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Table 1. — Reported Cases of Angiosarcoma of the Liver Among Vinyl Chloride Polymerization Workers.

Country	Case No.	Birth Date	1st VC or PVC Exposure	Diagnosis of Angiosarcoma	Age at Diagnosis	Years from 1st Exposure to Diagnosis	Total Years of Exposure	Date of Death
Belgium	01	00-00-00	00-00-00	00-00-00	00	00	00	06-29-76
Canada	01*	12-15-13	00-00-44	00-00-55	41	11	11	09-02-55
Canada	02*	03-06-14	00-00-43	00-00-57	43	14	14	12-21-57
Canada	03*	08-26-19	00-00-41	00-00-62	42	21	20	03-22-62
Canada	04*	04-05-19	00-00-45	00-00-67	48	22	22	01-21-68
Canada	05*	05-07-11	00-00-44	00-00-68	57	24	05	07-05-68
Canada	06*	12-15-19	00-00-47	00-00-71	51	24	23	04-10-71
Canada	07*	11-09-19	00-00-46	00-00-72	53	26	25	12-24-72
Canada	08	05-13-20	00-00-61	00-00-73	53	12	05	06-12-73
Canada	09	07-19-21	00-00-46	00-00-74	53	28	26	09-04-74
Canada	10	05-16-15	00-00-53	00-00-76	61	23	14	04-00-77
Czechoslovakia	01*	00-00-28	00-00-57	00-00-73	46	16	16	00-00-74
Czechoslovakia	02*	00-00-26	00-00-51	00-00-66	40	15	15	00-00-66
Fed. Rep. Germany	01*	06-04-30	10-01-56	09-19-68	38	12	12	01-25-69
Fed. Rep. Germany	02*	07-26-31	10-14-57	09-25-70	39	13	12	12-14-71
Fed. Rep. Germany	04	09-04-30	04-16-57	00-00-74	44	17	17	11-25-74
Fed. Rep. Germany	05*	01-01-32	12-16-62	00-00-75	43	13	12	01-09-75
Fed. Rep. Germany	07*	09-29-26	04-15-54	00-00-75	49	21	12	11-13-75
Fed. Rep. Germany	08*	10-19-17	04-19-54	00-00-75	58	22	21	12-25-75
Fed. Rep. Germany	09*	12-13-34	12-02-59	06-16-76	42	17	15	Alive
Fed. Rep. Germany	10*	07-25-29	10-10-55	06-28-77	47	22	22	06-28-77
Fed. Rep. Germany	11*	12-29-36	01-02-61	00-00-77	41	16	10	03-07-77
France	01*	04-15-24	01-00-46	02-18-67	43	21	19	02-19-67
France	02	06-03-11	07-06-59	01-08-75	63	15	12	01-24-75
France	03*	00-00-19	00-00-46	01-00-75	55	29	29	06-29-75
France	04*	01-27-27	10-19-49	01-04-76	49	26	26	01-04-76
France	05*	01-29-38	00-00-65	04-00-76	38	11	10	05-13-76
France	06*	04-14-34	00-00-58	09-00-76	42	18	17	09-12-76
France	07	00-00-27	07-01-50	07-00-76	49	26	23	07-02-76
France	08*	04-01-34	05-23-57	12-03-76	42	19	19	01-30-77
Great Britain	01*	04-20-01	00-00-48	12-00-72	71	28	22	12-00-72
Great Britain	03	06-02-37	02-00-66	12-00-74	37	09	04	12-24-74
Italy	02*	11-13-29	00-00-57	12-13-72	43	15	06	12-00-72
Italy	03*	03-14-20	00-00-53	07-10-75	55	22	21	07-10-75
Japan	01	08-01-22	04-00-53	08-21-74	52	22	22	10-24-75
Norway	01*	12-23-15	03-00-50	12-20-71	56	22	21	01-04-72
Sweden	01*	06-23-27	08-14-51	08-00-74	43	19	18	10-20-70
Sweden	03*	06-10-10	05-00-47	03-19-76	65	29	21	03-19-76
Sweden	04*	11-16-14	00-00-46	05-12-77	62	31	31	05-12-77
USA	01*	10-17-23	12-09-48	03-03-73	49	24	21	03-03-73
USA	02*	08-19-33	11-15-55	05-00-70	37	14	13	09-28-71
USA	03*	05-25-15	11-28-45	12-19-73	58	28	28	12-19-73
USA	04*	07-15-24	07-06-52	08-19-67	43	15	15	01-07-68
USA	05*	01-25-12	06-19-44	04-09-64	52	20	20	04-09-64
USA	06*	11-23-28	01-17-62	02-00-74	46	12	12	07-24-75
USA	07*	05-03-22	08-27-44	00-00-68	45	24	17	03-23-68
USA	08*	05-06-20	10-07-46	08-00-61	41	15	15	08-29-61
USA	09*	11-08-31	05-20-45	03-01-74	43	29	24	03-00-75
USA	10*	08-16-13	06-12-51	05-00-68	55	17	17	05-10-68
USA	11*	05-27-00	10-14-46	03-00-70	61	23	23	03-16-70
USA	12*	11-17-18	09-13-49	05-02-60	50	20	19	05-02-60
USA	13*	12-01-21	12-11-42	05-00-74	52	32	26	07-04-74
USA	16*	11-04-27	05-00-50	00-00-60	41	19	04	03-27-60
USA	17*	05-06-31	06-23-55	10-11-74	43	19	19	Alive
USA	18*	04-22-28	09-15-54	00-00-75	46	21	11	11-02-75
USA	19*	00-00-15	00-00-43	06-19-75	60	32	22	04-06-76
USA	20*	08-31-17	00-00-55	01-30-76	58	21	18	01-30-77
USA	21*	09-02-00	12-00-46	00-00-77	67	30	21	01-02-77
USA	22*	10-02-23	07-11-47	01-00-76	52	29	28	12-04-76
USA	23*	00-00-23	09-0-58	04-06-73	50	15	14	04-06-73
USA	24*	05-07-17	00-00-39	05-27-77	60	38	26	05-27-77
USA	25*	08-07-10	02-00-47	03-10-77	67	30	20	03-10-77
Yugoslavia	01*	04-05-14	00-00-53	04-08-73	59	20	20	04-08-73
Yugoslavia	02*	11-15-31	00-00-50	07-12-73	42	23	18	07-12-73
Total Reported Cases 64								

*Diagnosis was microscopically confirmed.

"00" indicates unknown data.

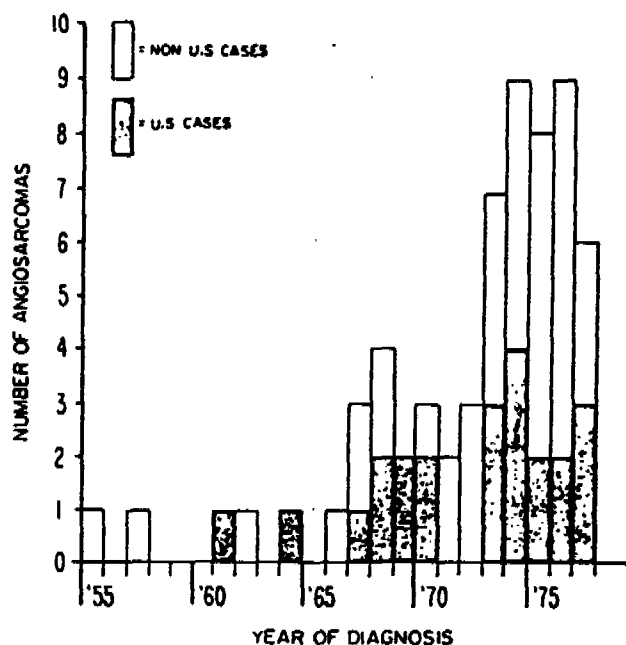


Fig 1. — Number of cases of VC/PVC related angiosarcomas reported to NIOSH by year of diagnosis. (This represents only 63 of the 64 cases known to NIOSH since information on diagnosis is missing for one case.)

tial cases were more biologically susceptible, or (3) random fluctuation. Analysis of the latency period for this disease in vinyl chloride workers should be a fruitful area for future study since multiple etiologies do not seem to be a factor in these cases and the exposure periods can be fairly well defined via employment histories.*

*Recent preliminary findings by NIOSH's Division of Biomedical and Behavioral Science suggest that the interaction of disulfiram with the enzymatic detoxification of ethylene dibromide results in increased carcinogenicity including angiosarcoma of the liver in laboratory rats.

One of the values in maintaining this register of cases among vinyl chloride workers is that it provides a base from which hypotheses for future research can be generated. However, the extremely rare occurrence of liver angiosarcoma lends great importance to the need for as complete reporting of the cases as possible if we are to develop a better understanding of liver angiosarcoma in relation to vinyl chloride exposure. The occupational health community is asked to report all new or as of yet unreported cases of angiosarcoma among VC/PVC workers to either Dr. Robert Spirtas or Ms. Rose Kaminski, Surveillance Branch/DSHEFS/NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226, (513) 684-3284.

In addition to vinyl chloride's association with angiosarcoma of the liver, recent studies have also found vinyl chloride to be associated with excesses in brain cancer and neoplasms of the respiratory and lymphatic systems.³⁻⁵ More studies are needed to assess these findings. For an overview of the literature concerning the health effects associated with VC/PVC exposure, the reader is referred to Volume 246 of the *Annals of the New York Academy of Sciences*.⁶

The authors wish to thank Dr. J. William Lloyd, Dr. Henry Falk and Mr. Richard Waxweiler for their constructive criticisms.

References

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Angina as a Diagnostic Predictor

It turns out that a history of typical angina is as good a predictor of ischemic heart pain or coronary disease as any other data we can get, including the exercise electrocardiogram. If you get this typical history your chances of finding significant obstructive coronary disease are 80 or 90%, depending, of course, on the "expertise" of your evaluation. If you find atypical features, on the other hand — something isn't quite right and you're not sure it's really angina — then the chances are going to fall off to only about 50% that such patients will have obstructive coronary disease. And if you're pretty certain that this is not ischemic pain, then the incidence of coronary disease falls to about 10 or 20%. So the ability to take a history and identify the typical anginal syndrome is your best way of determining whether the patient is likely to have obstructive coronary disease. We're all anxious to use exercise electrocardiography and other studies as supplements, but there's no specific test available that is any better than a good and careful history.

— From "Bedside Cardiac Diagnosis" by J. O'Neal Humphries, in *Emergency Medicine*, January, 1978.