

Coding cause of death in the United Kingdom

International Classification of Diseases (ICD)

Across the world, cause of death is coded using the International Classification of Diseases or ICD. The ICD classifies diseases into broad groups known as chapters and its worldwide use enables numbers of deaths from different causes to be compared both between countries and over time. This classification was first introduced in the late nineteenth century and has been regularly updated as clinical knowledge about diseases and their aetiology changes. The World Health Organisation (WHO) has co-ordinated these revisions for many years.

The most recent revision is ICD-10 and was introduced for coding deaths in England & Wales in 2001, in Scotland in 2000 and in Northern Ireland in 2001. Prior to these dates, ICD-9 had been in use across the UK since 1979. Each time the ICD has been revised there have 'step' changes in the numbers of deaths coded to different diseases:

- Coding rules are introduced or changed affecting the ways that deaths are coded;
- New diseases or categories are introduced leading to a change in the number assigned to the previously existing disease codes;

Thus, some changes in the numbers of deaths attributed to diseases are due to artefacts in the coding system.

How is ICD-10 different?

The introduction of ICD-10 is the biggest change in the ICD for more than 50 years. The first character, representing the chapter is now alphabetic which has given the opportunity for a big expansion in the number of available codes. This has enabled both coding of recently recognised diseases and coding of more detail on existing conditions. There has also been some re-organisation of the Chapters, with groups of diseases moving from one chapter to another to reflect current knowledge in their aetiology and pathology. Some diseases have now been given their own code rather than being a sub-category of a related condition. The other change which has had a major impact on the coding in ICD-10 is the changes in the rules for selecting cause of death from the death certificate. The number of coding rules has been reduced from nine to five in ICD-10. These changes have had greater impact on some diseases than others.

Rule 3

Rule 3 is an ICD-9 coding rule that has continued, with clarifications, in ICD-10. It is the changes to this Rule that have had a particularly big impact on respiratory deaths. Rule 3 allows a condition which is reported in either Part I or Part II of the death certificate (*see Box 1 overleaf*) to take precedence over the reported underlying cause of death (UCD), if the UCD is obviously a direct consequence of the former. In ICD-9 this list of conditions was left up to the individual coders or countries, leading to variations in its interpretation. However, in ICD-10, Rule 3 has been widened to specifically mention pneumonia and bronchopneumonia:

"Pneumonia and bronchopneumonia may be accepted as complications of any disease. In particular, bronchopneumonia should be assumed to be an obvious consequence of wasting diseases, ... and diseases causing paralysis, ... as well as communicable diseases and non-trivial injuries."

Early studies showed that the strict usage of this guidance led to an unreasonably large decrease in the number of deaths assigned to pneumonia. WHO therefore issued revised guidance including an agreed list of conditions, identified by their ICD-10 code, to which Rule 3 applies, which helped to reduce these large changes.

In the UK many death certificates, especially for the elderly, mention pneumonia or bronchopneumonia in Part I and other major chronic and degenerative diseases in Part II. Thus, the effect of this new interpretation of Rule 3 has led to a decrease in the numbers of deaths assigned to pneumonia and an increase in the numbers assigned to strokes, neurological diseases and other chronic conditions.

Box 1: Medical certificate of cause of death

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. Seen after death by me.

2 Information from post-mortem may be available later. Seen after death by another medical practitioner but not by me

3 Post mortem not being held. Not seen after death by a medical practitioner.

4 I have reported this death to the Coroner for further action. Not seen after death by a medical practitioner.

(See overleaf)

CAUSE OF DEATH
The condition thought to be the 'Underlying Cause of Death' should appear in the completed line of Part I.

I (a) Disease or condition directly leading to death†

(b) Other disease or condition, if any, leading to: I(a)

(c) Other disease or condition, if any, leading to: I(b)

II Other significant conditions CONTRIBUTING TO THE DEATH but not related to the disease or condition causing it

These particulars not to be entered in death register

Approximate interval between onset and death

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, asthma, 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

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Medical Certificate of cause of death

Figure 1

43 National Statistics

Source: Health Statistics Quarterly 08, Winter 2000, ONS

Box 2 gives two examples of how the underlying cause of death is coded using ICD-9 and ICD-10. Part I should list the conditions which led directly to death, so that the disease which started the sequence is in the lowest used line of Part I. This is usually taken to be the underlying cause of death. Any other significant conditions which have contributed to the death are listed in Part II.

Box 2: Rule 3 and coding cause of death in ICD-9 and ICD-10

Cause of death certificate

- I a Pneumonia
- b
- c
- II Parkinson's disease

Underlying cause of death assigned in

ICD-9	486	Pneumonia, organism unspecified
ICD-10	G20	Parkinson's disease

Cause of death certificate

- I a Respiratory failure
- b Bronchopneumonia
- c
- II Bronchogenic carcinoma

Underlying cause of death assigned in

ICD-9	485	Bronchopneumonia
ICD-10	C34.9	Malignant neoplasm of bronchus/lung, unspecified



Source: Health Statistics Quarterly 08, Winter 2000, ONS

ICD-10 and respiratory disease

Most respiratory diseases are coded together in the respiratory chapter, with the initial J. These include acute respiratory infections, pneumonia, influenza, bronchitis, emphysema, COPD, asthma and pneumoconiosis. Other respiratory diseases such as tuberculosis, respiratory cancers and cystic fibrosis are coded in other chapters. In ICD-10, there are also some new respiratory codes: for example, pleural mesothelioma used to be coded with cancer of the pleura and cystic fibrosis used to be a sub-code of 'Other and unspecified disorders of metabolism'. A full list of respiratory codes for ICD-10 can be found in box 3 (overleaf) and on our website.

Bridge coding exercise

To look at how ICD-10 affected the coding of deaths in England and Wales, National Statistics carried out a bridge coding exercise on the 1999 England and Wales deaths data. All deaths registered in 1999 were independently coded to both ICD-9 and ICD-10. This showed that about 95% of deaths remained in similar chapters in ICD-10, but there were some big movements in and out of Chapters. This reflected both changes in classification of particular causes and changes in how the underlying cause of death was selected from the death certificate. Further information on the results from this bridge coding exercise can be found in our companion factsheet on the effects of moving to ICD-10 for coding mortality (LAIA Factsheet 2008/1). Similar bridge coding exercises were carried out by Scotland on their 1999 deaths and by Northern Ireland on their 2000 deaths. Results for these can be found on the General Register Office for Scotland website and the Northern Ireland Statistics and Research Agency website (see sources below).

Useful websites

ICD-10 for mortality: www.statistics.gov.uk/about/classifications/icd10/default.asp

General Register Office for Scotland: www.gro-scotland.gov.uk

Annual Reports: www.gro-scotland.gov.uk/statistics/publications-and-data/annual-report-publications/index.html

The bridge coding exercise for Scotland is covered in Appendix 2 of the 2000 Annual Report.

Northern Ireland Statistics and Research Agency: www.nisra.gov.uk

Annual Reports: www.nisra.gov.uk/demography/default.asp22.htm

The bridge coding exercise for Northern Ireland is covered in Appendix 6 of the 2003 Annual Report.

World Health Organisation ICD: www.who.int/classifications/icd/en/

Box 3: Respiratory diseases and conditions and their ICD-10 codes**Respiratory chapter**

J00-J06	Acute upper respiratory infections
J10, J11	Influenza
J12-J18	Pneumonia
J20-J22	Other acute lower respiratory infections
<i>J20, J21</i>	<i>Acute bronchitis and bronchiolitis</i>
J30-J39	Other diseases of the upper respiratory tract
J40-J47	Chronic lower respiratory diseases
<i>J40</i>	<i>Bronchitis, not specified as acute or chronic</i>
<i>J41, J42</i>	<i>Chronic bronchitis</i>
<i>J43</i>	<i>Emphysema</i>
<i>J44</i>	<i>Other chronic obstructive pulmonary disease</i>
<i>J45</i>	<i>Asthma</i>
<i>J46</i>	<i>Status asthmaticus</i>
<i>J47</i>	<i>Bronchiectasis</i>
J60-J70	Lung diseases due to external agents (pneumoconioses)
J80-J99	Other respiratory disease

Tuberculosis

A15, A16	Respiratory tuberculosis
A19	Miliary tuberculosis
A31.0	Infection due to other mycobacteria (pulmonary)
B90	Late effects of tuberculosis

Cancers of the respiratory system

C30, C31	Nasal cavities, middle ear and accessory sinuses
C32	Larynx
C33	Trachea
C34	Bronchus and lung
C38.4	Pleura
C39	Other and ill-defined sites in the respiratory system and intrathoracic organs
C45	Mesothelioma
D02	Carcinoma in situ of middle ear and respiratory system
D14, D15	Benign neoplasms of middle ear, respiratory system, other & unspecified intrathoracic organs

Pulmonary circulatory disease

I26	Pulmonary embolism
I27	Other pulmonary heart disease
I28	Other diseases of pulmonary vessels

Perinatal conditions and congenital malformations

P20-P28	Respiratory disorders specific to the perinatal period
Q31-Q34	Congenital anomalies of the respiratory system

Other respiratory diseases and conditions

D86	Sarcoidosis
E84	Cystic fibrosis
G47	Sleep disorders
<i>G47.3</i>	<i>Sleep apnoea</i>

Symptoms and signs involving the respiratory system

R05	Cough
R06	Abnormalities of breathing
R07	Pain in throat and chest
R09	Other symptoms and signs involving the circulatory and respiratory systems



Source: World Health Organisation