

Malignant Mesothelioma

Epidemiologic patterns in New York State

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The association between asbestos exposure and malignant mesothelioma is well established, particularly among certain occupational groups such as asbestos miners, insulation, shipyard, and textile workers.¹ Nonoccupational exposure to this mineral might also be an important factor.²⁻⁴ Although this highly fatal tumor must be considered a rare manifestation of exposure to a relatively common agent, the spectrum of asbestos-associated diseases include pneumoconiosis, lung cancer (in smokers), and possibly gastrointestinal cancer.⁵ Thus, malignant mesothelioma represents an important signal lesion—a rare disease caused by an agent which is etiologically associated with more common disorders. This report examines the geographic distribution of malignant mesothelioma in New York State, with particular emphasis on the epidemiologic characteristics of those areas with the highest incidence rates.

Methods

Incidence study. This investigation included all cases of histologically confirmed malignant mesothelioma (histology code 905) diagnosed in New York State, excluding New York City, reported to the tumor registry of the Cancer Control Bureau, New York State Department of Health, from 1973 through 1978. Patients from New York City were excluded because cancer reporting from this area was not instituted until 1973, and at present reported investigation is incomplete. Using population estimates for the year 1975,* ten-year age-specific incidence rates

* Office of Biostatistics, State of New York Department of Health.

A study of malignant mesothelioma in New York State, excluding New York City, suggests that there was no increase in the incidence of disease from 1973 through 1978. The highest rates for this tumor were observed in 6 rural counties, and farmers, talc miners, and paper workers were the most common occupations involved. Certain other highly industrialized counties in close proximity to major waterways also had higher incidence rates than the State as a whole.

and sex ratios (male rate to female rate) were calculated for all patients reported with this disorder during the six-year study period, and separately for the pleural and peritoneal sites. The same denominator was used to calculate an average incidence rate for the State (excluding New York City), and for each county in the study area. Counties with high rates were defined as those with twice the average State rate. Time trends were also calculated using yearly population estimates from 1973 through 1978.*

Descriptive study. The first phase of this investigation attempted to obtain occupational information from death certificates on all male patients included in the incidence study who died from 1973 through the present in New York State, excluding New York City. Asbestos-related occupations were defined as those listed in "Work is Dangerous to Your Health"⁶ and by the National Institute of Occupational Safety and Health.⁷ Using this information, the occupations of male patients who died of malignant mesothelioma were categorized as asbestos-related or not.

For male and female mesothelioma patients diagnosed and reported from 1968 through 1978 in counties with high rates, interviews were conducted with either the patient or, in the event of death, a first-degree relative. Detailed information was obtained on both occupational histories and other potential sources of asbestos exposure. Indirect exposure was defined as residing in a household prior to diagnosis with a spouse, parent, or other family member who worked in an asbestos-related occupation.

Results

Incidence study. There were a total of 288 patients (193 males and 95 females) diagnosed in New York State (excluding New York City) and reported

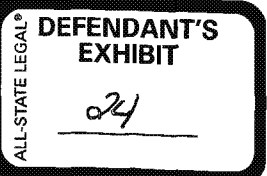


TABLE 1. Incidence rates and sex ratios by site in New York State (1973 through 1978)*

Site	Males		Females		Sex Ratio ^a
	Number of Patients	Rate per 100,000 Population	Number of Patients	Rate per 100,000 Population	
Pleura	164	0.54	57	0.17	3.2
Peritoneum	26	0.09	35	0.11	0.8
All sites	193	0.63	95	0.29	2.2

* Includes 3 males, 3 females with site unknown. Excluding New York City.

[†] Male rate to female rate, 1975 population estimate (Office of Biostatistics, New York State Health Department).

to the tumor registry from 1973 through 1978. Evaluation of annual incidence rates during the six-year study period did not indicate any significant increase in trend. Rates fluctuated from 0.37 to 0.52, and the over-all average incidence for this disease was 0.45 per 100,000 population. Rates generally increased with age, peaking for both sexes in the 75-through-84-year age group (total 2.19 per 100,000). Among males the peak occurred in the 65-through-74 age group (3.68 per 100,000) and among females the 75-through-84 age group (1.44 per 100,000). Table I indicates the over-all incidence and sex ratios for

study patients by site. County rates varied from a high of 1.52 per 100,000 population in Seneca County to 0.00 in 11 counties (Fig. 1). Six counties (Seneca, Livingston, Steuben, Jefferson, Schoharie, and Schuyler) had rates at least twice that of the over-all rate for New York State (excluding New York City). Thirty-six counties had average incidence rates below that observed for the State. Certain highly populated industrialized counties (such as Erie, Nassau, Suffolk) had average incidence rates slightly higher (range: 0.47 to 0.89 per 100,000 population) than that observed for New York State, excluding New

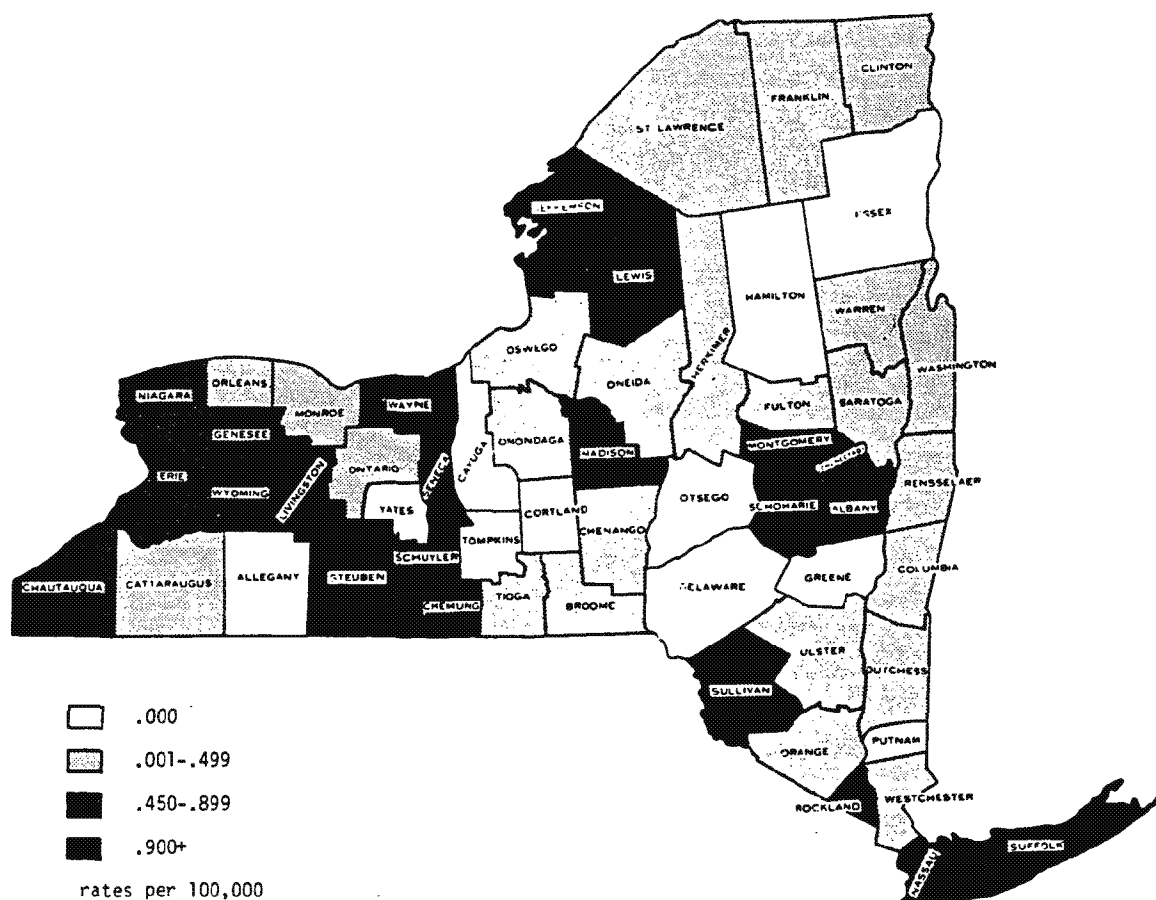


FIGURE 1. Average incidence rates for malignant mesothelioma in counties of New York State (excluding New York City) from 1973 through 1978.

York City, whereas others (such as Westchester and Onondaga) had lower rates (range: 0.31 to 0.40 per 100,000 population).

Descriptive study. Of 193 male patients diagnosed with malignant mesothelioma from 1973 through 1978, death certificates were obtained for 170 (89.0 percent) of the cases. Only 67 of these patients (39.4 percent) had well established asbestos-related occupations listed on their death certificates. Thirty-nine (58.2 percent) of these patients worked in construction, electrical work, and heating. The remaining 28 occupations included paper workers, printers, farmers, and longshoremen.

A potential source of asbestos exposure was documented for 24 of the 31 (77.4 percent) patients (22 males and 9 females) diagnosed with malignant mesothelioma in the six counties with high incidence rates. Fifteen of the 17 patients with direct exposure were males, 7 patients were farmers, 4 patients worked in talc mines, and 3 worked in the paper industry. These were the major occupations. Five males worked in more than one asbestos-related industry at different times. The two females in this group were talc workers. Six of the 7 patients with potential indirect exposure were females. The spouses or other family members residing in the same household of five females were farmers, and one was a fireman. Ten of the 24 patients (41.7 percent) had the opportunity for both direct and indirect exposure.

Comment

Although the industrial use of asbestos has greatly decreased in recent years, there has been growing concern that the frequency of malignant mesothelioma might be increasing.⁸ This is due to the widespread prevalence of this mineral in the environment, and the evidence suggesting that large cohorts of workers might have been exposed during the World War II period (for example shipyard workers).^{1,9} Our results suggest that there was no apparent increase in the incidence of this disease from 1973 through 1978. Although incomplete assessment is potentially a major problem confronting all studies of malignant mesothelioma, we have no reason to believe variability in the diagnosis and/or reporting of this entity during the six-year study period are responsible for our findings. Our observation that the highest rates for this disorder were essentially diagnosed in counties without university medical centers supports the concept that the clinical and pathologic recognition of mesothelioma has probably improved during the last decade.

Our findings suggest that the epidemiologic patterns of malignant mesothelioma differ in various sections of New York State. Highly populated, industrialized areas (such as Erie, Nassau, and Suffolk) in close proximity to major waterways had higher average incidence rates than the State, excluding New York City, as a whole. The major occupational

groups involved were construction and electrical-heating system workers. These observations are consistent with the evidence suggesting that the incidence of this tumor is extremely high for insulators among those who work or live in cities with shipyards, and among those who work or live in cities with large asbestos plants. However, the highest rates in our study were found in six generally rural counties (Fig. 1), and in these areas farmers, talc miners, and paper workers were the most common occupational groups involved. Farmers have two potential sources of exposure: construction and maintenance work,⁶ and the natural asbestos content of soils in certain areas.¹⁰ Certain talc mines, particularly those located in St. Lawrence County, contain as much as 50 percent or more tremolite, an amphibole type of asbestos material.¹¹ This might explain the observation that talc fibrosis resembles asbestosis more than silicosis.¹² Finally, asbestos-containing rollers are used in the production of paper.¹³

Other observations in our study raise several important considerations. There is a wide variation in the reported incidence of asbestos exposure in patients with mesothelioma.¹⁴⁻¹⁶ The possibility that this might be explained on the basis of inadequate occupational histories is supported by our observations. Thus, the occupations listed on death certificates of male patients suggested that only 39.4 percent had well-established asbestos exposure. This contrasts with 77.4 percent when detailed interviews were conducted. The crocidolite type of asbestos has been most frequently associated with malignant mesothelioma.¹⁷ Our results support the suggestion that exposure to other types of this mineral, such as chrysotile and/or amosite in insulators, and tremolite in talc workers, might be sufficient to induce this tumor.¹ As previous investigations have suggested, more subtle indirect, nonoccupational exposure might be important, especially in females.⁴ In certain instances, patients with this disorder have had both direct and indirect exposure to asbestos. Although we found no instances of familial mesothelioma in this investigation, recent reports^{4,18} have raised the possibility that genetic factors might also play a role in the etiology of this disorder. All of these factors should be considered in evaluating the patient with malignant mesothelioma.

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Rubens paintings reveal artist had arthritis

A study of the paintings of Peter Paul Rubens shows that the artist probably suffered from rheumatoid arthritis in his hands, says a report in the February 6 *Journal of the American Medical Association*.

This means, says a study group of Belgian and American physicians, that rheumatoid arthritis existed in man at least 200 years earlier than had previously been thought.

Rubens lived from 1577 to 1640, and was a successful painter during much of his lifetime. Study of his paintings through the years shows progressive rheumatoid arthritis that resulted in twisted fingers and swollen wrist, says George E. Ehrlich, M.D., of Hahnemann Medical College and Hospital, Philadelphia.

Traces of osteoarthritis have been found in the remains

of dinosaurs and early man. But there had been no indication that rheumatoid arthritis was in evidence prior to the 19th century.

Dr. Ehrlich and his Belgian colleagues at the University of Brussels examined an international exhibition in Antwerp of the paintings of Rubens. A painting from 1609, *St. Matthew*, features a swelling of joints of two fingers. Two paintings, *The Drunken Sleeping Satyr* (1610) and *Suzanna and the Elders* (1614) continue to show swollen fingers and also show a swollen wrist.

Through the years the arthritis portrayed in the Rubens paintings became steadily more severe, indicating the worsening of the condition as the artist grew older, Dr. Ehrlich says.

The study established that the artist likely introduced his own hands as models in many of the paintings. Other artists have been known to change painting style because of the ravages of the disease.