INVESTIGATION INTO THE WORKING OF THE “DEATH BENEFIT” FOR COALWORKERS’ PNEUMOCONIOSIS

BY

A. L. COCHRANE

Pneumoconiosis Research Unit of the Medical Research Council, Llandough Hospital, near Cardiff

AND

R. G. CARPENTER

Department of Human Ecology, University of Cambridge

WITH THE ASSISTANCE OF

F. MOORE

Pneumoconiosis Research Unit

Section 7(c) of the National Insurance (Industrial Injuries) Act (1946) states that “industrial death benefit (in this Act referred to as “death benefit”) shall be payable to such persons as are hereinafter provided if the death of the insured person results from the injury”, and death benefit has therefore been paid to relatives (under certain specified conditions) of those dying from coalworkers’ pneumoconiosis since 1948.

Difficulties have arisen in relation to the working of this Act in two ways:

(a) It has always been difficult for laymen and to a lesser extent for doctors to differentiate between those suffering from a chronic condition such as pneumoconiosis who die and those who die of pneumoconiosis. The difficulty is particularly obvious in the case of a miner who has been receiving a high rate of disablement benefit before he dies of some condition unconnected with his pneumoconiosis. The relatives are not unreasonably surprised when no death benefit is payable.

(b) There is a very real difficulty medically in deciding the exact cause of death in elderly people who are known to be suffering from pneumoconiosis. The difficulty often remains when post mortem evidence is available.

In these circumstances it is not surprising that there is considerable discontent about the working of the Act in areas such as South Wales where there is a high prevalence of pneumoconiosis, and a quantitative investigation seemed justified.

MATERIAL AND METHODS

The problem is not a simple one. The only figures available administratively are the number of men in receipt of industrial injury benefit for pneumoconiosis who die, the number of cases in which death benefit is claimed, and the number in which benefit is given. From such material no definite conclusions can be drawn, and one has to turn to more specialized investigations; we were fortunate in having available the Rhondda Fach population, which has been closely studied for several years.

The Rhondda Fach is one of the smaller Welsh mining valleys with a population of about 30,000, 90 per cent. of the population had their chests x-rayed in 1950 (Cochrane, Cox, and Jarman, 1952), and the population has been carefully studied ever since. In Table I the particular material used in this study has been summarized. All the miners and ex-miners x-rayed in 1950–51 have been carefully followed up for 6 years and death certificates have been obtained for all those who have died. We are confident that we have information about all those who died in the valley; we are naturally less certain...

<table>
<thead>
<tr>
<th>X-Ray Category*</th>
<th>Number</th>
<th>Number Died 1950–56</th>
<th>Number of Post Mortem Examinations</th>
<th>Number of Pneumoconiosis Deaths (001 and 523)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal and Simple Pneumoconiosis</td>
<td>5,429</td>
<td>626</td>
<td>186</td>
<td>11</td>
</tr>
<tr>
<td>Massive Pulmonary Fibrosis</td>
<td>A</td>
<td>386</td>
<td>48</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>B, C, D</td>
<td>659</td>
<td>192</td>
<td>128</td>
</tr>
<tr>
<td>Unknown (Lapses)</td>
<td>201</td>
<td>131</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>6,673</td>
<td>997</td>
<td>344</td>
<td>123</td>
</tr>
</tbody>
</table>

about those who have left the valley, but we went to
great lengths to trace them all. All the death cer-
ificates were coded by the Registrar General’s de-
partment. The vast majority of the post mortem
examinations were carried out in the Department of
Pathology, Cardiff Royal Infirmary.

Two points must be made in connexion with
Table I. If it is compared with similar Tables in
our previous publication (Carpenter and Cochrane,
1956), some differences will be found. These have
been caused by a re-check of the population at a new
census, resulting in a few transfers from the “non-
miner” group into the “miner and ex-miner” group,
and vice versa. In addition, we attempted to reduce
the number of lapses retrospectively by a search for
chest x-rays from all other sources, and by being
somewhat less fussy about the dates on which they
were taken. The other point concerns the high death
rate amongst the lapses. This is, of course, not, as
some field workers may have hoped, a judgement
from Heaven on their lack of co-operation, but is
simply due to the fact that it is very difficult and
sometimes inadvisable to x-ray the aged and infirm,
who have a reduced life expectancy. In point of fact,
133 of the 201 lapses were over the age of 65 in
1950–51. As they were not “certified” or “diagnosed”
in life as suffering from pneumoconiosis, and their
relatives only asked for post mortem examinations on
three occasions with a view to obtaining benefit, it is
very improbable that many were suffering from
progressive massive fibrosis (P.M.F.). This high death
rate amongst the lapses is thus unlikely to be a source
of error in this study. Both points will be dealt with at
greater length in a subsequent paper on mortality
rates of miners and ex-miners.

From this material we have selected those with the
more advanced type of P.M.F. (B, C, and D
shadows) for more detailed study, as shown in
Table II.

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Number of Cases</th>
<th>Deaths Observed</th>
<th>Deaths Expected</th>
<th>Excess Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–24</td>
<td>1</td>
<td>1</td>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td>25–34</td>
<td>26</td>
<td>2</td>
<td>2.8</td>
<td>12.2</td>
</tr>
<tr>
<td>35–44</td>
<td>128</td>
<td>15</td>
<td>9.3</td>
<td>19.7</td>
</tr>
<tr>
<td>45–54</td>
<td>150</td>
<td>29</td>
<td>29.4</td>
<td>61.6</td>
</tr>
<tr>
<td>55–64</td>
<td>184</td>
<td>51</td>
<td>24.2</td>
<td>0.8</td>
</tr>
<tr>
<td>65–74</td>
<td>129</td>
<td>70</td>
<td>44.1</td>
<td>25.9</td>
</tr>
<tr>
<td>75–84</td>
<td>140</td>
<td>25</td>
<td>24.2</td>
<td>0.8</td>
</tr>
<tr>
<td>85+</td>
<td>1</td>
<td>1</td>
<td>0.9</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>659</td>
<td>192</td>
<td>111.0</td>
<td>81.0</td>
</tr>
</tbody>
</table>

In this Table the observed and expected deaths
are compared. The rates for the expected deaths
were worked out by one of us (R. G. C.) using
the Registrar General’s death rates for all males in
England and Wales and the method outlined
previously (Carpenter and Cochrane, 1956).

At this stage it would seem natural to proceed to
the cases for which benefits are paid, but this seemed
to us unjustifiable, because in many cases where a
claim might reasonably have been made there were
either no relatives or the relatives were unwilling to
make a claim. The figure for benefits paid would
therefore be meaningless. We decided, therefore, to
adopt a more theoretical approach by assuming that
a claim was made in every case, and then estimating
from our knowledge of the working of the Pneumo-
coniosis Medical Panels of the Ministry of Pensions
and National Insurance, how many would have been
allowed. This could roughly be termed the “observed
benefits”. At the same time we attempted to estimate
from the data how many ought to have been given
benefits—roughly the “expected benefits”.

We believe that most people would agree that the
“expected benefits” should equal the excess deaths
as shown in Table II, but there are one or two points
that require amplification. The figure for the
“excess” deaths is dependent on the rates used to
calculate the “expected” deaths, and if the rates used
were inappropriate a serious bias could be intro-
duced. The rates used were based on the Registrar
General’s figures for all males in England and
Wales, and their use would be inappropriate if:

1. There was some local environmental factor in
the Rhondda Fach (other than mining) which caused
excessively high or low mortality. This is rendered
very unlikely by the fact that the use of the same
rates to the male non-mining population of the
Rhondda Fach gives an S.M.R. of approximately
100 (Carpenter and Cochrane, 1956).

2. The miners in the Rhondda Fach were selected
in such a way as to have an expectation of life
different from the average. This is a difficult point to
investigate, but the balance of the evidence suggests
that the population with which we are dealing was
somewhat negatively selected in that the healthier
members of the community tended to emigrate in
the 1920s and 1930s. If so, the appropriate rates
should have been a little higher and the excess deaths
somewhat lower. It does, however, seem probable
that the excess deaths give a reasonable measure of
the “expected” benefits, the errors, if any, tending
to make this figure too high.
Our approach to the problem of estimating the “observed” benefits is shown in Table III. The first column gives the deaths coded by the Registrar General as being due to pneumoconiosis (001 and 523). The next column gives the number of these deaths in which the cause of death was based on post mortem evidence. In general, one might argue that, if a claim were made and the death certificate stated that death was due to pneumoconiosis, the Pneumoconiosis Medical Panel would advise that the claim be allowed, and this would be true except in very rare cases. But in order to be quite sure that we have not over-estimated the “observed” benefits, it is safer to use the figure for the cases in which post mortem evidence was available. Here we can be quite certain that all claims would be allowed, for the simple reason that if they were refused there would certainly be an appeal, which, if supported by evidence from a University Department of Pathology, would certainly be successful.

**Table III**

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Number of Pneumoconiosis Deaths (1)</th>
<th>Number Based on post mortem Examination (2)</th>
<th>Number of Non-Pneumoconiosis Deaths in which Benefit was Given (3)</th>
<th>(2) plus (3) (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25–34</td>
<td>1</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>35–44</td>
<td>11</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>45–54</td>
<td>20</td>
<td>20</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>55–64</td>
<td>32</td>
<td>29</td>
<td>3</td>
<td>31</td>
</tr>
<tr>
<td>65–74</td>
<td>34</td>
<td>29</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>75–84</td>
<td>6</td>
<td>4</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td>85+</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>104</td>
<td>92</td>
<td>6</td>
<td>98</td>
</tr>
</tbody>
</table>

In addition to these 92, there is another small group which can safely be added (third column, Table III). This consists of cases in which the cause of death on the certificate was not given as pneumoconiosis but in which a death benefit claim was allowed. These were mainly deaths due to cardiovascular disorder according to the certificates. They were found by a direct search of all the records. Clearly the number of such cases (6) would have been much greater if claims had been made in all cases. We can therefore be sure that the combined figure for the “observed” benefits is a considerable under-estimate.

In Table IV the “expected” and “observed” benefits are compared, and it is clear that the latter are greater than the former, in spite of the fact that the figure for “observed” benefits is certainly an under-estimate, and that for “expected” benefits probably an over-estimate. There seems, therefore, little doubt that the Pneumoconiosis Medical Panels in this area are erring on the generous side.

**Table IV**

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Excess Deaths</th>
<th>Total Potential Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>25–34</td>
<td>0.7</td>
<td>1</td>
</tr>
<tr>
<td>35–44</td>
<td>12.2</td>
<td>10</td>
</tr>
<tr>
<td>45–54</td>
<td>19.7</td>
<td>20</td>
</tr>
<tr>
<td>55–64</td>
<td>21.6</td>
<td>31</td>
</tr>
<tr>
<td>65–74</td>
<td>25.9</td>
<td>32</td>
</tr>
<tr>
<td>75–84</td>
<td>0.8</td>
<td>4</td>
</tr>
<tr>
<td>85+</td>
<td>0.1</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>...</td>
<td>98</td>
</tr>
</tbody>
</table>

**Summary**

An investigation has been carried out into the working of the “Death Benefit” in relation to coal-workers’ pneumoconiosis. Using material derived from the follow-up of the Rhondda Fach miners and ex-miners x-rayed in 1951, and assuming that every miner who died had relatives who all made claims, estimates were obtained of “expected” and “observed” benefits. When compared, these estimates suggested that the Pneumoconiosis Medical Panel in that area was being, as expected, generous.

We should like to acknowledge the assistance we have had from many friends and colleagues in different fields. We should, in particular, like to thank Dr. A. Caplan of the Cardiff Pneumoconiosis Medical Panel of the Ministry of Pensions and National Insurance.

**REFERENCES**


National Insurance (Industrial Injuries) Act, 1946. Section 7(c).