRTHS AND DEATHS REGISTRATION ACT 1953, Section 23A

DECLARATION of PARTICULARS for the REGISTRATION of a DEATH

I, _____, being a person qualified under the Births and Deaths Registration Act 1953 to give information for the registration of the death of the undermentioned, DO SOLEMNLY DECLARE that the particulars below are those which are required to be registered concerning such death, according to the best of my knowledge and belief.

1. Date and place of death	
2. Name and surname	3. Sex
	4. Maiden surname of woman who has married
5. Date and place of birth	
6. Occupation and usual address	
7. (a) Name and surname of informant	(b) Qualification
(c) Usual address	
8. Cause of death	

SPECIMEN

And I make this declaration solemnly and deliberately, in pursuance of Section 23A of the Births and Deaths Registration Act 1953,

Signature Date
 Signed and declared by the above }
 named declarant in the presence of }Registrar of Births and Deaths
 Sub-districtDistrict
 Death registered by me at Entry No.Registrar
 Sub-districtDistrict

NOTICE: By Section 4 of the Perjury Act 1911 it is an offence wilfully to make any false declaration for the purposes of any Act relating to the registration of births and deaths.

Annex I Draft entry form used by registrars for registering deaths online (Registration online) (Form 310 (RON))

DEATH

Registration district: _____ Entry No.: _____
 Administrative area: _____

Sub-district: _____

1. Date and place of death: _____

2. Name and surname: _____
 3. Sex: _____
 4. Maiden surname of woman who has married: _____

5. Date and place of birth: _____

6. Occupation and usual address: _____

7. (a) Name and surname of informant: _____
 b) Qualification: _____

(c) Usual address: _____

8. I certify that the particulars given by me above are true to the best of my knowledge and belief: _____

9. Cause of death: _____
 Signature of informant: _____

10. Date of registration: _____
 11. Signature of registrar: _____

Register No. _____
 System No. _____

Draft Statistical Information - Death

District & Sub-district number	Register Number	Entry Number
Age	NHS Number	
Y M W D	Certified YES NO	
What number has been circled on the MCCD		
1 2 3 4	A B C	none
Seen or not seen after death		
YES NO	Last seen alive date	
Employment related		
Consultant's Name		
Referred to Coroner		
NOT REFERRED	REFERRED BY DOCTOR	REFERRED BY REGISTRAR
YES NO	Length of stay UNDER 6 MONTHS OVER 6 MONTHS	NOT KNOWN
Coroner's post mortem held		
YES NO	NOT KNOWN	
Did the deceased live in a communal establishment		
YES NO		
Duration Cause 1a		
Duration Cause 1c		
Duration Cause 1b		
Duration Cause II		
Deceased's country of birth		
E W	NON UK N/A	Spanish National
YES NO		
Postcode - Space 1		
Postcode - Space 7c		
Postcode - Space 6		
Postcode -		

Confidential Particulars

The particulars below, required under the Population (Statistics) Act, will not be entered into the register. This confidential information will be used only for the preparation and supply of statistical information by the Registrar General.

At date of death deceased was	Single	Married	Widowed	Divorced	Civil Partner	Surviving Civil Partner	Civil Partnership Dissolved	Not Known	Refused
If married date of birth of surviving spouse									
If in a civil partnership enter date of birth of surviving civil partner									
Reason for non completion (if applicable)									
NOT KNOWN REFUSED									

Voluntary Statistics

Deceased's or Mother's industry and employment															
Industry	Spouse/Civil Partner's or Father's industry and employment														
Reason for non completion (if applicable)	NOT KNOWN	REFUSED	NO GAINFUL EMPLOYMENT	Reason for non completion (if applicable)	NOT KNOWN	REFUSED	NO GAINFUL EMPLOYMENT	Reason for non completion (if applicable)	NOT KNOWN	REFUSED					
Employment status	1	2	3	4	5	6	7	Employment status	1	2	3	4	5	6	7

* If the deceased was under 16 years of age.

Other Comments

Previously registered on: _____ Register No.: _____ Entry No.: _____
 GRO Reference number: _____ System No. of previous entry (if applicable): _____

SPECIMEN

SPECIMEN

DDA11700

DD11425