



Morbidity and Mortality

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**EPIDEMIOLOGIC NOTES AND REPORTS
 PULMONARY FUNCTION
 OF ASBESTOS WORKERS - Massachusetts**

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On December 11, 1974, pulmonary function tests were performed on 30 workers at the Asbestos Textile Company plant in North Brookfield, Massachusetts. Forced vital capacity (FVC) and 1-second forced expiratory volume (FEV₁) were calculated for each worker from the best 3 of 5 attempts using a Stead-Wells spirometer. Other data obtained included smoking history and length of employment at the plant. FVC for each worker was compared to the value predicted on the basis of age, sex, and height (Veterans' Administration/Army Prediction Equation). The ratios of observed FVC to predicted FVC compared to length of employment are shown in Table 1, as are the FEV₁ to FVC ratios.

The loss of FVC related to length of employment (p=0.006 using a one-way analysis of variance) is substantial. The low values of FVC among persons working with asbestos for more than 20 years cannot be accounted for by smoking;

TABLE I. CASES OF SPECIFIED NOTIFIABLE DISEASES: UNITED STATES
 (Cumulative totals include revised and delayed reports through previous weeks)

DISEASE	5th WEEK ENDING		MEDIAN 1970-1974	CUMULATIVE, FIRST 5 WEEKS		
	February 1, 1975	February 2, 1974		February 1, 1975	February 2, 1974	MEDIAN 1970-1974
Aseptic meningitis	29	43	37	193	178	178
Brucellosis	1	4	2	8	9	9
Chickenpox	3,838	3,813	---	15,988	15,238	---
Diphtheria	9	2	2	43	5	10
Encephalitis	Primary	11	16	58	66	74
	Post-Infectious	2	3	6	15	21
Hepatitis, Viral	Type B	176	209	941	799	799
	Type A	718	929	3,228	4,058	---
	Type unspecified	147	140	1,011	662	5,327
Malaria	4	3	16	16	13	207
Measles (rubeola)	275	334	790	1,121	1,927	3,189
Meningococcal infections, total	Civilian	25	23	34	148	119
	Military	25	23	34	144	119
Mumps	---	---	---	4	---	8
Pertussis	1,411	1,559	2,364	6,284	7,408	10,398
Rubella (German measles)	32	8	---	135	113	---
Tetanus	204	180	550	757	858	2,274
Tuberculosis	1	1	1	7	5	5
Tularemia	581	665	---	2,400	2,334	---
Typhoid fever	---	2	1	6	8	8
Typhus, tick-borne (Rky. Mt. spotted fever)	5	5	5	17	28	27
Veneral Diseases:	---	2	1	9	12	2
Gonorrhea	Civilian	19,010	16,058	---	88,611	80,287
	Military	536	520	---	2,502	2,600
Syphilis, primary and secondary	Civilian	564	466	---	2,416	2,327
	Military	11	9	---	36	44
Rabies in animals	31	53	66	183	238	260

TABLE II. NOTIFIABLE DISEASES OF LOW FREQUENCY

	Cum.		Cum.
Anthrax:	---	Poliomyelitis, total: Tenn. 1	1
Botulism:	3	Paralytic: Tenn. 1	1
Congenital rubella syndrome:	4	Psittacosis:	2
Leprosy: Calif. 1, Hawaii 2, Tex. 1	18	Rabies in man:	1
Leptospirosis: Ore. 1	6	Trichinosis: *	7
Plague:	---	Typhus, murine:	---

*Delayed reports: Trichinosis: (1974) N.J. 3, W. Va. 1

ASBESTOSIS — Continued

6 of the 8 in the group with lowest FVC value had never smoked cigarettes (Table 2). In addition, because the prediction formula controls for age, as well as height and sex, the variation of FVC with length of employment is not a function of age. The FEV₁/FVC ratio was not observed to fall with increased length of employment (Table 1). The data indicate, therefore, that these workers have restrictive lung impairment of the sort typically seen in pulmonary asbestosis.

Table 1
Forced Vital Capacity (liters) in Asbestos Workers
Related to Length of Employment

Year First Employed	Number	Mean FVC Observed/ Predicted	FEV ₁ /FVC
1970-74	15	0.96	0.80
1954-69	7	0.93	0.79
Before 1954	8	0.76	0.82

Table 2
Forced Vital Capacity (liters) in Asbestos Workers
Related to Cigarette Smoking History

Number of Years Smoking	Number	Mean FVC Observed/ Predicted	FEV ₁ /FVC
0	14	0.87	0.82
≤15	6	0.93	0.82
>15	10	0.92	0.75

For many years, levels of asbestos dust in textile-producing areas of this plant, as measured by the State Division of Occupational Hygiene, have been well above the present federal standard of 5 fibers per cubic centimeter of air. Following action by the Occupational Safety and Health Administration (O.S.H.A.), the company recently shut down its dustiest textile-producing operations.

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Editorial Note

The relationship between inhalation of asbestos dust and the fibrotic lung lesion of asbestosis has been well known since early in this century. Pulmonary function tests have proved to be useful in screening for asbestosis in workers exposed to asbestos dust (1,2). FVC and FEV₁ both decrease as a result of the restrictive lung disease caused by asbestos, while the ratio of FEV₁ to FVC does not. As noted in this report, significant loss of lung function may not be observed until years after a worker's initial exposure to asbestos (2).

In 1972 the National Institute for Occupational Safety and Health (N.I.O.S.H.) proposed a standard of 2.0 asbestos fibers per cubic centimeter of air as a maximum average exposure in the workplace (3). Data showed that asbestosis does occur at average exposure levels of as low as 2 fibers/cc (4). The proposed standard was based primarily on knowledge of the dose-response relationship in asbestosis; but it is also of considerable concern that asbestos is a known carcinogen. The increased risk of lung cancer and mesothelioma in asbestos workers has been well documented, while an increased incidence of gastrointestinal cancer has also been suggested (3). In June, 1972, the Secretary of Labor promulgated the present official standard of 5.0 fibers/cc with a level of 2 fibers/cc to be achieved by 1976 (5).

However, the situation described above illustrates, as do other cases of asbestos exposure (6), the need for continual evaluation of the potential risks in the asbestos industry.

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TRANSFUSION-INDUCED MALARIA — Tennessee

On May 15, 1974, a 15-year-old girl was admitted to a hospital in Tennessee with a history of intermittent, spiking fever of unknown origin. A paroxysmal fever characterized by 72-hour cycles of temperature elevation had begun on May 11, 1974, and was associated with chills and sweating. Additional symptoms included malaise, myalgia, anorexia, headache, nausea, vomiting, and abdominal pain. A peripheral blood smear revealed the presence of rings, trophozoites, and schizonts of *Plasmodium malariae*. The patient was treated with chloroquine and primaquine and recovered uneventfully.

The patient had resided in Tennessee for the preceding 12 years and had never traveled outside the United States. She had no previous history of malaria. However, she had a history of chronic renal failure and had been receiving con-

tinuous hemodialysis for the previous 7 months. She also had a history of uterine bleeding and anemia which was diagnosed as endometriosis. In February 1974, after developing acute abdominal pain, she had an exploratory laparotomy. During her illnesses she received 14 units of frozen blood from 14 donors. None of the 14 donors had a history of malaria, and all but 1 donor had never lived or traveled in any areas designated as malarious. Peripheral blood smears examined from all 14 donors were negative for malaria parasites. Serologic examinations of all donors by indirect immunofluorescent antibody tests were negative, except for the 1 individual who revealed high antibody titers against *P. malariae* and *P. falciparum* and a low titer against *P. vivax*. This donor was a 28-year-old African man who had entered the United States in