

Epidemiology of Angiosarcoma of Liver In New York State

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Angiosarcoma of the liver (ASL) is a highly malignant tumor¹ which can be caused by exposure to arsenic in pesticides^{2,3} and Fowler's solution (potassium arsenite),⁴⁻⁶ thorium dioxide (ThO₂—a diagnostic radiopaque medium also called Thorotrast),⁷ and vinyl chloride monomer (VCM), a colorless gas which can be polymerized to make polyvinyl chloride (PVC) in the production of plastics.⁹⁻¹⁵ This disorder has also been associated with inorganic arsenic¹⁶ (vineyard sprayers), diethylstilbestrol,¹⁷ and melanochromatosis.^{18,19} Recently it has been suggested that more subtle types of exposure such as residential proximity to VCM/PVC industrial complexes²⁰ might be important. This report examines the geographical distribution of ASL in New York State with particular emphasis on occupation and other epidemiologic characteristics which might be of importance in the etiology of this disorder.

Methods

Incidence study. This study included all residents of New York State, excluding New York City, diagnosed with histologically confirmed ASL from 1958 through 1978, who were reported to the Tumor Registry, Cancer Control Bureau, New York State Department of Health. The New York State Tumor Registry is the largest population-based registry in the world. State law requires that all diagnoses of malignancy be reported by physicians and/or hospital institutions. This nine-year study period was selected because during this time the registry established a mechanism to improve reporting of cases through periodic examinations of the percent of cases assigned into the State Cancer Registry by death

certificates only and by an ongoing survey of hospital records. Patients from New York City were excluded because cancer reporting from this area was not instituted until 1973, and at present findings are incomplete. An average annual incidence rate was calculated for the nine-year period using the 1974 population estimate (Office of Biostatistics, New York State Department of Health). Age-specific incidence rates (calculated by 10-year age groups) and an overall sex ratio (male rate to female rate) were also determined using the above population estimates. The 57 counties of New York State, excluding New York City, were divided into the seven standard health service areas (HSA), and a regional rate was calculated for each area.

Descriptive study. All residents of New York State diagnosed with histologically confirmed ASL from 1958 through 1979 and reported to the New York State Tumor Registry (including those reported from New York City from 1973 through 1979) were included in this investigation. Trained field investigators used a prepared questionnaire to obtain information from all cases (or in the event of death, their closest living relative) regarding past and present occupation, medical, familial, travel, and social histories. Particular attention was given to histories of exposure to known or suspected causative agents. In addition, specific questions were asked about residential histories in an effort to determine whether patients ever lived in close proximity (one mile or less) to industrial complexes, farms, or known dumpsites prior to being diagnosed with ASL.²¹ Using information obtained from the New York State Departments of Commerce and Environmental Conservation²² to identify known VCM and/or PVC factories and dumpsites, we plotted all places of residence of patients with ASL prior to their diagnostic dates. The urban-rural distribution of all patients at the time of diagnosis was also determined. (Urban counties are counted as those with a population of 100,000 or greater.) Medical records of all patients were reviewed to confirm 1) the diagnosis of ASL; 2) past medical histories (diagnostic procedures involving ThO₂ and drug histories); 3) place of residence, and 4) occupation at the time of diagnosis.

Results

Twenty-five cases (14 males, 11 females) of ASL were included in the incidence study. The average annual incidence rate for New York State, excluding New York City, was 0.26 per million. Annual rates ranged from 0.0 to 0.46 per million population per year during the nine-year study period, and no temporal peaks were evident. Age at diagnosis ranged from one month to 83 years, with an overall mean age of 50.5 years (males 54.1 years, females 49.6 years). Analysis of age-specific incidence rates indicated that the highest rate, 1.08 per million population, occurred in the 60-through-69-year age group. The overall male to female ratio was 1.3 to 1. HSA I had the highest average annual incidence rate of 0.40 per

million population, followed by area VIII with a rate of 0.33 per million. Area V had a comparable rate to that for the state and the other four HSAs had lower rates (Fig. 1).

A total of 43 patients (male 24, female 19) diagnosed with ASL in New York State (Table I) and reported to the Registry from 1958 through 1979 were included in the descriptive study. Forty-two patients were deceased at the time of the investigation. A first degree relative (spouse, sibling, parent, or child) was interviewed regarding 37 of the 43 (86 percent) patients. Information on three patients was obtained from other close relatives and no interview was obtained for three cases (including two infants). Their ages ranged from one month to 83 years with an overall mean age of 52.7 years (males 65.5 years, females 49.1 years). There were 39 white patients, 3 blacks, and 1 Oriental. Four male patients (numbers 4, 8, 10, and 39; Table I) from Niagara and Erie counties worked in the same VC polymerization plant for a period ranging from 16 to 35 years (median 23.5 years) prior to being diagnosed with ASL. In addition,

The geographic distribution of ASL (angiosarcoma of the liver) among residents of New York was examined with special emphasis on the epidemiologic characteristics which might be of etiologic importance in this malignancy. The average annual incidence rate for the state, excluding New York City, was 0.26 per million population. Of the chemicals associated with ASL, potential exposure to vinyl chloride appeared to be the most important factor in certain urban industrialized counties, whereas probable arsenic exposure was the major factor in rural areas. Prior thorium dioxide injections accounted for only 7 percent of the 43 patients studied. We suggest that certain chemicals structurally similar to vinyl chloride might be of etiologic importance among patients who have no documented exposure to any of the established causes of ASL.

tion, five patients, all females (numbers 5, 11, 17, 21, and 25; Table I), resided within one mile of plastic-

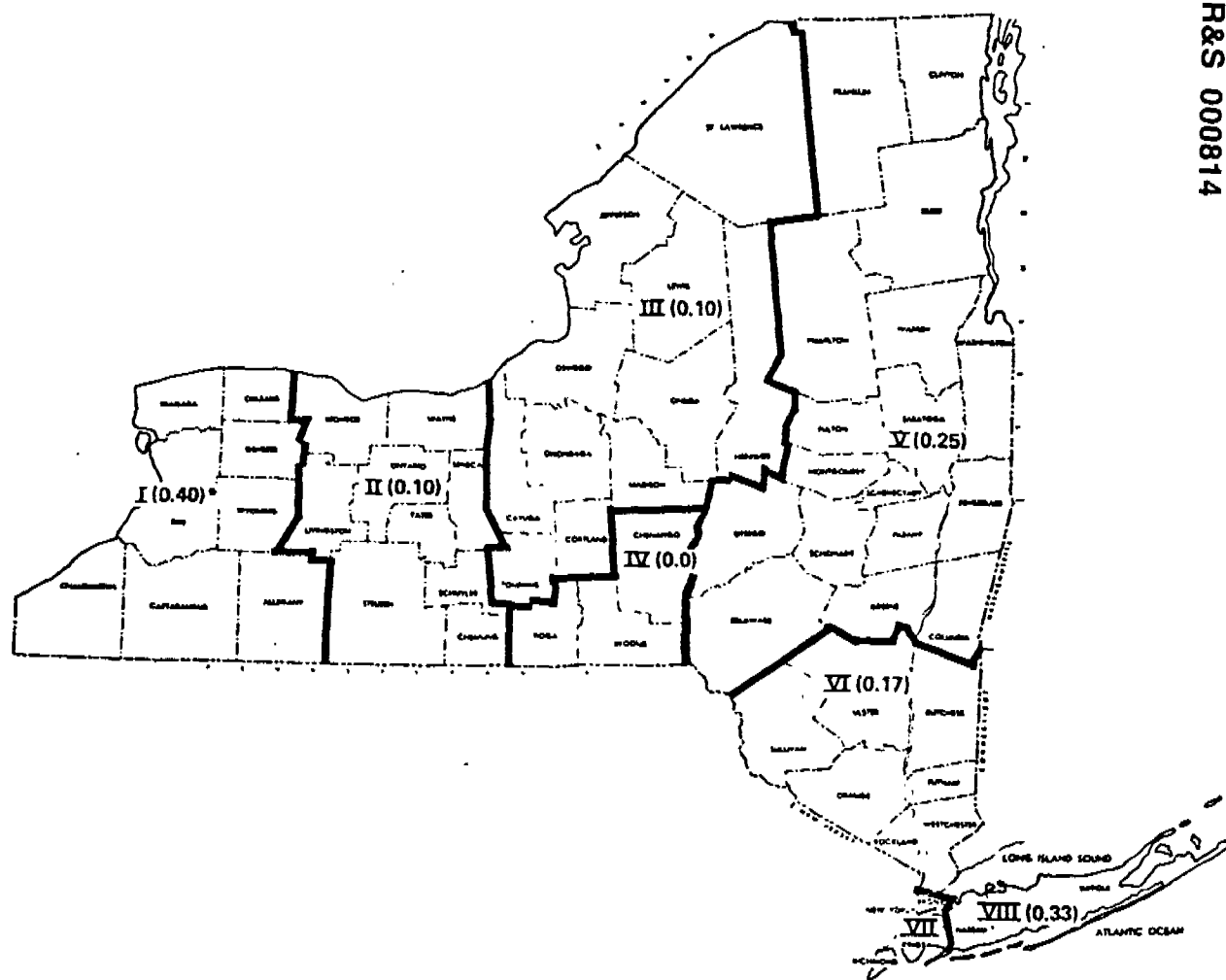


FIGURE 1. Average annual incidence rates (per 100,000 population) in the seven health service areas of New York State, excluding New York City, from 1970 through 1978.

Demographic data and exposure history of 43 residents of New York State with angiosarcoma of liver
(1958 through 1979)

Age at Diagnosis	Race*	Sex	Year of Diagnosis	County of Residence	Occupational History	Probable Exposure	Possible Residential Exposure History
32	W	M	1958	Greene†	gardener-caretaker	As**	
49	W	F	1959	Westchester	secretary/housewife		
53	W	F	1960	Monroe	salesclerk		
50	W	M	1961	Niagara	chemical operator	VC	
	W	F	1965	Nassau	clerk/housewife	VC	lived 4500' from factory
67	W	F	1967	Erie	aircraft worker/ verifax operator		
52	W	M	1968	Albany	machinist/appliance repair	ThO ₂	
54	W	M	1968	Niagara	chemical operator	VC	
60	W	M	1969	Nassau	secret service/ attorney		
60	W	M	1970	Niagara	chemical operator	VC	
45	W	F	1970	Erie	housewife	VC	lived 4500' from factory
45	W	M	1970	Nassau	attorney		
18	B	F	1970	Westchester	clerk		
68	W	M	1971	Nassau	school principal/ chemistry teacher		
55	W	F	1971	Fulton†	battery filler/glove operator	As, Cu**	
2 mos.	W	F	1971	Westchester	infant		
31	O	F	1972	Nassau	bankteller	VC	lived 1500' from factory
77	W	M	1972	Erie	laborer—aerospace industry & City of Buffalo		
64	W	F	1973	Lewis†	sewing machine operator	As	lived on farm
47	W	M	1973	Nassau	real estate broker	ThO ₂	
62	W	F	1973	Niagara	clerk—chemical company/ manager—candy store	VC	lived 1700' from factory
47	B	M	1973	Queens	bookkeeper	As	lived on banana farm
63	W	M	1973	Nassau	carpenter, cleaning and maintenance		
59	W	M	1973	Seneca†	minister		
31	W	F	1974	Erie	medical secretary/ housewife	VC	lived 500' from factory
45	W	M	1974	Rockland	office worker—plastic co./executive		
18	W	F	1974	Brooklyn	student		
62	W	F	1974	Greene†	owner—clothing store		
65	W	M	1975	Jefferson†	report analyst—brake co.		
71	B	M	1975	Queens	janitor—subways		
73	W	M	1975	Nassau	carpenter/painter		
57	W	F	1975	Manhattan	film lab./contract administrator for TV		
no.	W	M	1975	Greene†	infant		
3	W	M	1976	Wayne†	research chemist— photo co.	As	lived on farm
7	W	M	1976	Brooklyn	maintenance/cleaning		
5	W	M	1976	Manhattan	executive—soda co.		
7	W	F	1977	Richmond	housewife		
1	W	F	1977	Cattaraugus†	chromium chair co./ cafeteria worker		
	W	M	1977	Erie	chemical operator	VC	
	W	F	1977	Bronx	domestic/housewife		
	W	F	1978	Suffolk	sales—radio shop		
	W	M	1978	Suffolk	radio operator	ThO ₂	
	W	M	1979	Dutchess	dairy & fruit farmer/ truck driver	As	

Black, O = Oriental,
containing less than 100,000 population.
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Survival rate improving in systemic lupus erythematosus

Medical science is learning more about a particularly stubborn and uncomfortable disease—systemic lupus erythematosus—and the survival rate of sufferers has improved markedly in recent years.

SLE (systemic lupus erythematosus) is a chronic, inflammatory disease of unknown cause affecting skin, joints, kidneys, nervous system, and often other organs of the body. The most obvious sign is a persistent skin rash with classic butterfly pattern.

The disease strikes about one person in each 1,000 and five to 10 times more common among females than males.

In a report in the March 6 *Journal of the American Medical Association*, a California research group relates experience in treating 609 patients with SLE, with a follow-up period of up to ten years.

The overall ten-year survival was 79 percent, said Edmund L. Dubois, M.D., of the University of California at San Francisco School of Medicine. Male patients did worse than female patients. There was no basic difference in survival of blacks and whites.

One of the most serious results of SLE is kidney damage, and this was a factor in many of the fatal cases, Dr. Dubois found.

The survival rate of 79 percent was much improved over earlier results, and the California group credits improvement to closer follow-up, better nutritional status, and treatment begun at earlier stages of the disease.

"Our understanding of SLE has improved substantially over the last 30 years. While SLE initially was reported to have a 90 percent two-year mortality, more recent reports have shown much longer survival. This article represents the most cohesive group published to date. It represents the largest number ever reported by a private physician, with a follow-up report twice that of any other study," he said.

The disease progresses slowly. There is an average time lapse between first signs of the ailment and obtaining a diagnosis from the physician of around four years.

"We believe that the socioeconomic problems of patients who attend the larger city or county hospital clinics affect survival significantly. Less optimal living conditions, poor nutrition, and inferior education lead to less reliable medication administration, missed clinic appointments, greater risk of infection, and presentation with more advanced disease," Dr. Dubois said.