

Table 2.—Total Deaths and Deaths From Cancer of the Lung, Bronchus, Pleura, Mediastinum, and Trachea per 10,000 White Males per Year*

Age	1943-1947		1948-1952		1953-1957		1958-1962	
	Total	Lung Cancer†	Total	Lung Cancer†	Total	Lung Cancer†	Total	Lung Cancer†
35-39	36		30		26		25	1
40-44	55	1	48	1	43	1	42	1
45-49	85	2	78	3	72	3	70	3
50-54	133	4	124	5	115	6	116	7
55-59	196	5	189	8	178	10	178	11
60-64	295	7	281	10	276	14	272	17
65-69	435	7	417	11	416	17	418	21
70-74	634	6	605	11	586	16	607	21
75-79	977	6	915	10	878	14	866	17
80-84	1,453	5	1,353	8	1,346	12	1,363	15
85+	2,422	3	2,162	7	2,017	9	2,148	11

*Death rates as reported annually by the US National Office of Vital Statistics. A five-year average is given here for each period. Average for 1958-1962 is a projection of 1958-1960, since 1961-1962 rates are not yet available.

†Death rates include cancer of the lung, bronchus, pleura, mediastinum, and trachea, assigned to international list code No. 47b-f prior to 1949 and to No. 160-164 thereafter.

is almost always found in the first few years of a prospective epidemiological study of this type. The explanation is almost certainly as follows: The 632 men in this analysis were actively employed as asbestos workers in 1942. Since disability from illness or other causes precludes employment in a trade of this type, these men were presumably well (or at least not disabled) at the start of the study period. Almost any group so selected as to exclude the ill and disabled has a lower death rate during the ensuing few years than does the general population, since ill and disabled persons have extremely high death rates. A selective effect of this type gradually wears off with time and largely disappears within five to ten years from the time of initial selection.

During the second five-year period (1948-1952) the death rate of the asbestos workers was slightly higher than the death rate of all US white males, ie, 54 observed deaths compared with 50.8 expected deaths. In later periods, the death rate of the asbestos workers was proportionately higher. For the period 1953-1957, there were 85 observed deaths compared with 56.6 expected deaths, and for the period 1958-1962, there were 88 observed deaths compared with only 54.4 expected deaths.

Table 3.—Observed and Expected Number of Deaths Among 632 Asbestos Workers Exposed to Asbestos Dust 20 Years or Longer

Cause of Death	Years				Total, 1943-1962
	1943-1947	1948-1952	1953-1957	1958-1962	
Total, all causes	28	54	85	88	255
Observed (asbestos workers)	28	54	85	88	255
Expected (US white males)	39.7	50.8	56.6	54.4	203.5
Total cancer, all sites	13	17	26	39	95
Observed (asbestos workers)	13	17	26	39	95
Expected (US white males)	5.7	8.1	13.0	9.7	36.5
Cancer of lung and pleura	6	8	13	18	45
Observed (asbestos workers)	6	8	13	18	45
Expected (US white males)	0.8	1.4	2.0	2.4	6.6
Cancer of stomach, colon, and rectum	4	4	7	14	29
Observed (asbestos workers)	4	4	7	14	29
Expected (US white males)	2.0	2.5	2.6	2.3	9.4
Cancer of all other sites combined	3	5	6	7	21
Observed (asbestos workers)	3	5	6	7	21
Expected (US white males)	2.9	4.2	8.4	5.0	20.5
Asbestosis	0	1	4	7	12
Observed (asbestos workers)	0	1	4	7	12

Cancer of the Lung, Pleura, and Trachea.—In each of the four five-year periods, far more deaths from cancer of the lung and pleura occurred among the asbestos workers than would have occurred had their death rates from these diseases been the same as for all US white males (Table 3). Altogether 45 of the 632 asbestos workers died of cancer of these sites, whereas only 6.6 such deaths would be expected from general US experience. Of these 45 deaths, 42 were recorded as due to bronchogenic carcinoma and 3 to neoplasms of the pleura. The pleural neoplasms were all recorded as mesotheliomas.

Thus it was found that the death rate from cancer of the bronchus and pleura was 6.8 times as high among these asbestos workers as in the general US white male population (both age and date being taken into consideration).

It may be asked whether the high rate of lung cancer among these asbestos workers could possibly be attributed to an unusually large proportion of cigarette smokers among them. We cannot answer this question directly, since we have not yet been able to ascertain the smoking habits of the men who died. However, the following pieces of evidence indicate that unusual smoking habits cannot account for the high death rate from lung cancer among these workers:

We have interviewed 320 of the 377 surviving members of the 1942 group. Table 4 gives a summary of the smoking habits in this group compared with a sample of men drawn from the general population of 1,121 counties in 25 states.⁷ The union sample is somewhat inadequate since it does not include the men who died and does not include all of the present living members of the union. Nevertheless, it shows that a substantial proportion of asbestos workers never smoked cigarettes regularly. Certainly the 632 men in our analysis of death rates were not all heavy cigarette smokers.

In the general male population, lung-cancer death rates are about ten times as high among cigarette smokers as among nonsmokers; and the