

Mortality Experience of Family Contacts of Asbestos Factory Workers

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Studies linking asbestos to disease began in the early 1900s. Direct exposure to asbestos has been implicated in various diseases, principally mesothelioma, lung cancer, asbestosis, and lung scarring. The risks in all four diseases are closely influenced by dose and duration of asbestos exposure, and they involve long and variable latent periods after initial exposure (20–40 years).

Only limited epidemiologic investigations have been undertaken to assess the risks of nonmalignant and malignant disease associated with low levels of exposure to asbestos dust from living in the same house with an asbestos worker; we refer to those secondarily exposed persons as *household contacts*. In such cases the worker would typically come home with his clothes covered with asbestos dust, which would then constitute the exposure for the contact person.

Since 1975 we have been observing a group of 878 household contacts of workers at UNARCO Industries, an amosite asbestos factory in New Jersey that was in operation from 1941–1954. The plant produced thermal insulation. All workers still alive in 1978–1980 were contacted and questioned about the persons who lived in his or her household at the time of the exposure. The next of kin of deceased workers were also contacted and questioned about the persons living in the household at the time of his exposure. Street directories were also consulted to verify information.

The composition of the subjects in the study was as follows:

Number of workers	=	1664	
Number of household contacts	=	4044	
Number of contacts examined (1973–1976)	=	878	(22%)
Alive		763	
Dead		115	
Traced through January 1990		870	(99.1%)

For all of the household contacts more than 20 years had elapsed from onset of exposure to the time of initial examination.

This paper reports the mortality experience of the 115 persons who died among these household contacts examined (TABLES 1, 2, and 3).

None of the 878 contacts had personal occupational exposure to asbestos. The source of home contamination in individual exposure resulted from dust adhering

TABLE 1. Total Cohort by Length of Exposure of Worker^a

Length of Exposure	No. of Persons	Percentage of Cohort	No. of Deaths	Percentage of Deaths
Less than 1 yr	129	23	47	41
1 yr–5 yr	369	66	55	48
5+ yr	64	11	13	11
Totals	562	100%	115	100%

^a For this report we do not have exposure on 201 cases.

TABLE 2. Cancer Deaths (115) by Length of Worker's Exposure

Length of Exposure	No. of Persons	Percentage of Cancer Deaths	Percentage of Total Deaths
Less than 1 yr	20	47	17
1 yr–5 yr	16	37	14
5+ yr	7	16	6
Total	43	100%	37

to workclothes, hair, and shoes. Household exposure started at a relatively early age in this group: Most were 10 to 15 years old. Their deaths occurred between the ages of 70 and 80 (FIGS. 1 and 2).

The actual intensity of household asbestos contamination and length of exposure for each family contact is not known, but the data of first employment and duration of employment of the worker are known. Length of employment ranged from one day to 13 years.

We observed 115 total deaths, of which 43 were cancer deaths. Death certificates were obtained on all cases and coded by death certificate cause only. We

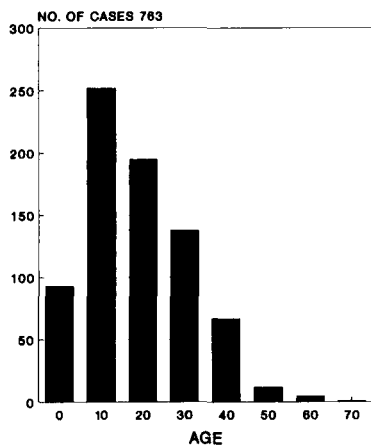
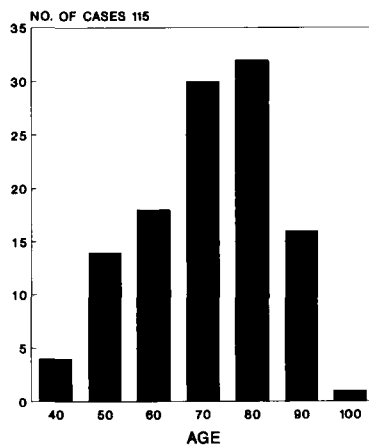
**FIGURE 1.** Alive householders' frequency distribution by age at first exposure of workers.**FIGURE 2.** Householder's frequency distribution at age of death.

TABLE 3. Number and Percentage of Deaths for Cancer Sites among Male and Female Household Contacts of Asbestos Factory Workers to January 1, 1990

Cancer Site	Total Observed	Percent
All Sites	43	100
Lung	12	28
Total digestive organs including stomach, pancreas, esophagus, and colon and rectum	10	23
Non-Hodgkin's lymphoma	7	16
Breast	4	9
Reproductive organs	2	5
Other kinds of cancer (nonspecified)	4	9
Pleural mesothelioma	4	9

have observed that 38% of the deaths to January 1, 1990 were of cancer: mesothelioma, non-Hodgkin's lymphoma, and cancer of the lung and gastrointestinal tract among others. The national estimated overall percentage is about 22%. Our figures were about double that.

Therefore, since there is no known safe level of asbestos exposure, we urge that studies of other groups of family contacts be undertaken so that additional data be available to confirm whether such limited asbestos contact is as dangerous as it appears, and whether many more people may be at risk of asbestos-induced cancer than is now anticipated.