



## Pneumonia mortality in the elderly

Pneumonia is one of the most serious lower respiratory tract infections. In England and Wales, pneumonia is classified as the underlying cause of death in six percent of deaths in the 65+ age group, but is mentioned as an immediate or contributory cause of death in approximately one death in four in this age group. Together with lung cancer and chronic obstructive pulmonary diseases, it is one of the three main respiratory causes of death in the elderly (figure 1).

### Trends

Over the 20 year period up to 1983, mortality attributed to pneumonia increased in all age bands over 70, and doubled in the 85+ age band (figure 2). Over the same period, mortality from other respiratory causes showed a decline (figure 3).

In 1984 there was a sharp drop in the number of deaths attributed to pneumonia. This was the result of the implementation of the ICD coding rule 3. This provides for certain underlying causes of death, including pneumonia, to be replaced by more likely primary causes recorded elsewhere on the death certificate (see explanatory footnote).

Since 1984, mortality from pneumonia has remained relatively constant.

### Validity of trends

Three pointers suggest that the pre 1984 time trends in pneumonia mortality do not reflect epidemiological changes:

- The sudden change in mortality attributed to pneumonia in 1984 following the implementation of rule 3.
- The absence of similar trends in acute hospital admission rates. Except in the 85+ age group, there was no increase in acute admission rates for pneumonia in the period up to 1983, and no decrease in admissions occurred between 1983 and 1984.

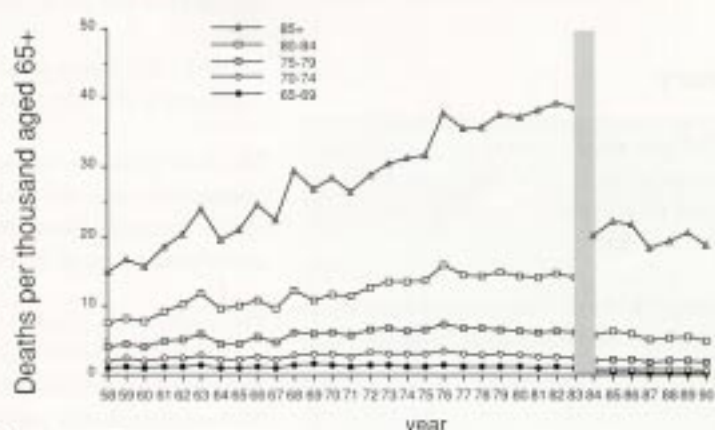
**Figure 1: Deaths from selected respiratory causes, age 65+, England & Wales 1990**

	No. of deaths
Cancer of trachea, bronchus and lung	25,659
Pneumonia	25,473
Chronic obstructive pulmonary disease	24,489
Influenza	735
Upper respiratory conditions	523
Pneumoconioses	488
Pulmonary TB	283
<b>ALL CAUSES</b>	<b>456,916</b>



Source: OPCS

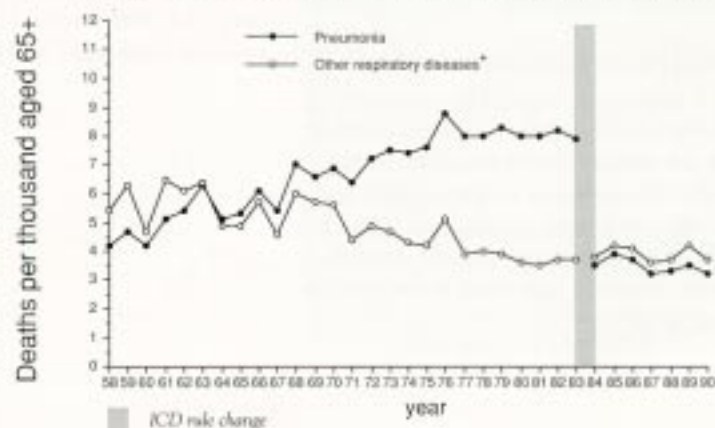
**Figure 2: Age specific pneumonia mortality rates, males and females combined, England & Wales 1958-90**



ICD rule change

Source: OPCS

**Figure 3: Age/Sex standardised mortality rates, pneumonia and other respiratory diseases, age 65+, England & Wales 1958-90**

Standardised to 1990 population  
\*ICD9 chapter VIII, excluding pneumonia

Source: OPCS

Evidence of a greater effect of rule 3 on deaths occurring in hospital, particularly those in psychiatric hospitals.

More recent trends probably reflect the underlying epidemiology of the disease.

## Seasonal variations

Pneumonia and lower respiratory infections in general exhibit strong seasonal variations in mortality, with higher mortality in the winter months. There has been a marked decline in seasonality since the late 60s.

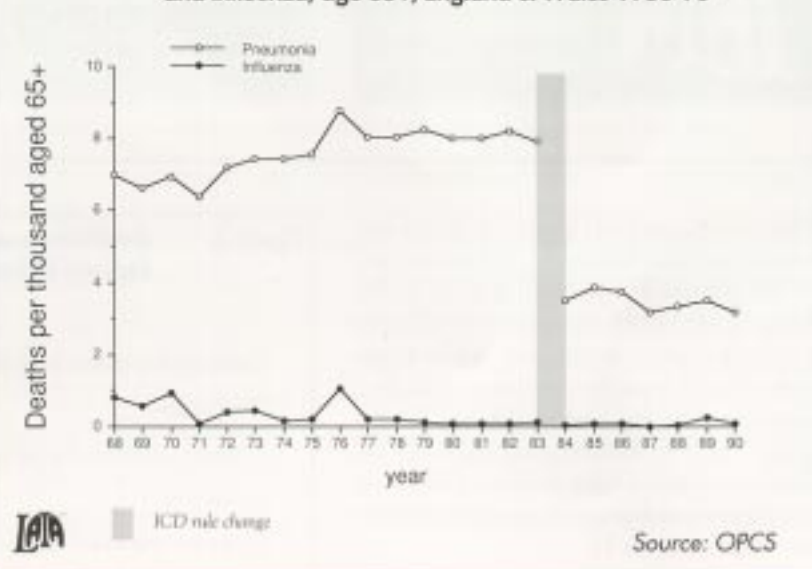
## Influenza

Excess winter deaths from pneumonia and other causes are closely related to winter temperature, changes in temperature and to seasonal outbreaks of influenza. The peak in pneumonia deaths in 1976, for example, corresponded with a peak in influenza deaths in that year (figures 4). More recently, one in five of the excess deaths during the 1989/90 influenza epidemic was attributed to pneumonia.

## Summary

- The apparent increase in pneumonia mortality in the elderly up to 1983 is unlikely to have reflected epidemiological changes.
- Since 1984, mortality attributed to pneumonia has remained relatively constant at around 3.5 deaths per thousand aged 65+.
- Pneumonia mortality is subject to seasonal variations associated with outbreaks of influenza and variations in winter temperature. Seasonality in general is decreasing.
- Mortality statistics do not reflect the full impact of pneumonia on mortality in the elderly - pneumonia is classified as the underlying cause of death in only 6% of deaths in the 65 plus age group but is mentioned as an immediate or contributory cause of death in approximately one death in four in this age group.

Figure 4: Age/Sex standardised mortality rates, pneumonia and influenza, age 65+, England & Wales 1968-90



## Footnote

### Rule 3

Published mortality statistics are routinely tabulated by underlying cause of death. This is normally coded from conditions recorded under "cause of death" in part I of the death certificate. Contributory factors may be recorded in part II of the death certificate.

In 1984, OPCS issued additional guidance to coders to ensure that the WHO rule 3 governing the selection of the underlying cause of death was correctly applied.

The new guidance stated that where one of a range of conditions, including pneumonia, was the only cause of death mentioned in part I of the death certificate, and a major disease was recorded in part II of the death certificate, the underlying cause of death should be taken from part II of the certificate.

The application of rule 3 led to a 55% reduction in the number of cases classified as *bronchopneumonia* and a 46% reduction in the number of cases classified as *pneumonia, unspecified*, resulting in an overall 52% reduction in the total number of cases classified as pneumonia.

In the case of *bronchopneumonia*, deaths were predominantly reclassified to *diseases of the circulatory system* (34% of cases reclassified), *mental disorders* (22%), *neoplasms* (10%) and *endocrine, nutritional & metabolic disorders* (7%). Substantial numbers of cases were reclassified to four disease groups: *cerebrovascular disease* (18%), *ischaemic heart disease* (9%), *senile & organic psychotic conditions* (16%) and *diabetes mellitus* (5%).