Definition of avoidable mortality

Background

The Office for National Statistics (ONS) consulted on proposed definitions of avoidable mortality between 16 February and 12 April 2011. The aim of this consultation was to seek the views of statistics users, academics and experts with regard to the new definitions that were proposed by ONS. ONS received 20 responses to this consultation and a summary of these responses was published on ONS’s website in August 2011. The final definition of avoidable mortality and the list of causes considered to be avoidable are presented here. This definition will be used to produce an indicator of potentially avoidable mortality in England and Wales, which will be made available annually in a statistical bulletin. The first bulletin will be published on 9th May 2012 and will contain data for 2001-2010.

The Concept of Avoidable Mortality

The basic concept of avoidable mortality is that deaths caused by certain conditions, for which effective public health and medical interventions are available, should be rare and ideally, should not occur. This concept was based on work first carried out by Rustein et al, published in 1976; but despite a great deal of interest and significant work carried out on this topic, there is still little consensus over the precise definition of avoidable mortality.

One of the main difficulties in producing an indicator of avoidable mortality is the selection of the causes of death for inclusion. There is limited evidence on which to base the selection, and the choices are heavily influenced by the persons making the selection, so any list of causes should be viewed with caution. A recent study funded by the European Union, ‘Avoidable mortality in the European Union: Towards better indicators for the effectiveness of health systems’ (AMIEHS) included a substantial piece of work to determine the best method for selecting conditions to include in a list of avoidable causes of death. Using the Delphi method to form an overall opinion from a group of experts, the study concluded that it was not possible to reach a consensus of opinion for all but a small number of conditions.

While a particular condition can be considered to be avoidable, this does not mean that every death caused by this condition could be prevented. In producing an indicator of avoidable mortality, the precise nature of each death, such as the age of the patient, the extent of disease progression at diagnosis, or the existence of other medical conditions, is not taken into account.

Due to the differing priorities in healthcare seen internationally, and the differences in incidence of some conditions, it is not envisaged that the list of causes and definition of avoidable mortality presented here will be useful for making comparisons with countries outside of the United
Definition of avoidable mortality

Kingdom. An indicator of amenable mortality, based on the widely used Nolte and McKee (2004) definition is currently produced by the NHS Information Centre for Health and Social Care, while the AMIEHS project produced an Atlas of Amenable Mortality, which will promote international comparability.

It is anticipated that the main use that will be made of statistics on avoidable mortality is as an indicator to help to assess the quality and performance of healthcare and public health policies. Mortality from causes considered amenable to healthcare is an overarching indicator for preventing people dying prematurely in the new NHS Outcomes Framework produced by the Department of Health. Mortality from causes considered preventable is also included in the Department of Health’s Public Health Outcomes Framework.

Limitations of an indicator of avoidable mortality

Studies carried out across the European Union (AMIEHS, 2011) and in Scotland (Grant et al, 2006), suggest that changes in the mortality rate for causes of death considered avoidable are often not linked to healthcare innovation. The AMIEHS study found few associations between specified innovations in healthcare and changes in mortality and Grant et al found a strong correlation between amenable mortality rates and deprivation. Furthermore, analysis of avoidable mortality through time does not take into account changes in disease incidence throughout the period. This means that if there was a sudden increase in the incidence of a particular condition, and a subsequent increase in mortality rate for this condition, this might be interpreted mistakenly as a decrease in the quality of the healthcare provided. An indicator of avoidable mortality may prove useful in the identification of possible areas for improvement in the healthcare system but great care should be taken if the statistics are to be used to monitor the performance of healthcare systems or policy through time.

There is also likely to be a substantial time lag between the introduction of a public health policy or improved healthcare services and a corresponding reduction in avoidable mortality. The AMIEHS project (2011) looked at the association between the introduction of healthcare innovations and mortality trends, and found that the average time lag between the introduction of a new healthcare innovation and a decline in mortality was 7 years. This time lag, which includes the time taken for the innovation to become widely used for all patients as well as the time taken for mortality to decline, means that statistics on avoidable mortality are unlikely to provide an immediate measure of the success of medical innovations.
Definition of Avoidable Mortality

The final definitions that ONS will use to compile statistics on avoidable mortality are shown in Box 1 below. These definitions have been amended slightly in response to comments received as part of the consultation.

**Box 1. Proposed conceptual definitions**

<table>
<thead>
<tr>
<th><strong>Amenable mortality</strong></th>
<th>A death is amenable if, in the light of medical knowledge and technology at the time of death, all or most deaths from that cause (subject to age limits if appropriate) could be avoided through good quality healthcare.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preventable mortality</strong></td>
<td>A death is preventable if, in the light of understanding of the determinants of health at the time of death, all or most deaths from that cause (subject to age limits if appropriate) could be avoided by public health interventions in the broadest sense.</td>
</tr>
<tr>
<td><strong>Avoidable mortality</strong></td>
<td>Avoidable deaths are all those defined as preventable, amenable, or both, where each death is counted only once. Where a cause of death falls within both the preventable and amenable definition, all deaths from that cause are counted in both categories when they are presented separately.</td>
</tr>
</tbody>
</table>

The definitions of both amenable and preventable mortality have been amended so that rather than including deaths that can be considered avoidable in light of current medical knowledge, technology or understanding of determinants of health, deaths are included that may have been avoided given knowledge and technology at the time the death took place. This small change to these definitions has been made to allow for changes to the list of causes of death to be made through time. If an indicator of avoidable mortality reported the number of deaths considered avoidable using current medical knowledge and technology, this would overstate the number of avoidable deaths in the past which may not have been avoidable at all at the time they took place.

The definition of avoidable mortality has been amended to make clear that under this definition, each death is counted only once. This change has been made in response to comments made during the consultation.
List of causes for inclusion

The final list of causes of death that are considered avoidable that is presented here is based upon cause lists produced by Nolte and McKee (2004) and Page, Tobias and Glover (2006). These cause lists have been updated and amended in an attempt to make them more relevant to the United Kingdom and to take account of more recent developments in healthcare public health policy. Changes to these lists have been influenced by Wheller et al (2007), AMIEHS (2011) and views of respondents to ONS’s recent consultation.

In response to the consultation, ONS received a large number of suggestions for causes of death that should be included or excluded from the list of conditions that can be considered avoidable. For the purposes of arriving at a final list of causes that can be considered avoidable we have sought to ensure that each cause meets the following criteria:

- The number of annual deaths caused by the condition should exceed 100. This ensures that the condition is relatively common and will mean that any trends observed in the number of deaths will be genuine and not due to chance alone.
- There should be a clear link between the number of deaths and healthcare interventions. For the indicator of avoidable mortality to attempt to serve as an indicator of healthcare performance, it is essential that conditions are included for which highly effective interventions are available.
- The condition should be easily classified under the International Classification for Diseases. If there is any ambiguity around the classification of a particular cause, this would make monitoring long-term trends difficult.

The final list of causes that will be used to produce statistics on avoidable mortality is presented in table 1, below.

It is unlikely that all potential users of an indicator of avoidable mortality will agree entirely with the list of causes included. It is possible to argue that many additional causes can be prevented or are amenable to healthcare but for inclusion in the list, it must be clear that it is possible to avoid the majority of deaths from this cause.

Age limits have been applied to the many of the causes included in the list. The selection of age limits should not be taken to mean that deaths from the selected causes for older persons are considered unavoidable, or that the condition will not respond well to treatment in older people.

It is planned that this list of causes, along with the associated age limits, will be reviewed every three years, and the views of users will be sought to assist with this process. This means that any causes of death which have been excluded from the current list due to concerns around the extent to which death can be avoided will be reassessed and may be included into future lists.
## Table 1. Final avoidable mortality cause list

<table>
<thead>
<tr>
<th>Condition group and cause</th>
<th>ICD-10 codes</th>
<th>Age</th>
<th>Amenable</th>
<th>Preventable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>A15-A19, B90</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Selected invasive bacterial and protozoal infections</td>
<td>A38-A41, A46, A48.1, B50-B54, G00, G03, J02, L03</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>B17.1, B18.2</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>B20-B24</td>
<td>All</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Neoplasms</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of lip, oral cavity and pharynx</td>
<td>C00-C14</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of oesophagus</td>
<td>C15</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of stomach</td>
<td>C16</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of colon and rectum</td>
<td>C18-C21</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Malignant neoplasm of liver</td>
<td>C22</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of trachea, bronchus and lung</td>
<td>C33-C34</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant melanoma of skin</td>
<td>C43</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Mesothelioma</td>
<td>C45</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of breast</td>
<td>C50</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Malignant neoplasm of cervix uteri</td>
<td>C53</td>
<td>0-74</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Malignant neoplasm of bladder</td>
<td>C67</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasm of thyroid gland</td>
<td>C73</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Hodgkin's disease</td>
<td>C81</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Leukaemia</td>
<td>C91, C92.0</td>
<td>0-44</td>
<td>•</td>
<td></td>
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<tr>
<td>Benign neoplasms</td>
<td>D10-D36</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><strong>Nutritional, endocrine and metabolic</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Diabetes mellitus</td>
<td>E10-E14</td>
<td>0-49</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><strong>Drug use disorders</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol related diseases, excluding external causes</td>
<td>F10, G31.2, G62.1, I42.6, K29.2, K70, K73, K74 (excl. K74.3-K74.5), K86.0</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Illicit drug use disorders</td>
<td>F11-F16, F18-F19</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td><strong>Neurological disorders</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epilepsy and status epilepticus</td>
<td>G40-G41</td>
<td>0-74</td>
<td>•</td>
<td></td>
</tr>
</tbody>
</table>
### Cardiovascular diseases

- **Rheumatic and other valvular heart disease**
  - I01-I09
  - 0-74
  - •
- **Hypertensive diseases**
  - I10-I15
  - 0-74
  - •
- **Ischaemic heart disease**
  - I20-I25
  - 0-74
  - •
- **DVT with pulmonary embolism**
  - I26, I80.1-I80.3, I80.9, I82.9
  - 0-74
  - •
- **Cerebrovascular diseases**
  - I60-I69
  - 0-74
  - •
- **Aortic aneurysm and dissection**
  - I71
  - 0-74
  - •

### Respiratory diseases

- **Influenza (including swine flu)**
  - J09-J11
  - 0-74
  - •
- **Pneumonia**
  - J12-J18
  - 0-74
  - •
- **Chronic obstructive pulmonary disorder**
  - J40-J44
  - 0-74
  - •
- **Asthma**
  - J45-J46
  - 0-74
  - •

### Digestive disorders

- **Gastric and duodenal ulcer**
  - K25-K28
  - 0-74
  - •
- **Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/lithiasis, pancreatitis, hernia**
  - K35-K38, K40-K46, K80-K83, K85, K86.1-K86.9, K91.5
  - 0-74
  - •

### Genitourinary disorders

- **Nephritis and nephrosis**
  - N00-N07, N17-N19, N25-N27
  - 0-74
  - •
- **Obstructive uropathy and prostatic hyperplasia**
  - N13, N20-N21, N35, N40, N99.1
  - 0-74
  - •

### Maternal and infant

- **Complications of perinatal period**
  - P00-P96, A33
  - All
  - •
- **Congenital malformations, deformations and chromosomal anomalies**
  - Q00-Q99
  - 0-74
  - •

### Unintentional injuries

- **Transport Accidents**
  - V01-V99
  - All
  - •
- **Accidental Injury**
  - W00-X59
  - All
  - •

### Intentional injuries

- **Suicide and self inflicted injuries**
  - X60-X84, Y10-Y34
  - All
  - •
- **Homicide/Assault**
  - X85-Y09, U50.9
  - All
  - •
- **Misadventures to patients during surgical and medical care**
  - Y60-Y69, Y83-Y84
  - All
  - •

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Office for National Statistics
References

http://amiehs.lshtm.ac.uk/publications/reports/AMIEHS%20final%20report%20VOL%201.pdf


