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- Attached is copy of NIOSH criteria document.
- Attached is copy of Proposed Standard.
- Attached is copy of Final Standard.
- Attached is copy of O.R.C. Split-Sheet Analysis.
- Attached is O.R.C. Task Force Membership.
- × Attached is report from O.R.C.
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Memorandum

November 26, 1975

To: Participants in ORC Occupational Safety and Health
Standards Group

From: Leo Teplow, Special Consultant
William Nichols, Study Administrator

Attached is the "Interim Report on Mortality Data Collected by ORC
Concerning the Effects of Vinyl Chloride Exposure in PVC Fabrication,"
issued October 10, 1975.

The report is based on an analysis of death certificates from 10 companies
having completed records in August 1975 for employees who died during the
period 1964-1973. An additional eight companies had certificates in various
stages of completion and their data will be included in the final report. Other
companies are now attempting to retrieve their records and they may also
be included.

The final report will be submitted in December 1975. It is difficult to
estimate the total number of companies participating in the final study but
it will probably be 18-20.

Dr. Leonard Chiazze, who prepared the analysis in this report, joined
the National Cancer Institute, effective September 1, 1975, and is no
longer in his role as consultant to ORC.

If there are any questions regarding this interim report, please feel free
to contact us.

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Interim Report

MORTALITY DATA COLLECTED BY ORC
CONCERNING THE EFFECTS OF VINYL CHLORIDE
EXPOSURE IN PVC FABRICATION

October 1975



Organization Resources
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INTERIM REPORT ON
MORTALITY DATA COLLECTED BY ORC CONCERNING
THE EFFECTS OF VINYL CHLORIDE EXPOSURE
IN PVC FABRICATION

October, 1975

In March 1974, representatives of the polyvinyl chloride (PVC) producers who were members of the ORC Occupational Safety and Health Standards Group asked ORC to conduct a study of health risks to workers engaged in fabrication of PVC products. They were concerned over the effect on manufacturers using PVC resins, as well as on the general public, of the implication that vinyl chloride was an occupational carcinogen — and particularly that it was an apparent cause of angiosarcoma of the liver.¹

Since the fabrication of PVC would expose workers only to very low levels of vinyl chloride, the producers hypothesized that the apprehension of users might be allayed by a survey of the experience of employees working directly with the resin in fabrication processes. Such a survey might also provide evidence that could be submitted to OSHA concerning a possible safe concentration of vinyl chloride. To

¹ In January, 1974, B. F. Goodrich Chemical Company disclosed three deaths at its Louisville, Kentucky plant which were diagnosed as caused by angiosarcoma of the liver, a rare form of cancer.

PVC fabricators, the predicted standard of less than 50 ppm² then being considered by OSHA was unnecessarily stringent because (1) there was no evidence in studies to date of danger at low exposure levels, and (2) compliance would require costly changes in equipment and facilities which might make use of PVC resins unfeasible economically.

Accordingly, the study was designed to answer three basic questions:

1. What is the incidence of angiosarcoma of the liver in the population selected for study?
2. What is the mortality experience from cancer and liver disease among that population?
3. How does the mortality experience from the above causes in the study group compare with the rate in an appropriate general population?

This interim report summarizes the findings and conclusions to date of the ORC study. They are based on an analysis of death certificates of employees in plants processing PVC who died in the period 1964-1973 while working for, or retired from, their respective companies.

The protocol of the study was developed by Leonard Chiazze, Jr., Sc.D., until August 1, 1975, Director, Division of Biostatistics and Epidemiology, Department of Community Medicine and International

² In January, 1974, the Threshold Limit Value for occupational exposure to vinyl chloride was 500 ppm; an emergency temporary standard promulgated by OSHA reduced the concentration to 50 ppm.

Health, Georgetown University School of Medicine, Washington, D. C., and the analysis contained in this report is his. The administration of the study was under the supervision of William E. Nichols, Ph. D., of the ORC staff. The nosologist was Clara Walden. Most of the field work was conducted by Claire Goodwin, RRA, and Patricia Walker, RRA.

STUDY DESIGN

The original design of the study called for review of death certificates supplied from life insurance underwriters over the study period. The use of a third party was desirable to enhance the objectivity of the study and hence its credibility. Moreover, it was expected that insurance company records would provide a relatively complete source of information and that retrieval would not be difficult. In practice, however, insurance carriers often were unable to provide all the certificates for the 1964-1973 period, and a combination of insurance company and employer files had to be used.

Study of death certificates for the 1964-1973 period made it possible to develop a data base from company experience large enough for comparison with official published data on deaths in the general population during that period. Additionally, the total work history of the sample population spanned most of the period that PVC had been in use.

As already noted, only those companies with plants fabricating PVC resin into finished products were considered for participation. Additional criteria for selection included:

1. At least one death from any cause among current or former employees in the study period.
2. A history of PVC use in excess of the 10-year period, 1964-1973. (The period of possible exposure had to be equal to or greater than the known or expected latency period of angiosarcoma of the liver in plants where deaths from that cause had occurred.)
3. A recordkeeping system that would identify all deaths in the work population, of both active and retired employees, during the 10-year period. It was also considered desirable to find out from plant records the levels of vinyl chloride exposure at given times. In practice few fabricators had regularly monitored exposures prior to 1974, and there were no records.³

At the outset, over 500 companies were identified as fabricators using PVC resin. Of these, 22 actually met the above criteria and agreed to participate. This number was further reduced, however, for two main reasons:

1. Records were not available or were so incomplete as to compromise their validity.
 - a. In many cases they had been destroyed after a short period of time, usually five years.
 - b. Plants had been acquired and sold without records being maintained. (One plant, now closed, had had four owners in the 10-year period.)

³ Monitoring in 1974 and 1975 showed concentrations to be under applicable limits set by OSHA.

- c. Some collective bargaining agreements provided that the administration of health and welfare benefits, including life insurance, was the function of the union; the employer, therefore, had no supporting documents for the deaths of employees.
 - d. Some companies did not require a death certificate in all cases.
2. In some plants, both polymer production (known sometimes to have had high-risk exposure levels) and PVC fabrication were in the same complex. Because it would not be possible to separate high exposures from low exposures, bias would be introduced into a study of presumed low levels.

Thus, by August 1975, refinement of the study population had led to selection of 16 companies, data from 10 of which are included in this interim report. Both single and multiplant companies are represented. The size of plants ranges from one with approximately 70 employees currently to one with over 7,000, with the size of most plants clustering around 300 to 500 employees.

Over the study period, plant size was found to have changed drastically in many cases. In one instance a plant employing 300 employees in 1973 employed fewer than 10, ten years ago. At the other extreme, one plant employing 5,000 people in 1964 had only 2,000 in 1973. Such developments show not only the rapid changes taking place in the industry over the 10-year study period, but also the difficulty of determining average industry employment. For these reasons, there is little significance in breaking down study population by plant.

Plants are located in both urban and small rural communities throughout the country. The employees are predominantly white males.

The six companies whose plants originally were to be covered in the study that are not included in the interim report had to be eliminated from the sample because of difficulties in retrieving death records of employees. Assuming these death records can be obtained, the experience of these plants will be reflected in the final report.

STUDY PROCEDURES

To date, records have been processed on a total of 4,205 employees, including a number for deaths occurring in 1962, 1963, or 1974. Since these years are not within the study period, the related records were eliminated from the analysis made for this report. In total, the sample consists of death certificates of 3,274 active or retired employees.

All available death certificates were examined by a trained nosologist and classified according to ICDA number⁴ by cause of death. Sex, color, age and place of death were also abstracted (see Appendix) for all certificates. From the total, certificates were separated into two groups as follows:

- a. All deaths with cancer (ICDA 140-205 up to 1967; ICDA 140-209 for 1968 on) or liver disease (ICDA 580-586 up to 1967; ICDA 570-576 for 1968 on) or suspected liver condition mentioned on the death certificate.

⁴ International Classification of Diseases Adapted for Use in the United States, 8th Revision.

- b. All deaths from causes other than cancer or liver disease. (Although the analysis focused on cancer and liver-related diseases, as the study proceeded it became clear that information on deaths from other diseases could be retrieved at the same time.)

Death records mentioning cancer or liver disease and giving a hospital as the place of death were segregated and sorted by hospital. Where there was a significant number of death records for a single hospital or several hospitals in the same area, arrangements were made for a trained Medical Records Administrator (MRA) to visit the hospitals and to review their medical records. In the hospitals visited, an additional element of the investigational strategy was to contact the hospital pathologist to inquire whether there were any angiosarcoma cases in the pathology records. If so, an attempt was made to determine whether or not the angiosarcoma could be related to vinyl chloride exposure. The procedure of contacting the hospital pathologist turned up five cases of angiosarcoma, but none involved individuals employed at any time in PVC fabricating plants.⁵ Hospitals which could not be visited personally were contacted by mail.

Incorporation of hospital visits in the investigation was designed as a control to verify death certificate data and as a means of supplementing incomplete information given on many of the certificates.

⁵ The existence of these five deaths were reported to OSHA and NIOSH by ORC.

The purpose was to cut "leakage" resulting from transfer of an employee from a PVC plant to a non-PVC plant within the same company. Such an investigation also ensured coverage of a fairly wide geographic area and permitted records of workers from other companies in the locality to be examined. This step revealed any people who formerly worked for a PVC fabricator who had contracted angiosarcoma since terminating their employment.

In total, 409 hospital contacts were made as a result of the review protocol. To date, hospital information has been obtained on 296 deaths or just over 50 percent of the total cancer and liver deaths reported in the analysis. (See Table 1, page 11).

Death certificates not mentioning a hospital as a place of death required an added step. First, the physician certifying the death was asked by mail for information on recent hospitalizations of the decedent and if there was any indication that he or she had cancer or liver disease. Where hospitals were identified, a hospital contact was made as described above.

Because the population at risk could not be determined, mortality rates as measures of risk could not be computed, and Proportionate Mortality Ratios (PMR), adjusted for age, had to be used instead. Briefly, the PMR utilizes relative frequencies of specific causes of death (by age) in a comparison population to obtain expected

numbers of deaths from that cause in the study population. Despite the well known deficiencies of the PMR, it can provide clues on unusual distributions of causes of death, where true rates cannot be calculated. Selection of an appropriate comparison population, however, poses a number of difficulties. Ideally, it would be desirable to have a cause of death distribution for a similar group of workers dying during the same time period, but not subjected to the factor under study. Such a comparison population was not available, and the study, in accordance with standard practice, utilized mortality for the United States specific for color and sex for comparative purposes.

FINDINGS

1. No angiosarcoma of the liver was found in the employee population studied. Overall, the incidence of all cancer in this study fell within the range of expectation for the comparison population, as did the incidence of liver disease.

2. Of 3,274 deaths which occurred among employees of the 10 PVC fabricators during 1964-1973, the majority were among white men (77 percent). Proportionate mortality ratios based upon the distribution of deaths among U. S. white men and women in 1968 indicate that there may have been an excess of deaths from diseases of the circulatory system for white men and deficits for cancer of the genitals and

cirrhosis of the liver. There appears to have been an excess of cancers among white women, especially in urinary cancers. Despite the variability of PMR's, they would appear to be within the range of expected variability, with the exceptions noted above.

3. As Table 1 shows, of deaths tabulated for whites and non-whites, 554 (18 percent) were due to cancer or liver disease. Additional analyses are planned for a more detailed cause of death list. Among white men, nearly 64 percent of the deaths are from diseases of the circulatory system (ICDA-8th Revision Rubrics 390-458) and 16 percent were deaths from cancer. The corresponding percentages for the total U. S. population of white males in 1968⁶ (midpoint of the study) were 54 percent for diseases of the circulatory system and 16 percent for cancer. Among white women in this study, 52 percent of deaths were from diseases of the circulatory system (compared with 57 percent for all U. S. white women in 1968⁷) and 26 percent were due to cancer (compared with 18 percent for all U. S. white women in 1968).

4. Distribution of deaths in the study group, compared with the corresponding U. S. distribution of deaths but adjusted for age, are shown in Table 2 in the form of Proportionate Mortality

⁶ U. S. Department of Health, Education and Welfare, Public Health Service, National Center for Health Statistics, "Vital Statistics of the United States, 1968," Vol. II — Mortality Part A, Table 1-25.

⁷ Ibid.

Table 1
DISTRIBUTION OF DEATHS FROM SELECTED CAUSES
AMONG EMPLOYEES OF 10 PVC FABRICATORS
BY COLOR* AND SEX, 1964 - 1973

Cause of Death	ICDA Code	Male		Female	
		Number	Percent	Number	Percent
WHITE					
ALL CAUSES	..	2,521	100.0%	427	100.0%
ALL CANCERS	140 - 209	403	16.0	111	26.0
Buccal Cavity and Pharynx	140 - 149	10	0.4	..	..
Digestive	150 - 159	146	5.8	32	7.5
Liver	155	4	0.2	..	..
Respiratory	160 - 163	112	4.4	8	1.9
Breast	174	..	..	24	5.6
Genitals	180 - 187	22	0.9	13	3.0
Urinary	188 - 189	26	1.0	10	2.3
Brain	191	7	0.3	..	..
Lymphatic	200 - 209	33	1.3	6	1.4
Others	..	43	1.7	18	4.2
DIABETES	250	37	1.5	7	1.6
DISEASES OF CIRCULATORY SYSTEM	390 - 458	1,608	63.8	221	51.8
CIRRHOSIS OF LIVER	571	17	0.7	3	0.7
ALL OTHER CAUSES	..	456	18.1	85	19.9
NONWHITE					
ALL CAUSES	..	77	100.0%	9	100.0%
ALL CANCERS	140 - 209	15	19.5	4	44.4
Buccal Cavity and Pharynx	140 - 149	..	..	..	..
Digestive	150 - 159	5	6.5	2	22.2
Liver	155	1	1.3	..	..
Respiratory	160 - 163	2	2.6	..	..
Breast	174	..	..	2	22.2
Genitals	180 - 187	1	1.3	..	..
Urinary	188 - 189	2	2.6	..	..
Brain	191	..	..	..	..
Lymphatic	200 - 209	3	3.9	..	..
Others	..	1	1.3	..	..
DIABETES	250	1	1.3	..	..
DISEASES OF CIRCULATORY SYSTEM	390 - 458	37	48.1	3	33.3
CIRRHOSIS OF LIVER	571	..	..	1	11.1
ALL OTHER CAUSES	..	24	31.2	1	11.1

*Color was unknown in 240 cases which are not shown in this table.

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Table 2
OBSERVED AND EXPECTED DEATHS DUE TO SELECTED CAUSES
AMONG EMPLOYEES OF 10 PVC FABRICATORS, 1964 - 1973

Cause of Death	Observed	Expected	PMR ^a
WHITE MALE			
ALL CANCERS	403	432.2	0.93
SELECTED TYPES OF CANCER			
Buccal Cavity and Pharynx	10	12.6	0.79
Digestive	146	126.2	1.16
Liver	4	3.2	1.25
Respiratory	112	133.6	0.84
Genitals	22	43.1	0.51
Urinary	26	25.9	1.00
Lymphatic	33	42.2	0.78
Breast	..	..	..
DIABETES	37	38.6	0.96
DISEASES OF CIRCULATORY SYSTEM	1,608	1,444.2	1.11
CIRRHOSIS OF LIVER	17	44.9	0.38
WHITE FEMALE			
ALL CANCERS	111	89.0	1.25
SELECTED TYPES OF CANCER			
Buccal Cavity and Pharynx	..	1.2	..
Digestive	32	24.5	1.31
Liver	..	0.4	..
Respiratory	8	7.4	1.08
Genitals	13	14.5	0.90
Urinary	10	3.3	3.03
Lymphatic	6	8.2	0.73
Breast	24	19.8	1.21
DIABETES	7	11.2	0.63
DISEASES OF CIRCULATORY SYSTEM	221	236.1	0.94
CIRRHOSIS OF LIVER	3	7.1	0.42

^aPMR = ratio of Observed to Expected where the expected number is calculated on the basis of the 1968 U.S. white male (or female) distribution of deaths specific for cause and age.

Ratios (PMR) for selected causes of death among white men. "Expected" numbers of deaths have been calculated on the basis of cause-age-specific distribution of deaths among U. S. white men in 1968, applied to the total number of deaths by age among white men in the study group. Of several possible comparison groups to be examined, 1968 deaths among U. S. white men was selected for the interim report because 1968 is in the middle of the study period, and distributions were available according to the Eighth Revision of the ICDA, which was easily accessible. The expected number gives the number of deaths to be expected among white men in this study, if the proportion of total deaths ascribed to a given cause in the study group were the same as for all U. S. white men, while accounting for differences in the age distribution between the study group and all U. S. white male deaths in 1968.

The PMR's would seem to indicate that there is not much difference between the distribution of deaths by cause for white men employed by the 10 PVC fabricators and the distributions by cause for all U. S. white men, with three possible exceptions. There would appear to be an important excess of deaths due to diseases of the circulatory system among the study group and deficits for cancers of the genital organs and cirrhosis of the liver. Certainly, for all cancers, the observed and expected numbers are quite close.

Proportionate Mortality Ratios for white women, based upon the 1968 distribution of deaths among U. S. white women are also given in Table 2. In contrast to the results for white men, there appears to be an important excess for all cancers for white women. Any potential excess would appear to be concentrated in urinary cancer and perhaps digestive cancer. However, given the number of deaths in most categories, variability is such that, except for the two exceptions noted above, observed and expected numbers of deaths are quite close.

5. The number of deaths varies by year (Table 3), but there is no reason to believe that ascertainment was better or worse for any given year. The variation is more likely a reflection of the changing number of employees engaged in PVC fabrication during the study years. Details of this are being explored.

6. Other findings based on analysis of the study population by age, color and sex, and whether death occurred in or out of a hospital are as follows:

- Table 4 distributes deaths among employees under study by sex and color.
- Distributions by age at death for decedents of known color are given in Table 5 for whites and nonwhites respectively. For both white men and white women, over 60 percent of the deaths are among employees aged 65 or over. All the

Table 3
DISTRIBUTION OF DEATHS
AMONG EMPLOYEES OF 10 PVC FABRICATORS,
BY YEAR OF DEATH, 1964 - 1973

<u>Year of Death</u>	<u>Number</u>	<u>Percent</u>
1964	280	8.6%
1965	290	8.9
1966	324	9.9
1967	317	9.7
1968	382	11.7
1969	338	10.3
1970	340	10.4
1971	355	10.8
1972	380	11.6
1973	268	8.2
Total	3,274	100.0

Table 4
DISTRIBUTION OF DEATHS
AMONG EMPLOYEES OF 10 PVC FABRICATORS,
BY SEX AND COLOR, 1964 - 1973

Category	Number	Percent
BY SEX		
Male	2,794	85.3%
Female	464	14.2
Unknown	16	0.5
TOTAL	3,274	100.0
BY COLOR		
White	2,948	90.0%
Nonwhite	86	2.6
Unknown	240	7.3
TOTAL	3,274	100.0

Table 5
DISTRIBUTION OF DEATHS AMONG EMPLOYEES OF 10 PVC FABRICATORS,
BY COLOR*, AGE, AND SEX, 1964 - 1973

Age	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
WHITE						
All Ages	2,948	100.0%	2,521	100.0%	427	100.0%
Under 35	84	2.8	70	2.8	14	3.3
35 - 44	112	3.8	89	3.5	23	5.4
45 - 54	297	10.1	248	9.8	49	11.5
55 - 64	591	20.0	515	20.4	76	17.8
65 and Over	1,859	63.1	1,594	63.2	265	62.1
Unknown	5	0.2	5	0.3	..	..
NONWHITE						
All Ages	86	100.0%	77	100.0%	9	100.0%
Under 35	11	12.8	11	14.3	..	..
35 - 44	10	11.6	9	11.7	1	11.1
45 - 54	14	16.3	11	14.3	3	33.3
55 - 64	13	15.1	11	14.3	2	22.2
65 and Over	38	44.2	35	45.4	3	33.3
Unknown	..	..	..	..	..	..

*Color was unknown in 240 cases which are not shown in this table.

companies in this interim report maintained noncontributory life insurance policies as a retirement benefit; therefore it was possible to identify all the death claims among retired employees. The proportions of death occurring among the individuals in the total U. S. over age 65 is somewhat lower for U. S. white men (about 59 percent) than the study group and somewhat higher for the U. S. white white women (about 71 percent).⁷ The number of deaths among nonwhites is rather small, so that the relative frequencies by age are not very stable, especially for non-white women.

— Nearly half of the death certificates (1,565 of 3,272) indicated that death occurred in a hospital (Table 6).

CONCLUSIONS

Several factors militate against drawing definitive conclusions from the results, and these should be pointed out or reiterated.

1. We do not have a known population base for computation of rates as direct measures of risk.
2. Some "leakage" or incompleteness has been unavoidable. Some bias is introduced because of employees who may have

⁷ Ibid.

Table 6
DISTRIBUTION OF DEATHS
AMONG EMPLOYEES OF 10 PVC FABRICATORS,
ACCORDING TO WHETHER OR NOT EMPLOYEE DIED IN HOSPITAL,
1964 - 1973

<u>Death in Hospital</u>	<u>Number</u>	<u>Percent</u>
Yes	1,565	47.8%
No	1,191	36.4
Unknown	518	15.8
TOTAL	3,274	100.0

worked less than five years, then left the company and died. Also limitation of a death certificate review to those available from life underwriters would not include any employee who left the company and died without coverage provided by life insurance underwriters. Still further leakage could occur because of the difficulty of obtaining data on the transfer within a company of employees from a job in an operation using PVC to a job in a non-PVC operation. Whenever possible death certificates were obtained on a companywide basis to minimize this factor.

3. There are no direct measures of exposure levels for the working life of deceased employees.

4. At least with respect to angiosarcoma, the expected numbers are low enough to make a negative result (absence of angiosarcoma of the liver among decedents) in a study group of this size nonconclusive.

At this stage, there are some tentative conclusions that can be drawn with respect to future epidemiological studies. There will no doubt be continuing concern over occupational exposure to chemicals or physical agents. If standards are to be set at a level that protects employee health but does not impose unnecessary requirements on employers in equipment and procedures, it would be desirable to base these rules on well documented work histories of a broad population. One would

conclude from this study that few companies can provide data complete enough for epidemiological research and that probably no major industry in the United States could be studied on a broad basis.

It will be necessary for companies to improve and expand recordkeeping. Current OSHA standards require long retention of records. More important, in order to take proper remedial action, an employer must be able to determine whether an occupational exposure has adverse effects on employees' health. If the employer (either a single company or an industry) can demonstrate that there are no discernible health problems, the opportunity of avoiding unnecessarily restrictive standards will be greater.

Appendix
MORTALITY STUDY

<u>1-7</u> <u>8-13</u> <u>14</u> <u>15</u> <u>16-17</u> <u>18-23</u> <u>24</u> <u>25-26</u> <u>27-30</u> <u>31-34</u> <u>35-38</u> <u>39</u> <u>40-41</u>	ID NUMBER: _____ NAME: _____ DATE OF DEATH: _____ month day y ar SEX: ☐ Male (1) ☐ Female (2) ☐ Unk (9) RACE: ☐ White (1) ☐ Non-White (2) ☐ Unk (9) AGE: _____ years DATE OF BIRTH: _____ month day year MARITAL STATUS: ☐ Ever (1) ☐ Never (2) ☐ Unk (9) PLACE OF DEATH: State: _____ County: _____ CAUSE OF DEATH: _____ _____ _____ DEATH IN HOSPITAL; ☐ Yes (1) ☐ No (2) IF <u>YES</u> , NAME OF HOSPITAL: _____ IF <u>NO</u> , STREET ADDRESS: _____ RESIDENCE AT TIME OF DEATH: State: _____ County: _____ City: _____ Street: _____ CERTIFYING PHYSICIAN: _____ _____ Street City State Zip CODED: _____ VERIFIED: _____ Initial Date Initial Date ***** OLI 2758 HOSPITAL FOLLOW-UP <u>42</u> CONTACT: ☐ Yes (1) ☐ No (2) <u>43</u> HOSPITAL INFORMATION: ☐ Yes (1) ☐ No (2) ☐ Not Approved (9)
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REVISION OF PAGE 2 OF ABSTRACT FORM

8/31/74

44-47

DIAGNOSIS FROM DISCHARGE SUMMARY: _____

48

PATHOLOGY REPORT

Angiosarcoma: ☐ Yes - with other liver disease (1)
☐ Yes - with no other liver disease (2)
☐ No - with other liver disease (3)
☐ No - with no other liver disease (4)
☐ NO PATHOLOGY REPORT (9)

49-50

Date of Diagnosis: _____

51

Other Cancer: ☐ Yes (1) ☐ No (2)

52-53

Date of Diagnosis: _____

54-57

Diagnosis: _____

58

OTHER LIVER/CANCER (FROM AUTOPSY OR CLINICAL)

☐ Yes-Autopsy(1) ☐ Yes-Clinical(2)
☐ No (9)

59-60

Date of Dx (liver): _____

61-64

Diagnosis: _____

65-66

Date of Dx (cancer): _____

67-70

Diagnosis: _____

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HOSPITAL PATHOLOGIST CONTACTED

71

Any Angiosarcoma in Pathology Records:

☐ Yes (1) ☐ No (2)

If yes, Name: _____

Address: _____

Date of Death: _____

Date of Diagnosis: _____

Employment: _____

72-73

OTHER LIVER DISEASE FROM SURGICAL PATHOLOGY REPORT

Date of Diagnosis: _____

74-77

Diagnosis: _____
