CENTER FOR DISEASE CONTROL

Morbidity and Mortality

Vol. 23, No. 6

WEEKLY REPORT

For Week Ending February 9, 1974

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE

DATE OF RELEASE: FEBRUARY 15, 1974 – ATLANTA, GEORGIA 30333

EPIDEMIOLOGIC NOTES AND REPORTS
ANGIOSARCOMA OF THE LIVER AMONG POLYVINYL CHLORIDE WORKERS – Kentucky

Between September 1967 and December 1973, 4 cases of angiosarcoma of the liver were diagnosed among men employed in the polyvinyl chloride polymerization section of a B.F. Goodrich plant near Louisville, Kentucky. This section of the plant began operations in 1938. It employs about 270 persons and produces polyvinyl chloride as well as a variety of copolymers by polymerization of vinyl chloride monomer. All 4 men had worked continuously in the section for at least 14 years prior to onset of illness (Table 1); all 4 had worked directly in various phases of the polymerization process.

Case 1 presented in August 1967 with an epigastric mass and thrombocytopenia. An exploratory laparotomy was performed in September 1967; liver biopsy revealed angiosarcoma. Case 2 presented in January 1970 with gastrointestinal (GI) bleeding. Recurrent bleeding in May 1970 led to an exploratory laparotomy at which time a diagnosis of angiosarcoma was made on liver biopsy. Case 3 presented in January 1964 with GI bleeding which recurred in May 1965 with

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

DISEASE	6th WEEK ENDING		MEDIAN 1969-1973	CUMULATIVE, FIRST 6 WEEKS		
	February 9, 1974	February 10, 1973		1974	1973	MEDIAN 1969-1973
Aseptic meningitis	34	29	35	213	238	218
Brucellosis	1	3	1	9	11	11
Chickenpox	3,609	5,305	– – –	18,811	27,061	– – –
Diphtheria	1	2	2	7	12	17
Encephalitis:						
Primary: Arthropod-borne and unspecified	19	21	18	86	95	120
Post-Infectious	12	4	5	27	20	26
Hepatitis, Viral:						
Type B	135	120	128	934	805	805
Type A	871	1,027	1,067	4,914	5,775	6,407
Type unspecified	153			812		
Malaria	6	6	39	18	17	243
Measles (rubeola)	521	704	704	2,414	3,461	3,663
Meningococcal infections, total	34	34	50	156	174	331
Civilian	34	34	49	156	166	307
Military	–	–	2	–	8	15
Mumps	1,762	2,145	2,502	9,148	10,400	12,594
Pertussis	72	– – –	– – –	182	– – –	– – –
Rubella (German measles)	258	441	823	1,098	2,269	2,964
Tetanus	2	1	1	6	6	6
Tuberculosis, new active	529	562	– – –	3,040	3,027	– – –
Tularemia	2	2	2	10	10	10
Typhoid fever	6	4	4	35	22	26
Typhus, tick-borne (Rky. Mt. spotted fever)	–	1	–	12	6	3
Venereal Diseases:						
Gonorrhea	16,810	14,259	– – –	97,831	85,951	– – –
Syphilis, primary and secondary	462	516	– – –	2,661	2,917	– – –
Rabies in animals	43	69	67	267	327	347

TABLE II. NOTIFIABLE DISEASES OF LOW FREQUENCY

	Cum.		Cum.
Anthrax:	1	Poliomyelitis, total:	–
Botulism: Wash. 2	2	Paralytic:	–
Congenital rubella syndrome: Ida. 1, Tex. 1	7	Psittacosis: Tex. 1	2
Leprosy: Hawaii 1	4	Rabies in man:	–
Leptospirosis: Hawaii 1, Ida. 1	6	Trichinosis: N.Y.C. 1, Okla. 1	13
Plague:	–	Typhus, murine: Calif. 1, Va. 1	2

ANGIOSARCOMA – Continued

signs of portal hypertension. A portacaval shunt was performed, and liver biopsy yielded a diagnosis of cirrhosis. Repeat biopsies in October 1970 and September 1972 confirmed this diagnosis. Autopsy in March 1973 revealed angiosarcoma. Case 4 presented in July 1973 with hepatosplenomegaly, weight loss, and jaundice. Two liver biopsies were interpreted as showing severe cirrhosis. Autopsy in December 1973 revealed angiosarcoma.

In each case, pathologic material revealed the presence of extensive cirrhosis of a non-alcoholic type in addition to angiosarcoma. In 2 cases, the diagnosis of angiosarcoma was made only at autopsy, cirrhosis having been diagnosed 7 years before in Case 3 and 5 months before in Case 4. None of the patients gave histories of prolonged alcohol use or exposure to hepatotoxins outside their work place. In particular, none had ever had exposure to thorium dioxide or to arsenic, 2 materials known specifically to induce hepatic angiosarcoma in man *(1,2)*.

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Editorial Note

Angiosarcoma of the liver is an exceedingly rare tumor. It is estimated that only about 25 such cases occur each year in the United States. Four cases, therefore, among a small number of workers at a single plant is a most unusual event, and one which raises the possibility of some work-related carcinogen, conceivably vinyl chloride itself. Although no data are yet available concerning the occurrence of angiosarcoma among workers at other vinyl chloride plants in the United States, it seems distinctly possible that the problem may be industry-wide. Epidemiologic studies have started to determine the extent of the problem in the United States, with respect both to angiosarcoma of the liver and to its possible relationship to post-toxic cirrhosis.

Table 1
Cases of Angiosarcoma of the Liver
among Polyvinyl Chloride Workers
B. F. Goodrich Plant
Louisville, Kentucky

Case	Age at illness onset	Date of			Years worked with PVC before illness
		Illness onset	Diagnosis	Death	
1	43	Aug. 1967	Sept. 1967	Jan. 7, 1968	17
2	36	Jan. 1970	May 1970	Sept. 27, 1971	14
3	41	Jan. 1964	Mar. 1973	Mar. 3, 1973	14
4	58	July 1973	Dec. 1973	Dec. 19, 1973	27

Published data concerning the potential hepato-toxicity and oncogenicity of vinyl chloride are limited. Studies in Germany have suggested a link between hepatic damage and occupational exposure to vinyl chloride *(3)*, while Italian workers have suggested that vinyl chloride may cause a wide variety of tumors in animals *(4)*. The chemical concentrations used in these latter experiments, however, far exceed levels likely to be encountered in industrial environments. Efforts to confirm such observations and to measure effects at lower dose levels are now in progress.

References

1. da Silva Horta J, Abbatt JD, Cayolla da Motta L, Roriz ML: Malignancy and other late effects following administration of thorotrast. Lancet 2:201-205, 1965

2. Regalson W, Kim U, Ospina J, Holland JF: Hemangioendothelial sarcoma of liver from chronic arsenic intoxication by Fowler's solution. Cancer 21:514-522, 1968

3. Marsteller HJ, Lelbach WK, Müller R, et al: Chronisch-toxische leberschäden bei Arbeitern in der PVC-Produktion. Dtsch Med Wochenschr 98:2311-2314, 1973

4. Viola PL, Bigotti A, Caputo A: Oncogenic response of rat skin, lungs, and bone to vinyl chloride. Cancer Research 31:516-522, 1971

WILD MUSHROOM POISONING – Pennsylvania

On October 9, 1973, 37 nuns ate their evening meal at a convent in Berks County, Pennsylvania. Between ¾ and 4¼ hours later (median–approximately 2 hours), 17 nuns developed an illness characterized by profuse sweating (76%), watery diarrhea (76%), chills (58%), and abdominal pain (42%) (Table 2). Six of the nuns were hospitalized; none died.

Food-specific attack rates for foods ingested in the 24 hours before illness strongly implicated mushrooms as the intoxicating food (Table 3). Stool specimens from 4 of the ill nuns and bacteriologic cultures of the remaining mushrooms yielded no enteric pathogens. Remnants of the mushrooms were identified as *Clitocybe sp.* and *Lepiota sp.* Some species of the former genus are known to contain muscarine, which produces parasympathomimetic effects.

The mushrooms had been picked on the grounds of the convent on the afternoon of the outbreak. For several years, the nuns had eaten these mushrooms at meals, and no apparent illness had occurred. On October 9, however, the nun who

Table 2
Symptoms in 17 Ill Nuns
Berks County Convent – October 9, 1973

Symptom	Percent with Symptom
Diarrhea	76
Sweating	76
Chills	58
Abdominal pain	42
Nausea	35
Vomiting	23
Excessive salivation	23
Feverish feeling	18
Dry mouth	12
Blurred vision	12
Headache	6
Weakness	6
Faint feeling	6

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