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"We now know that if a person inhales significant amounts of asbestos dust, he carries a burden that will provide a latent potential for the development of cancer for the rest of his life."

Dr. Irving J. Selikoff, M.D.,
Chairman,
Mount Sinah School of Medicine,
The City University of New York.

ASBESTOS— a survey of its effects

A STUDY of the members of the New York Local 12 and Newark Local 32 of the International Association of Heat and Frost Insulators and Asbestos Workers in America has provided an authoritative report on the dangers associated with exposure to asbestos.

The study has been continuing since 1962 and is being carried out by Dr. Irving J. Selikoff, a specialist on tuberculosis, who participated in the basic research on isoniazid, the antibiotic that has provided a cure for tuberculosis, Dr. Jacob Churg, Chief Pathologist at Barnert Memorial Hospital, Paterson, U.S.A., and Dr. E. Cuyler Hammond, Vice-President for Epidemiology and Statistics of the American Cancer Society.

As previous studies suggested that asbestos induced lung cancer takes twenty years to develop, the first study undertaken was that of Union members who were on the Union rolls twenty years prior. Thus 632 men who were members on December 31, 1942, were the subject of the study. Taking the men's ages into consideration, a comparison of the causes of death was made with those of the general male population in the United States. The comparisons are set out hereunder:—

	Heat and Frost Insulators and Asbestos Workers	Standard Mortality Rate
Total Deaths	255	203 (1)
Lung Cancer Deaths	45	6 or 7 (1)
Asbestosis Deaths	12	No comparison given
Mesothelioma Deaths	4	No comparison given
Gastro-intestinal Cancer Deaths	29	9 or 10

The "total deaths" figure does not include seven men who died before incurring 20 years of exposure.

The health of the surviving 370 men has been closely watched and has continued to produce alarming comparisons. The following comparison of mortality experience is given for the period January, 1963, to March, 1968:—

	Heat and Frost Insulators and Asbestos Workers	Standard Mortality Rate
Total Deaths	113	50
Lung Cancer Deaths	28	2 or 3
Asbestosis Deaths	15	No comparison given
Mesothelioma Deaths	13	No comparison given
Gastro-intestinal Cancer Deaths	8	2

The sharp rise in the number of deaths due to the malignant mesothelioma tumors, four in 255, compared with 13 in 113 deaths, suggests that the latent period for mesothelioma is longer than that for asbestosis or lung cancer.

The second part of the study was the examination of 1117 union members. Evidence of asbestosis was found in fully half of these men, the extent of the disease varying directly with duration of exposure. This was despite the fact that the men **"had comparatively light and intermittent exposure as asbestos workers go, because they often worked out of doors on construction projects and because most of the materials they used had an asbestos content of less than fifteen per cent."**

The details revealed by the examinations regarding asbestosis and exposure are as follows:—

	Number of men	Evidence of Asbestosis
Exposure of less than 10 years	346	10%
Exposed 10 to 19 years	379	less than 50%
Exposed more than 20 years	392	339 men

In the group with more than 20 years' exposure, 11 men had developed cancer and more than half of the asbestosis sufferers had the disease moderately or extensively.

EXPOSURE TO ASBESTOS

Prevalence of the disease asbestosis increases with the duration of exposure when the concentration is constant and can therefore be controlled by limiting either the concentration in the air inhaled or the period of exposure.

This, however, does not appear to be the case with the malignant and fatal mesothelioma tumour as cases of indirect, short-term and intermittent exposure are as common amongst the victim of this disease as the cases of direct occupational exposure. The workman must therefore protect not only himself from this disease but also those members of his family with whom he has close contact.

Details of the life histories of mesothelioma cases gathered in two separate studies are set out in the table hereunder. The first is a study of Dr. Muriel L. Newhouse and Dr. Hilda Thompson, of the Department of Occupational Health, London School of Hygiene and Tropical Medicine. The second is the study of Dr. Jan Lieben and Dr. Harry Pistawaka read before the International Cancer Congress in Tokio in October, 1966:—

	Newhouse and Thompson	Lieben and Pistawaka
Worked with asbestos	31	10
Relatives of asbestos workers	9	3
Lived or worked within the vicinity of an asbestos factory	11	8
	—	10
Minor Exposure	25	11
Exposure not known	—	—
	—	42
Total number of patients	76	—

OCCUPATIONAL EXPOSURE

Drs. Lieben and Pistawaka, in giving details of the ten patients who had occupational exposure to asbestos, have noted that one was a boilermaker in a railroad yard who for 25 years worked on the insulation of steam engines, one built bakery ovens in which asbestos insulation is used while another was a certified accountant who worked in the office of an asbestos textile plant.

Other examples of only light occupational exposure to asbestos are the case of a 56-year-old boilermaker who died of mesothelioma although he handled asbestos lagging only intermittently during his working life (South African Medical Journal, July 15, 1967), and the report of a 47-year-old insurance agent and liquor salesman whose contact with asbestos was confined to 18 months' work as a stock boy in an asbestos plant 24 years before (JAMA, August 21, 1967). He also died due to mesothelioma.

EXPOSURE OF FAMILY CONTACTS

The dangers of asbestos induced mesothelioma have not been confined to occupational exposure and there are several reported cases where a member of the workman's family has been a victim of the disease.

Drs. Lieben and Pistawaka report on the case of a three-year-old child, the daughter of a ceramic engineer who worked in an insulating plant that utilised 400 tons of Canadian chrysotile and 1500 tons of South African amosite annually, who contracted mesothelioma.

The nine reported cases of family exposure by Drs. Newhouse and Thompson consisted of seven women and two men. Most of these women had washed their husbands' work clothes regularly. One woman had brushed her husband down every evening for three or four years when he came home from work "white with asbestos." Both of the men had, when they were boys of eight or nine, had sisters who worked in asbestos textile factories. In one of the cases the sister was an asbestos spinner from 1925 to 1936 and used to return home with dust on her clothes. She died of asbestosis in 1947. Her brother died of mesothelioma in 1956.

NEIGHBOURHOOD EXPOSURE

Of the eight cases of neighbourhood exposure detailed by Drs. Lieben and Pistawaka, one patient was a clergyman who had never had any occupational exposure to asbestos. Prior to his becoming a minister in 1935 he had lived for 19 years within one half of a mile of an insulation plant which used asbestos. He died in 1961 a victim of a mesothelioma tumour.

Dr. T. F. B. Collins reports the case of a 56-year-old African male who died from mesothelioma in February, 1967, in a Durban Hospital. Asbestos fibres were evident in the patient's spittle although his only contact with asbestos was once living in the vicinity of the Havelock asbestos mine in Swaziland, South Africa.

MINOR EXPOSURE

The incidence of mesothelioma in patients with only minor exposure to asbestos (Drs. Lieben and Pistawaka reported ten cases) is significant with regard to workmen such as our members who do insulation work periodically and indicates the need for vigilance in exposure protection at all times.

One of the cases reported by Drs. Lieben and Pistawaka refers to a 14-year-old boy with mesothelioma whose only contact with asbestos was the assistance which he gave his father in replacing plaster board in the extensive remodelling of the family home. The plaster board contained a high percentage of asbestos.

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