Trichloroethylene Issues Group

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December 22, 1997

Ms. Cheryl Siegel Scott
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Dear Cheryl:

Enclosed is a copy of the final report from Environmental Health Strategies on the update of the Hughes study. It has been submitted for publication and should be treated with confidentiality until it has been accepted by the journal. As in the past, however, we expect you will need to send this to the author of the epidemiology chapter, and we encourage you to do so.

Please call me if you have any questions.

Sincerely,

Paul A. Cammer, Ph.D.
President

Enclosure

cc: J. Cogliano

DEC 29 1997

Cohort Mortality Study of Aerospace Workers with Exposure to Trichloroethylene

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a member of The Failure Group, Inc.

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Abstract

We conducted a cohort mortality study of 20,508 aerospace workers who were followed over the period 1950-1993. A total of 4,733 workers had occupational exposure to trichloroethylene (TCE). In addition, TCE was present in some of the washing and drinking water used at the work site. We developed a job-exposure matrix to classify all jobs by TCE exposure levels into four categories ranging from "none" to "high" exposure. We calculated Standardized Mortality Ratios (SMRs) for the entire cohort and the TCE-exposed sub-cohort. Low SMRs for *All Causes* and *Cardiovascular* mortality indicate a strong healthy worker effect. In the SMR analyses we observed a consistent elevation for non-malignant respiratory disease attributable primarily to the higher background rates of respiratory disease in this region. Defining unexposed workers as the reference group, we also conducted internal cohort analyses using Mantel-Haenszel stratified analysis techniques and Cox regression models. All relative risk estimates derived from the Cox models for nonmalignant respiratory disease were near or less than 1.0 for TCE exposure groups. We observed elevated rate ratios for ovarian cancer that have not been reported in previous TCE studies. We observed slightly elevated risk ratios for cancers of the kidney, bladder and prostate, but with wide confidence intervals. Our findings do not suggest an association between TCE exposure and respiratory cancer, liver cancer, leukemia or lymphoma, or all cancers combined.

Keywords: Aerospace workers, cancer, cohort study, epidemiology, healthy worker effect, respiratory disease, trichloroethylene.

Cohort Mortality Study of Workers with Exposure to Trichloroethylene

Introduction

Trichloroethylene (TCE) has been used in degreasing metal, processing food, and as an anesthetic agent. In 1992, the United States Environmental Protection Agency (EPA) withdrew its classification of TCE as a "probable human carcinogen."[1] In 1995, the International Agency for Research on Cancer (IARC) reclassified TCE to Category 2A, indicating that "...a positive association has been observed between exposure to the agent...and cancer...but chance, bias, or confounding could not be ruled out with reasonable confidence."[2] At least two reviewers questioned the IARC classification.[2,3]

Previous studies examined cohorts exposed either to TCE or to solvent mixtures containing TCE.[3,4-18] Of fifteen published occupational mortality studies mentioning TCE, a few report positive associations, but no consistent major increases in cancer mortality.[4-18] Weiss[3] recently reviewed studies of TCE production workers (Finland[19] and Sweden[4]), civilian air force employees (Utah)[17] and aerospace workers (Arizona).[20] He concluded that there was no excess cancer risk, with the possible exception of non-Hodgkin's lymphoma and cancers of the liver, biliary tract, and kidney.

Anttila, *et al* reported excess incidence of cancers of the stomach, liver, prostate, and lymphohematopoietic systems in Finnish workers exposed to organic solvents including TCE.[19] Henschler, *et al* reported excess incidence of renal cell cancers in a small (n=169) heavily exposed cohort of German cardboard workers.[21]

In a study of aircraft maintenance workers, Spirtas *et al.* reported elevated SMRs for biliary cancer among male employees and multiple myeloma and non-Hodgkin's lymphoma among female employees.[17] Low SMRs were reported for all causes, all cancers combined, and non-malignant respiratory diseases. Axelson *et al.* reported an excess of skin cancer among Swedish workers identified through a TCE surveillance program.[4] They also report SIRs of 1.6 and 1.4 for non-Hodgkin's lymphoma and liver/biliary cancer. An earlier analysis of Hughes aircraft workers found no excess cancer risk or overall impacts on mortality.[20]

Our study evaluates the mortality of the same cohort of employees working at a Hughes Aircraft manufacturing site in Arizona. Most TCE exposure occurred in vapor degreasing units between 1952 and 1977. Prior to 1981, the plant had used some contaminated well water (TCE levels estimated between 730 and 2200 ppb) for showers and drinking. Thus, workers were potentially exposed through both occupation (inhalation and skin exposure) and water. We have now followed the cohort through 1993, with more extended analyses than the 1990 study of this cohort. [20]

Methods

From company records, we identified all workers who were employed at the plant for at least six months between January 1, 1950 and December 31, 1985. We determined vital status through the Social Security Administration (SSA) and National Death Index (NDI). We excluded 27 persons from the cohort because of missing information, leaving a cohort of 20,508 workers.

Personnel data included name, social security number, date of birth, sex, race, date of hire, job title and termination date. After ascertaining deaths either through SSA or NDI, we obtained death certificates from each state and coded cause of death according to the International Classification of Diseases in use at time of death (Revisions 7-9).

Since limited industrial hygiene measurements were available for the Hughes plant prior to 1975, Hughes employees with at least 30 years experience rated TCE exposure for each job classification. Hughes industrial hygienists then compiled these ratings into a master exposure matrix that was reviewed and confirmed by the Hughes employees.

From the ratings, jobs were classified into exposure categories of high, medium, low, or none. The highest rating involved work on degreaser machines using TCE, which the industrial hygienists estimate were equivalent to exposures above 50 ppm. Jobs with a medium rating were near the degreasing area, with more than occasional contact with TCE. A low exposure rating was given to jobs away from the degreasing area, but entailing occasional contact with TCE. All other jobs were assigned zero exposure. Most TCE-exposed workers had more than one category of exposure. We did not consider potential exposure to drinking or wash water in classifying occupational TCE exposure.

We assigned exposure scores of 0 for None, 1 for Low, 4 for Medium, and 9 for High Exposure, which assumes a potential exponential exposure response relationship. We assigned a zero level to anyone with less than six months of any TCE exposure (n=1025). Then, for each job, months of exposure were multiplied by the TCE rating (0, 1, 4, or 9) and results summed to arrive at a cumulative (total) exposure score. For internal cohort analyses, we created exposure groups using both cumulative exposure and the job with the highest TCE exposure rating ("peak" exposure). (We utilized "peak" exposure to evaluate hypotheses that high-level exposure involves different metabolic pathways and may thus be more important in assessing cancer risk.) SMR analyses used cumulative exposure scores and none/any exposure to define exposure groups.

Statistical Analysis

We used the OCMAP-PC computer program to calculate Standardized Mortality Ratios (SMRs) and 95% confidence limits for the overall cohort and TCE-exposed sub-cohorts.[22] For internal cohort analyses, we used Mantel-Haenszel procedures and Cox proportional hazard models that included exposure classification, age at hire, and gender.[23] Data concerning race were too sparse to use in the stratified analyses or Cox models. Since we found that decade of hire did not influence relative risk estimates, we did not include it in the final Cox models. We analyzed all causes of death, non-malignant respiratory disease, and selected cancer outcomes using three exposure classification systems (ever/never, peak, and cumulative).

To analyze peak exposure, we combined jobs with no and low exposure into one group, and medium and high exposed jobs in the second group. To define cumulative exposure categories,

we examined the distribution of cumulative exposure scores to identify any obvious cutpoints. The distribution was approximately lognormal, with no obvious modes. Therefore, we divided TCE-exposed group into "low" and "high" based on cumulative exposure score. Exposure groups were roughly equal (50%), with the low group including any workers with the equivalent of up to five years exposure to jobs at low exposure or 1.4 years of medium exposure. The high exposure group includes all other TCE exposed workers.

Our SMR analyses include most causes of death. For internal cohort analyses, we selected outcomes on the basis of either previous reports or because of elevated SMRs in our analyses. Since results from the Mantel-Haenszel and Cox proportional hazards models were so similar, we present only Cox modeling results. Although we used the ever/never exposure classification in both SMR and internal cohort analyses, we do not report those results because they are highly correlated with both peak and cumulative exposure classifications. (A full set of analytic tables is available upon request.)

For cancer sites previously identified as possibly TCE-associated, we combined our data with previously published cohorts to calculate a series of meta-SMRs and associated confidence limits. We derived the meta-SMRs from the sums of observed and expected deaths.

Results

The cohort is composed of primarily white males, and nearly one-half were hired before 1960.

Of 4,052 deaths, we were unable to locate 112 death certificates. Some occupational TCE exposure was experienced by 23% of the cohort (Table 1).

SMR Analysis

For the full cohort, most SMRs were below 100 (Table 2), with elevations for Hodgkin's disease (124.9), and kidney cancer (114.2), although with wide confidence intervals (95% CI: 59.9-229.6 and 78.1-161.3, respectively). SMRs for all respiratory diseases and for suicide were also elevated. For these conditions, Arizona rates are considerably higher than national rates. When we used Arizona rates for comparison instead of U.S. rates, SMRs were lower (data not shown).

The TCE-exposed sub-cohort results resembled the total cohort SMRs for most causes of death (Table 2). SMRs for respiratory disease (114.4 (95% CI: 91.6-141.1)) and kidney cancer (131.9 (95% CI: 57.0-259.9)) were elevated, but with wide confidence intervals. SMRs for prostate (117.8 (95% CI: 72.9-180.1)), respiratory (111.5 (95% CI: 91.0-135.2)) and bladder (136.2 (95% CI: 58.8-268.4)) and ovarian (120.6 (95% CI: 52.1-237.6)) cancers, which were all below 100 in the overall cohort analysis, were slightly elevated in the TCE-exposed sub-cohort analysis,

although, again, with wide confidence intervals. For respiratory cancers, we observed higher SMRs in the low exposure category than in the high exposure group. We also examined SMRs among the non-exposed sub-cohort (data not shown). These results were similar to the SMRs for the overall cohort.

Internal Cohort Analysis

Our Cox proportional hazards modeling results are presented in Tables 3, 4 and 5. For all cancers and nonmalignant respiratory disease, all risk ratios for peak and cumulative exposure classifications were near 1.0 (Table 3). The risk ratio for respiratory cancers in the low cumulative exposure group was 1.47 (95% CI: 1.07-2.03); however, both peak and high cumulative exposure groups had risk ratios near 1.0 (Table 3).

For cancers of the lymphatic and hematopoietic systems (Table 4), risk ratios were close to 1.0 for all of these cancers combined and for leukemia. For lymphosarcoma and reticulosarcoma, the risk ratios were slightly elevated for the peak exposure and the low cumulative exposure groups; however, these estimates had wide confidence intervals. For the high cumulative exposure group, the risk ratio was 0.8, suggesting lack of a dose-response effect. There were 11 cases of Hodgkin's disease in the cohort; since only one case was in the TCE-exposed group (Table 2), we did not conduct internal cohort analyses on this outcome.

For liver, kidney, bladder, prostate, and ovarian cancer, we observed somewhat higher associations with TCE exposure, but with varying confidence intervals (Table 5). These are based on only a few exposed cases, uniformly leading to wide confidence intervals with all but the lower confidence limit less than 1.0, except for bladder and ovarian cancers in the high exposure categories, with confidence intervals of 1.10-6.65 and 2.14-23.54, respectively. For liver cancers, there was no association with the peak exposure classification nor was there an apparent dose-response trend for cumulative exposure. Kidney cancers had a higher association (RR=1.89 (95% CI: 0.85-4.23)) with peak exposure than high cumulative exposure (1.59 (95% CI: 0.68-3.71)). Ovarian cancers had the highest associations with TCE exposure for peak (RR=2.74) and high cumulative exposures (RR=7.09).

The meta-SMRs, which combine results from the four TCE cohorts cited by Weiss,[3] were all near 1.0, ranging from 1.09 for prostate and kidney cancers to 1.25 and 1.32 for non-Hodgkin's lymphoma and liver cancer, respectively (Table 6).

Discussion

We observed slightly elevated relative risks for kidney, bladder, and prostate cancer and a fairly high relative risk for ovarian cancers. Among some of the cancers previously, but inconsistently, reported as potentially associated with TCE exposure (stomach, liver, lymph and blood

malignancies), we observed only mild or no elevations in either relative risks or SMRs.

Of the cancer outcomes noted in the Weiss review as possibly related to TCE (biliary tract, liver, kidney, and non-Hodgkin's lymphoma), we observed only a slightly elevated relative risk for kidney cancer. Biliary tract cancer was not specifically evaluated and there were essentially no associations with TCE for liver cancer and non-Hodgkin's lymphoma. Our relative risk estimates for kidney cancer showed modest increases (RR=1.89 and 1.59) but were based on small numbers with wide confidence intervals. For bladder cancer, the highest relative risk was in the high cumulative exposure group with only a modest association with the peak exposure classification. Relative risks for prostate cancer were modest. We were unable to control for smoking, an established causal factor for bladder cancer. Our data offer little support for an association between TCE exposure and cancer mortality from leukemia, cancer in hematopoietic tissues, and digestive, liver and respiratory cancers. Our findings for kidney, bladder, prostate, and ovarian cancers should be viewed cautiously considering the limitations of small numbers, lack of information on smoking, and lack of quantitative exposure information.

In particular, our finding of a potential association between TCE and ovarian cancer has not been previously reported. Very few studies have examined occupational exposures and these cancer risks. Among the TCE studies, Anttila, *et al.* found no excess risk and Spirtas, *et al.* report similar findings (SMR=101).[17,19] A hospital based case-control study in the Washington, DC, area did not find an association between ovarian cancer and occupational solvent or polycyclic

aromatic hydrocarbon exposures; however, only a few participants in this study held manufacturing jobs.[24] We observed 13 such cancers in the entire cohort and eight among the TCE-exposed subcohort. The expected numbers in the SMR analyses were 19.4 and 6.6, respectively. The fact that six of the eight exposed cases were classified as "high" TCE exposure accounts for the higher rate ratios.

Risk factors for ovarian cancer include family history of ovarian cancer, use of infertility drugs and long periods of unprotected intercourse.[25] Protective factors for ovarian cancer include use of oral contraceptives, number of pregnancies, breast feeding and history of gynecological surgery.[24,25] We reviewed the death certificates for these deaths and did not find any similarity in last names that could suggest a potential cluster of ovarian cancer cases among the same families. This review is limited because we relied only on names of workers in the cohort; we did not conduct interviews or collect other data on family history of ovarian cancer. Our results are dependent on six exposed cases, and exposure misclassification or another cause from a competing risk factor in one or two cases could substantially reduce the association. The lack of previous research suggesting ovarian cancer risk, the small number of cases involved, and the numerous unmeasured potential confounding factors limit our ability to interpret these findings. Given the largely unknown etiology of ovarian cancer, further research may be warranted.

To compare these updated results with previous research, we calculated meta-SMRs for liver, prostate, and kidney cancers, and non-Hodgkin's lymphoma across the studies evaluated in the

recent review by Weiss.[3] Although these four studies do not represent the complete set of TCE studies, IARC considered them to be the most relevant for assessing TCE carcinogenicity. In general, the meta-SMRs offer little support for a relationship between TCE exposure and non-Hodgkin's lymphoma or cancers of the kidney, bladder, and prostate (Table 6). Small numbers of cases (except for prostate cancer), even aggregated across all four studies, further limits causal interpretation of these findings.

To address the pronounced healthy worker effect (HWE) in this cohort, we employed Cox proportional hazards models, using peak and cumulative exposures. In our study, however, the Cox method is limited by small numbers of cancers in the exposed, unexposed, or both groups. Thus, narrowly defining exposure groups, while reducing potential exposure misclassification, creates smaller groups, which produces more imprecise estimates of relative risk. These factors have to be considered in interpreting internal cohort analysis results. The small number of cases in the TCE sub-cohort limits our ability to assess the risks for rare cancers. In addition, although nearly two-thirds of the TCE-exposed cohort had a latency of more than twenty years (Table 1), it is possible that higher risks could be observed in future years.

In addition to its modest statistical power, this study has other limitations. We lack data on potential confounders such as smoking, diet, or exposure to other solvents. Furthermore, with no direct measurements of personal exposure, we had to rely on experts to assign estimated levels of TCE exposure, although we believe the extensive review process should have helped to reduce exposure misclassification.

The recent IARC review of trichloroethylene carcinogenicity considered positive findings from three occupational studies (Anttila,[19] Axelson[4] and Spirtas[17]) for liver/biliary cancer and non-Hodgkin's lymphoma as suggestive of TCE carcinogenicity.[2] Our results and the meta-SMRs do not suggest high cancer risks for these outcomes. Because TCE is no longer widely used, there will be limited opportunity for further study of worker populations to help resolve the discrepancies among existing studies. The identification and analysis of other historically exposed cohorts, improved exposure assessment, more comprehensive meta-analysis, and evaluation of female cancers will help to resolve cancer risk questions.

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Table 1: Demographic Profile By Sex, Race,Birth Decade, Hire Decade and Exposure Classification
Aerospace Worker Cohort, 1950-1993

Demographic Factor	Non Exposed				TCE Exposed				Totals			
	n	%	PY[1]	%PY	n	%	PY	%PY	n	%	PY	%PY
Sex												
male	11187.0	70.9	250410.0	70.4	2555.0	54.0	57879.0	54.7	13742.0	67.0	308289.0	66.8
female	4588.0	29.1	105355.0	29.6	2178.0	46.0	47973.0	45.3	6766.0	33.0	153328.0	33.2
Race									20508.0		461617.0	
white	14698.0	93.2	331072.0	93.1	4132.0	87.3	91561.0	86.5	18830.0	91.8	422633.0	91.6
nonwhite	1077.0	6.8	24693.0	6.9	601.0	12.7	14291.0	13.5	1678.0	8.2	38984.0	8.4
Birth Year									20508.0		461617.0	
1920.0	3168.0	20.1	88953.0	25.0	1022.0	21.6	29711.0	28.1	4190.0	20.4	118664.0	25.7
1920-29	3171.0	20.1	96152.0	27.0	893.0	18.9	23950.0	22.6	4064.0	19.8	120102.0	26.0
1930-39	3252.0	20.6	89186.0	25.1	803.0	17.0	19382.0	18.3	4055.0	19.8	108568.0	23.5
1940-49	2288.0	14.5	37968.0	10.7	1008.0	21.3	19779.0	18.7	3296.0	16.1	57747.0	12.5
1950-59	2840.0	18.0	33669.0	9.5	749.0	15.8	10558.0	10.0	3589.0	17.5	44227.0	9.6
1960 +	1056.0	6.7	9838.0	2.8	258.0	5.5	2472.0	2.3	1314.0	6.4	12310.0	2.7
Hire Date									20508.0		461618.0	
<1960[2]	6941.0	44.0	222557.0	62.6	1563.0	33.0	48779.0	46.1	8504.0	41.5	271336.0	58.8
1960-69	1782.0	11.3	44080.0	12.4	913.0	28.8	23045.0	21.8	2695.0	13.1	67125.0	14.5
1970-79	2448.0	15.5	42545.0	12.0	1322.0	18.9	24625.0	23.3	3770.0	18.4	67170.0	14.6
1980-89	4604.0	29.2	46584.0	13.1	935.0	16.5	9403.0	8.9	5539.0	27.0	55987.0	12.1
TOTALS	15775.0	76.9	355766.0	77.1	4733.0	23.1	105852.0	18.7	20508.0	100	461618.0	100.0

1. PY=Person Years
2. Only 27 employees started before 1950

Table 2: Standardized Mortality Ratios[1] for Selected Causes of Death

Overall Cohort and Occupationally-Exposed TCE Sub-Cohort

Aerospace Workers Cohort 1950-1993

Cause of Death[2,3]	OVERALL COHORT (n=20,508)					TCE-EXPOSED SUB-COHORT (n=4,733)				
				95% Confidence Interval					95% Confidence Interval	
	Obs	Exp	S.M.R.	Lower	Upper	Obs	Exp	S.M.R.	Lower	Upper
All Causes of Death	4052	4772.5	84.9	82.3	87.6	917	1088.8	84.2	78.9	89.9
All Malignant Neoplasms	1100	1267.3	86.8	81.7	92.1	270	295.0	91.5	80.9	103.1
Cancer of Digestive Organs & Peritoneum	255	307.8	82.8	73.0	93.7	55	71.3	77.1	58.1	100.4
Cancer of Rectum	18	25.3	71.3	42.2	112.7	6	5.7	105.9	38.9	230.6
Cancer of Bilary Passages & Liver	20	26.0	76.9	47.0	118.8	6	6.1	97.9	35.9	213.1
Cancer of Pancreas	47	61.9	75.9	55.8	101.0	11	14.4	76.4	38.1	136.7
Cancer of Respiratory System	401	424.0	94.6	85.5	104.3	103	92.4	111.5	91.0	135.2
Cancer of Breast	47	62.8	74.9	55.0	99.5	16	21.3	75.2	43.0	122.1
Cancer of Uterus (Females only)	6	17.4	34.4	12.6	74.9	1	6.1	16.3	0.4	91.0
Cancer of Cervix Uteri (Females only)	1	10.0	10.0	0.2	55.5	0	3.5	-	0.0	106.7
Cancer of Ovary (Females only)	13	19.4	67.2	35.8	114.9	8	6.6	120.6	52.1	237.6
Cancer of Prostate (Males only)	76	81.4	93.4	73.6	116.8	21	17.8	117.8	72.9	180.1
Cancer of Kidney	32	28.0	114.2	78.1	161.3	8	6.1	131.9	57.0	259.9
Cancer of Bladder	23	27.3	84.1	53.3	126.2	8	5.9	136.2	58.8	268.4
Cancer of Central Nervous System	28	33.3	84.1	55.9	121.6	4	7.3	54.7	14.9	139.9
Cancer of All Lymphatic, Haematopoietic Tissue	107	111.5	96.0	78.7	116.0	25	25.2	99.3	64.3	146.6
Lymphosarcoma & Reticulosarcoma	11	14.2	77.5	38.7	138.6	3	3.1	96.2	19.9	281.2
Hodgkin's Disease	10	8.0	124.9	59.9	229.6	1	1.7	60.0	1.5	334.5
Leukemia & Aleukemia	42	42.8	98.1	70.7	132.6	10	9.5	104.9	50.3	192.9
Cancer of All Other Lymphopoietic Tissue	44	46.5	94.7	68.8	127.2	11	10.9	101.3	50.6	181.3
All Heart Disease	1409	1751.5	80.4	76.3	84.8	290	387.5	74.8	66.5	84.0
Cerebrovascular Disease	170	278.0	61.1	52.3	71.1	40	67.4	59.3	42.4	80.6
Non-Malignant Respiratory Disease	389	337.7	115.2	104.0	127.2	87	76.1	114.4	91.6	141.1
Bronchitis, Emphysema, Asthma	116	71.1	163.2	134.8	195.7	27	15.7	172.1	113.4	250.4
Emphysema	66	51.5	128.1	99.1	163.0	15	11.1	135.5	75.8	223.4
Other Non-Malignant Respiratory Disease	171	153.9	111.1	95.1	129.1	39	34.8	112.2	79.8	153.4
Cirrhosis of Liver	65	115.0	56.5	43.6	72.0	14	25.3	55.3	30.2	92.7
All External Causes of Death	293	366.7	79.9	71.0	89.6	68	80.1	84.9	65.9	107.6
Accidents	156	225.0	69.3	58.9	81.1	41	48.9	83.9	60.2	113.8
Suicides	115	89.1	129.0	106.5	154.9	20	18.4	108.9	66.5	168.2
Other Causes of Death	379	483.9	78.3	70.6	86.6	101	114.2	88.5	72.1	107.5

1. US Mortality Rates, 1950-1992, provided by OCMAP software (see Ref. 22)
2. Totals do not add up to "All Causes" total deaths because not all specific causes are presented
3. "Other Causes" does not include all other cause ICD codes (see Appendix)

Table 2 (Cont'd): Standardized Mortality Ratios[1] for Selected Causes of Death

Cumulative-Exposed Sub-Cohort

Aerospace Workers Cohort 1950-1993

Cause of Death[2,3]	Low (n=2,357)					High (n=2,376)				
				95% Confidence Interval					95% Confidence Interval	
	Obs	Exp	S.M.R.	Lower	Upper	Obs	Exp	S.M.R.	Lower	Upper
All Causes of Death	345	402.44	85.7	76.9	95.3	572	686.31	83.3	76.7	90.5
All Malignant Neoplasms	114	109.31	104.3	86.0	125.3	156	185.73	84.0	71.3	98.3
Cancer of Digestive Organs & Peritoneum	21	25.92	81.0	50.1	123.8	34	45.41	74.9	51.8	104.6
Cancer of Rectum	1	2.03	49.2	1.2	274.4	5	3.63	137.6	44.7	321.2
Cancer of Bilary Passages & Liver	3	2.28	131.7	27.2	384.8	3	3.85	77.9	16.1	227.7
Cancer of Pancreas	5	5.25	95.3	30.9	222.4	6	9.16	65.5	24.1	142.6
Cancer of Respiratory System	46	31.59	145.6	106.6	194.2	57	60.81	93.7	71.0	121.4
Cancer of Breast	11	10.72	102.6	51.2	183.6	5	10.55	47.4	15.4	110.6
Cancer of Uterus (Females only)	1	3.28	30.5	.8	170.0	0	2.84	---	.0	129.7
Cancer of Cervix Uteri (Females only)	0	1.91	---	.0	192.8	0	1.54	---	.0	238.9
Cancer of Ovary (Females only)	2	3.4	61.1	7.4	220.9	6	3.4	178.5	65.5	388.4
Cancer of Prostate (Males only)	7	5.42	129.3	52.0	266.3	14	12.41	112.8	61.7	189.2
Cancer of Kidney	1	2.13	47.0	1.2	261.9	7	3.94	177.8	71.5	366.4
Cancer of Bladder	1	1.97	50.8	1.3	282.9	7	3.90	179.3	72.1	369.4
Cancer of Central Nervous System	2	2.7	73.0	8.8	263.6	2	4.6	43.7	5.3	157.8
Cancer of All Lymphatic, Hematopoietic Tissue	10	9.37	106.8	51.2	196.3	15	15.81	94.9	53.1	156.5
Lymphosarcoma & Reticulosarcoma	2	1.12	178.9	21.6	646.1	1	2.00	50.0	1.3	278.7
Hodgkin's Disease	1	.65	155.0	3.9	863.5	0	1.02	---	.0	361.4
Leukemia & Aleukemia	3	3.55	84.5	17.4	246.9	7	5.98	117.0	47.0	241.1
Cancer of All Other Lymphopoietic Tissue	4	4.05	98.7	26.9	252.6	7	6.80	102.9	41.4	212.0
All Heart Disease	77	136.78	56.3	44.4	70.4	213	250.72	85.0	73.9	97.2
Cerebrovascular Disease	17	25.71	66.1	38.5	105.9	23	41.73	55.1	34.9	82.7
Non-Malignant Respiratory Disease	32	27.00	118.5	81.1	167.3	55	49.06	112.1	84.4	145.9
Bronchitis, Emphysema, Asthma	11	5.42	203.0	101.3	363.2	16	10.27	155.8	89.0	253.0
Emphysema	5	3.66	136.7	44.4	319.1	10	7.42	134.8	64.7	248.0
Other Non-Malignant Respiratory Disease	13	12.11	107.3	57.2	183.6	26	22.66	114.8	75.0	168.2
Cirrhosis of Liver	9	9.49	94.8	43.4	180.0	5	15.85	31.6	10.2	73.6
All External Causes of Death	27	32.77	82.4	54.3	119.9	41	47.36	86.6	62.1	117.5
Accidents	18	19.68	91.5	54.2	144.6	23	29.18	78.8	50.0	118.3
Suicides	6	7.23	83.0	30.5	180.7	14	11.14	125.7	68.7	210.9
Other Causes of Death	46	44.00	104.5	76.5	139.4	55	70.16	78.4	59.1	102.0

1. US Mortality Rates, 1950-1992, provided by OCMAP software (see Ref. 22)
2. Totals do not add up to "All Causes" total deaths because not all specific causes are presented
3. "Other Causes" does not include all other cause ICD codes (see Appendix)

TABLE 3: All Cancers and Respiratory Diseases: Internal Cohort Analyses for Peak and Cumulative Exposure Classifications Using Cox Proportional Hazards Models
Aerospace Workers Cohort, 1950-1993

	Exposed (n)	Unexposed (n)	R.R	Lower C.I.	Upper C.I.
All Cancers					
Peak: med and high vs. low and no exposure	177	923	1.057	0.900	1.242
Cumulative (Low)	114	830	1.215	0.993	1.486
Cumulative (High)	156	830	1.006	0.847	1.194
Non-Malignant Respiratory Disease					
Peak: med and high vs. low and no exposure	59	330	0.967	0.733	1.276
Cumulative (Low)	32	302	1.010	0.696	1.467
Cumulative (High)	55	302	0.994	0.745	1.326
Respiratory Cancers					
Peak: med and high vs. low and no exposure	64	324	1.071	0.818	1.401
Cumulative (Low)	45	291	1.473	1.067	2.034
Cumulative (High)	52	291	0.963	0.716	1.294

TABLE 4: Lymphatic and Hematopoietic Cancers: Internal Cohort Analyses for Peak and Cumulative Exposure Classifications Using Cox Proportional Hazards models
Aerospace Worker Cohort, 1950-1993

	Exposed (n)	Unexposed (n)	R.R	Lower C.I.	Upper C.I.
Lymphatic & Hematopoietic					
Peak: med and high vs. low and no exposure	17	90	1.081	0.642	1.818
Cumulative (Low)	10	82	1.094	0.558	2.143
Cumulative (High)	15	82	1.031	0.593	1.792
Leukemia					
Peak: med and high vs. low and no exposure	7	35	1.102	0.489	2.486
Cumulative (Low)	3	32	0.691	0.206	2.316
Cumulative (High)	7	32	1.141	0.502	2.597
Lymphosarcoma & Reticulosarcoma					
Peak: med and high vs. low and no exposure	2	9	1.305	0.280	6.079
Cumulative (Low)	2	8	2.248	0.455	11.091
Cumulative (High)	1	8	0.806	0.100	6.491

TABLE 5: Urinary Tract and Reproductive Cancers: Internal Cohort Analyses for Peak and Cumulative Exposure Using Cox Proportional Hazards Models
Aerospace Worker Cohort, 1950-1993

	Exposed (n)	Unexposed (n)	R.R	Lower C.I.	Upper C.I.
Liver					
Peak: med and high vs. low and no exposure	3	17	0.977	0.285	3.345
Cumulative (Low)	3	14	2.123	0.589	7.659
Cumulative (High)	3	14	1.189	0.339	4.163
Kidney Cancer					
Peak: med and high vs. low and no exposure	8	24	1.893	0.847	4.232
Cumulative (Low)	1	24	0.312	0.041	2.356
Cumulative (High)	7	24	1.589	0.681	3.705
Bladder*					
Peak: med and high vs. low and no exposure	5	18	1.413	0.524	3.810
Cumulative (Low)	1	15	0.693	0.090	5.359
Cumulative (High)	7	15	2.707	1.102	6.649
Prostate Cancer*					
Peak: med and high vs. low and no exposure	16	60	1.468	0.845	2.551
Cumulative (Low)	7	55	1.050	0.479	2.321
Cumulative (High)	14	55	1.352	0.751	2.435
Ovarian Cancer*					
Peak: med and high vs. low and no exposure	4	9	2.743	0.837	8.986
Cumulative (Low)	2	5	3.454	0.664	17.970
Cumulative (High)	6	5	7.092	2.136	23.540

*Cox models include age only as independent variable

Table 6

Meta-Analysis of Four Occupational Cohort Mortality Studies with Exposure to TCE

Cancer Site		Finnish[1]	Swedish[2]	Civilian Air Force[3]	Aerospace Workers[4]	Total	Meta-SMR	95% C.I.
Liver	Observed	5	4	2	6	17	1.32	0.77-2.11
	Expected	2.2	2.8	1.8	6.1	12.9		
Prostate	Observed	13	26	22	21	82	1.09	0.87-1.36
	Expected	9.4	20.7	27.6	17.8	75.5		
Kidney	Observed	6	6	8	8	28	1.09	0.72-1.58
	Expected	6.9	5.2	7.5	6.1	25.7		
Bladder	Observed	5	8	11	8	32	1.15	0.78-1.62
	Expected	6.1	7.9	7.9	5.9	27.8		
Non-Hodgkins Lymphoma	Observed	8	5	14	14	41	1.25	0.89-1.70
	Expected	4.4	3.2	11.2	14	32.8		

1. Anttila A, et al. Cancer incidence among Finnish workers exposed to halogenated hydrocarbons. J Occup Environ Med 1995; 37(7):797-806.
2. Axelson O, et al. Updated and expanded Swedish cohort study on trichloroethylene and cancer risk. J Occup Med 1994; 36(5):556-562.
3. Spirtas R, et al. Retrospective cohort mortality study of workers at an aircraft maintenance facility. I epidemiological results. Br J Ind Med 1991; 48:515-530.
4. Morgan RW, et al. Cohort mortality study of aerospace workers with exposure to trichloroethylene. Unpublished report 1997.

Exposure
Frequencies

CUMEXP Midpoint		Freq	Cum. Freq	Percent	Cum. Percent
0		0	0	0.00	0.00
200	**********	295	295	6.23	6.23
400	**********	387	682	8.18	14.41
600	**********	287	969	6.06	20.47
800	**********	396	1365	8.37	28.84
1000	**********	237	1602	5.01	33.85
1200	**********	213	1815	4.50	38.35
1400	**********	176	1991	3.72	42.07
1600	**********	146	2137	3.08	45.15
1800	**********	168	2305	3.55	48.70
2000	**********	118	2423	2.49	51.19
2200	**********	129	2552	2.73	53.92
2400	**********	127	2679	2.68	56.60
2600	**********	119	2798	2.51	59.12
2800	**********	104	2902	2.20	61.31
3000	*********	87	2989	1.84	63.15
3200	*********	93	3082	1.96	65.12
3400	**********	110	3192	2.32	67.44
3600	*******	67	3259	1.42	68.86
3800	*****	54	3313	1.14	70.00
4000	*****	49	3362	1.04	71.03
4200	*******	66	3428	1.39	72.43
4400	*****	53	3481	1.12	73.55
4600	******	59	3540	1.25	74.79
4800	****	44	3584	0.93	75.72
5000	*****	46	3630	0.97	76.70
5200	****	39	3669	0.82	77.52
5400	****	40	3709	0.85	78.36
5600	***	27	3736	0.57	78.94
5800	***	27	3763	0.57	79.51
6000	**	23	3786	0.49	79.99
6200	***	33	3819	0.70	80.69
6400	***	29	3848	0.61	81.30
6600	***	33	3881	0.70	82.00
6800	**	19	3900	0.40	82.40
7000	***	30	3930	0.63	83.03
7200	****	35	3965	0.74	83.77
7400	**	22	3987	0.46	84.24
7600	**	18	4005	0.38	84.62
7800	**	22	4027	0.46	85.08
8000	**	16	4043	0.34	85.42
8200	**	17	4060	0.36	85.78
8400	*	14	4074	0.30	86.08
8600	**	19	4093	0.40	86.48
8800	*	10	4103	0.21	86.69
9000	*	12	4115	0.25	86.94
9200	*	9	4124	0.19	87.13
9400	*	12	4136	0.25	87.39
9600	*	10	4146	0.21	87.60

9800	*	10	4156	0.21	87.81
10000	*	11	4167	0.23	88.04
10200	**	16	4183	0.34	88.38
10400	*	14	4197	0.30	88.68
10600	**	16	4213	0.34	89.01
10800	*	11	4224	0.23	89.25
11000	*	10	4234	0.21	89.46
11200		3	4237	0.06	89.52
11400	*	12	4249	0.25	89.77
11600	*	11	4260	0.23	90.01
11800	*	10	4270	0.21	90.22
12000	**	16	4286	0.34	90.56
12200	*	7	4293	0.15	90.70
12400	*	10	4303	0.21	90.91
12600		4	4307	0.08	91.00
12800	*	7	4314	0.15	91.15
13000	*	7	4321	0.15	91.30
13200	*	7	4328	0.15	91.44
13400	*	5	4333	0.11	91.55
13600	*	6	4339	0.13	91.68
13800	*	8	4347	0.17	91.84
14000	*	5	4352	0.11	91.95
14200	*	9	4361	0.19	92.14
14400	*	5	4366	0.11	92.25
14600	*	6	4372	0.13	92.37
14800	*	5	4377	0.11	92.48
15000	*	7	4384	0.15	92.63
15200	*	8	4392	0.17	92.80
15400	*	5	4397	0.11	92.90
15600	*	8	4405	0.17	93.07
15800	*	5	4410	0.11	93.18
16000		3	4413	0.06	93.24
16200		2	4415	0.04	93.28
16400	*	11	4426	0.23	93.51
16600	*	5	4431	0.11	93.62
16800	*	7	4438	0.15	93.77
17000	*	7	4445	0.15	93.92
17200		4	4449	0.08	94.00
17400	*	6	4455	0.13	94.13
17600	*	5	4460	0.11	94.23
17800	*	5	4465	0.11	94.34
18000	*	6	4471	0.13	94.46
18200	*	5	4476	0.11	94.57
18400		4	4480	0.08	94.65
18600	*	9	4489	0.19	94.84
18800		4	4493	0.08	94.93
19000	*	6	4499	0.13	95.06
19200	*	5	4504	0.11	95.16
19400	*	8	4512	0.17	95.33
19600	*	8	4520	0.17	95.50
19800		4	4524	0.08	95.58
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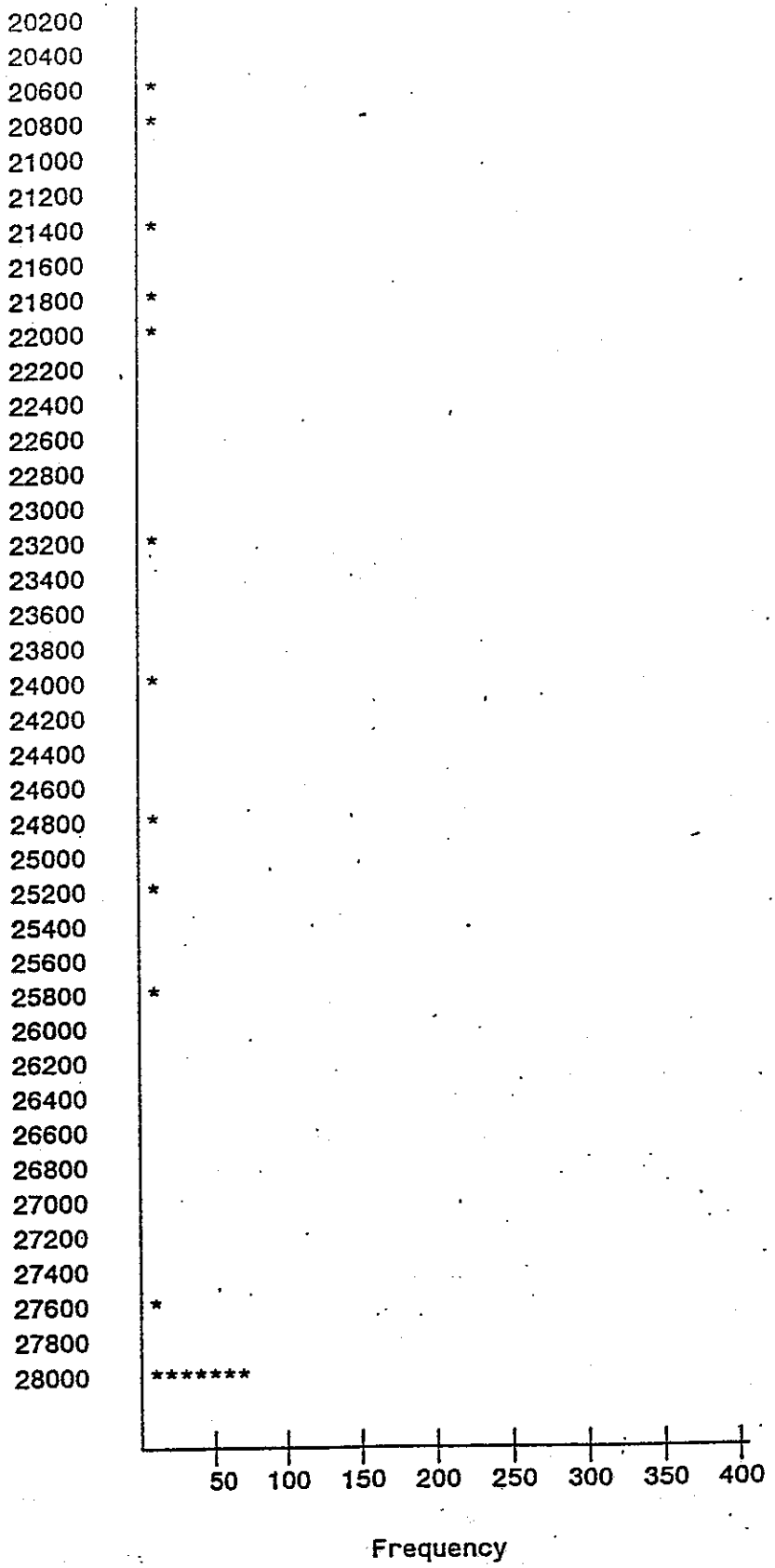

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2	4559	0.04	96.32
7	4566	0.15	96.47
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3	4583	0.06	96.83
2	4585	0.04	96.87
5	4590	0.11	96.98
4	4594	0.08	97.06
4	4598	0.08	97.15
3	4601	0.06	97.21
6	4607	0.13	97.34
3	4610	0.06	97.40
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5	4628	0.11	97.78
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4	4647	0.08	98.18
3	4650	0.06	98.25
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1	4652	0.02	98.29
1	4653	0.02	98.31
3	4656	0.06	98.37
3	4659	0.06	98.44
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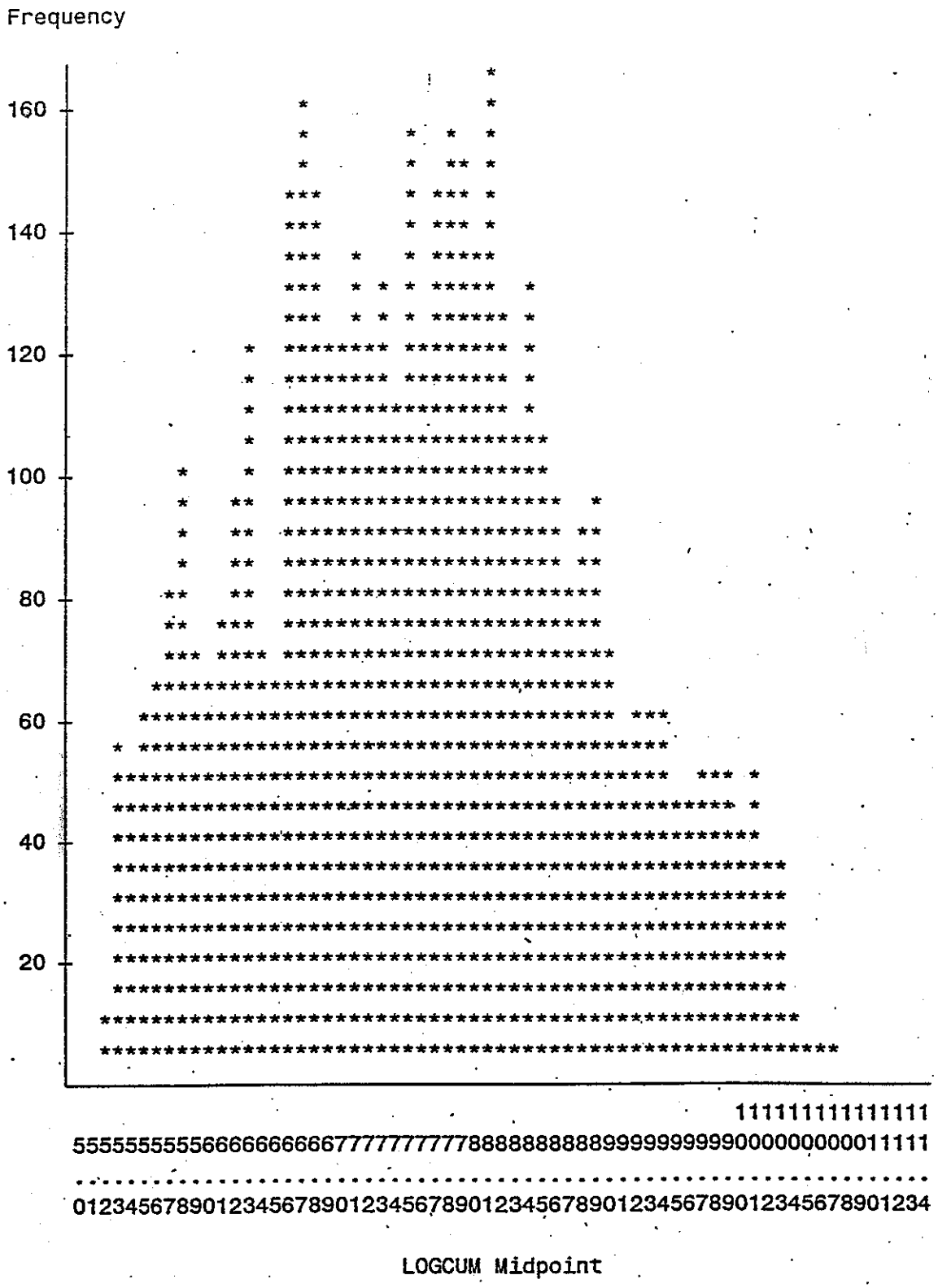
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LOGCUM Midpoint

SMR Tables

Aerospace Workers Cohort
Standardized Mortality Ratios for Selected Causes of Death

Overall Cohort

Cause of Death	Observed	Expected	SMR	95% Confidence Interval Lower	Upper
All Causes of Death	4052	4772.00	84.9	82.3	87.6
All Malignant Neoplasms	1100	1267.00	86.8	81.7	92.1
Cancer of Digestive Organs & Peritoneum	255	307.80	82.8	73.0	93.7
Cancer of Stomach	22	44.62	49.3	30.9	74.7
Cancer of Large Intestine	121	109.90	110.0	91.3	131.4
Cancer of Rectum	18	25.25	71.3	42.2	112.7
Cancer of Biliary Passages & Liver	20	26.00	76.9	47.0	118.8
Cancer of Pancreas	47	61.90	75.9	55.8	101.0
Cancer of Respiratory System	401	423.90	94.6	85.5	104.3
Cancer of Bronchus, Trachea & Lung	388	404.90	95.8	86.5	105.8
Cancer of Breast	47	62.78	74.9	55.0	99.5
All Uterine Cancers (Females Only)	6	17.43	34.4	12.6	74.9
Cancer of Other Female Genital Organs	13	19.35	67.2	35.8	114.9
Cancer of Prostate (Males Only)	76	81.41	93.4	73.6	116.8
Cancer of Bladder & Other Urinary	23	27.34	84.1	53.3	126.2
Cancer of Kidney	32	28.01	114.2	78.1	161.3
Cancer of Central Nervous System	28	33.29	84.1	55.9	121.6
Cancer of All Lymphatic, Haematopoietic	107	111.40	96.0	78.7	116
Lymphosarcoma & Reticulosarcoma	11	14.20	77.5	38.7	138.6
Hodgkin's Disease	10	8.01	124.9	59.9	229.6
Leukemia & Aleukemia	42	42.83	98.1	70.7	132.6
Cancer of All Other Lymphopoietic Tissue	44	46.45	94.7	68.8	127.2
All Other Malignant Neoplasms	67	95.22	70.4	54.5	89.4
Diabetes Mellitus	47	85.92	54.7	40.2	72.7
All Heart Disease	1409	1751.00	80.4	76.3	84.8
Cerebrovascular Disease	170	278.00	61.1	52.3	71.1
Nonmalignant Respiratory Disease	389	337.70	115.2	104.0	127.2
Bronchitis, Emphysema, Asthma	116	71.08	163.2	134.8	195.7
Bronchitis	23	10.78	213.4	135.3	320.1
Emphysema	66	51.51	128.1	99.1	163.0
Asthma	27	8.80	306.9	202.3	446.6
Other Nonmalignant Respiratory	171	153.90	111.1	95.1	129.1
Cirrhosis of Liver	65	115.00	56.5	43.6	72.0
Nephritis & Nephrosis	36	36.13	99.6	69.8	137.9
All External Causes of Death	293	366.70	79.9	71.0	89.6
Accidents	156	224.90	69.3	58.9	81.1
Motor Vehicle Accidents	88	104.90	83.9	67.3	103.3
All Other Accidents	68	120.00	56.6	44.0	71.8
Suicides	115	89.14	129.0	106.5	154.9
Homicides & Other External Causes	22	52.58	41.8	26.2	63.3
All Other Causes of Death	385	483.80	78.3	70.6	86.6
Unknown Causes of Death	112				

Aerospace Workers Cohort
Standardized Mortality Ratios for Selected Causes of Death

TCE-Exposed Sub-Cohort

Cause of Death	Observed	Expected	SMR	95% Confidence Interval Lower	Upper
All Causes of Death	917	1088.0	84.2	78.9	89.9
All Malignant Neoplasms	270	295.0	91.5	80.9	103.1
Cancer of Digestive Organs & Peritoneum	55	71.34	77.1	58.1	100.4
Cancer of Stomach	1	10.37	9.6	0.2	53.7
Cancer of Large Intestine	26	25.63	101.4	66.3	148.6
Cancer of Rectum	6	5.66	105.9	38.9	230.6
Cancer of Biliary Passages & Liver	6	6.13	97.9	35.9	213.1
Cancer of Pancreas	11	14.40	76.4	38.1	136.7
Cancer of Respiratory System	103	92.40	111.5	91.0	135.2
Cancer of Bronchus, Trachea & Lung	97	88.31	109.8	89.1	134.0
Cancer of Breast	16	21.27	75.2	43.0	122.1
All Uterine Cancers (Females Only)	1	6.12	16.3	0.4	91.0
Cancer of Other Female Genital Organs	8	6.63	120.6	52.1	237.6
Cancer of Prostate (Males Only)	21	17.83	117.8	72.9	180.1
Cancer of Bladder & Other Urinary	8	5.87	136.2	58.8	268.4
Cancer of Kidney	8	6.06	131.9	57.0	259.9
Cancer of Central Nervous System	4	7.32	54.7	14.9	139.9
Cancer of All Lymphatic, Haematopoietic	25	25.17	99.3	64.3	146.6
Lymphosarcoma & Reticulosarcoma	3	3.12	96.2	19.9	281.2
Hodgkin's Disease	1	1.67	60.0	1.5	334.5
Leukemia & Aleukemia	10	9.53	104.9	50.3	192.9
Cancer of All Other Lymphopoietic Tissue	11	10.86	101.3	50.6	181.3
All Other Malignant Neoplasms	13	22.22	58.5	31.2	100.1
Diabetes Mellitus	9	21.33	42.2	19.3	80.1
All Heart Disease	290	387.4	74.8	66.5	84.0
Cerebrovascular Disease	40	67.43	59.3	42.4	80.8
Nonmalignant Respiratory Disease	87	76.07	114.4	91.6	141.1
Bronchitis, Emphysema, Asthma	27	15.69	172.1	113.4	250.4
Bronchitis	6	2.35	254.9	93.6	554.9
Emphysema	15	11.07	135.5	75.8	223.4
Asthma	6	2.26	265.3	97.4	577.5
Other Nonmalignant Respiratory	39	34.76	112.2	79.8	153.4
Cirrhosis of Liver	14	25.34	55.3	30.2	92.7
Nephritis & Nephrosis	6	8.96	66.9	24.6	145.7
All External Causes of Death	68	80.13	84.9	65.9	107.6
Accidents	41	48.86	83.9	60.2	113.8
Motor Vehicle Accidents	23	22.76	101.0	64.1	151.6
All Other Accidents	18	26.09	69.0	40.9	109.0
Suicides	20	18.36	108.9	66.5	168.2
Homicides & Other External Causes	7	12.91	54.2	21.8	111.7
All Other Causes of Death	101	114.10	88.5	72.1	107.5
Unknown Causes of Death	16				

Aerospace Workers Cohort
Standardized Mortality Ratios for Selected Causes of Death

Overall Cohort

Cause of Death	SMRs by Exposure Categories					
	None or Low		Medium		High	
	Obs	SMR	Obs	SMR	Obs	SMR
All Causes of Death	3436	86.5	295	86.0	321	70.1
All Malignant Neoplasms	915	87.1	90	96.3	95	76.8
Cancer of Digestive Organs & Peritoneum	218	85.5	18	79.4	19	63.0
Cancer of Large Intestine	103	113.0	8	98.1	10	93.8
Cancer of Pancreas	40	78.1	4	87.5	3	49.3
Cancer of Respiratory System	330	93.3	31	109.5	40	95.2
Cancer of Breast	41	82.8	5	66.5	1	17.3
Cancer of Prostate (Males Only)	61	90.7	5	90.4	10	116.4
Cancer of Bladder & Other Urinary	17	74.3	3	166.6	3	112.7
Cancer of Kidney	24	102.3	2	106.8	6	223.1
Cancer of All Lymphatic, Haematopoietic	90	96.8	9	113.2	8	75.7
Lymphosarcoma & Reticulosarcoma	10	84.1	1	100.4	0	—
Hodgkin's Disease	9	132.2	1	189.3	0	—
Leukemia & Aleukemia	35	97.7	3	100.1	4	99.8
Cancer of All Other Lymphopoietic Tissue	36	93.6	4	116.7	4	87.4
All Heart Disease	1198	81.9	86	71.3	125	74.2
Cerebrovascular Disease	143	62.3	11	50.1	16	59.9
Nonmalignant Respiratory Disease	322	114.6	34	143.7	33	99.8
Bronchitis, Emphysema, Asthma	96	161.9	10	202.9	10	145.9
Emphysema	54	125.4	6	173.6	6	120.2
Other Nonmalignant Respiratory	137	107.3	17	159.8	17	109.2
Cirrhosis of Liver	58	60.1	5	64.1	2	18.5
All External Causes of Death	255	82.5	23	90.0	15	47.1
Accidents	136	71.7	12	76.9	8	40.9
Suicides	101	133.4	8	139.9	6	78.0
All Other Causes of Death	323	80.5	31	85.7	25	54.0

Aerospace Workers Cohort
Standardized Mortality Ratios for Selected Causes of Death

TCE-Exposed Sub-Cohort by Duration of Employment

	Cohort by Duration					
	< 10 years		10 - 19 years		20+ years	
Cause of Death	Obs.	SMR	Obs.	SMR	Obs.	SMR
All Causes of Death	306	78.8	393	84.8	218	92.0
All Malignant Neoplasms	91	86.7	110	92.9	69	96.3
Cancer of Digestive Organs & Peritoneum	18	72.4	21	70.7	16	95.3
Cancer of Large Intestine	8	93.1	8	75.4	10	155.6
Cancer of Pancreas	5	102.1	2	33.5	4	113.4
Cancer of Respiratory System	35	112.2	41	113.6	27	107.5
Cancer of Breast	8	87.0	7	89.8	1	23.3
Cancer of Prostate (Males Only)	7	155.8	8	88.1	6	141.0
Cancer of Bladder & Other Urinary	0	—	4	153.5	4	276.9
Cancer of Kidney	3	138.5	3	128.9	2	127.4
Cancer of All Lymphatic, Haematopoietic	7	73.4	16	164.3	2	33.9
Hodgkin's Disease	1	111.0	0	—	0	—
Leukemia & Aleukemia	3	81.8	6	163.7	1	45.5
Cancer of All Other Lymphopoietic Tissue	2	54.9	8	187.6	1	33.9
All Heart Disease	89	69.8	130	75.2	71	81.4
Cerebrovascular Disease	6	27.2	21	63.8	13	104.6
Nonmalignant Respiratory Disease	22	93.3	42	124.4	23	122.8
Bronchitis, Emphysema, Asthma	8	157.3	14	200.2	5	138.5
Emphysema	5	148.2	7	139.1	3	112.5
Other Nonmalignant Respiratory	11	109.0	17	117.3	11	108.0
Cirrhosis of Liver	4	36.5	7	73.7	3	61.6
All External Causes of Death	37	83.3	24	93.4	7	69.7
Accidents	22	84.1	15	91.1	4	64.2
Suicides	9	91.3	8	140.4	3	106.8
All Other Causes of Death	36	86.2	44	88.9	21	91.6

Demographics

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	LIVE OR DEATH										ALL				
	LIVE					DEAD									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP															
NO EXPOSURE	7955	548	3842	295	12640	2478	206	423	28	3135	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	687	100	1053	172	2012	178	40	105	22	345	865	140	1158	194	2357
HIGH EXPOSURE >2000	982	112	658	52	1804	362	94	107	9	572	1344	206	765	61	2376
ALL	9624	760	5553	519	16456	3018	340	635	59	4052	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	ALL CANCER										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP															
NO EXPOSURE	9819	695	4114	317	14945	614	59	151	6	830	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	813	129	1111	190	2243	52	11	47	4	114	865	140	1158	194	2357
HIGH EXPOSURE >2000	1245	186	731	58	2220	99	20	34	3	156	1344	206	765	61	2376
ALL	11877	1010	5956	565	19408	765	90	232	13	1100	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE, IN THREE GROUPS

	CANCER OF KIDNEY									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10416	753	4259	323	15751	17	1	6	24	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	865	140	1157	194	2356	.	.	1	1	865	140	1158	194	2357
HIGH EXPOSURE >2000	1339	204	765	61	2369	5	2	.	7	1344	206	765	61	2376
ALL	12620	1097	6181	578	20476	22	3	7	32	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF BREAST								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP													
NO EXPOSURE	10433	754	4238	319	15744	27	4	31	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	865	140	1148	193	2346	10	1	11	865	140	1158	194	2357
HIGH EXPOSURE >2000	1344	206	760	61	2371	5	.	5	1344	206	765	61	2376
ALL	12642	1100	6146	573	20461	42	5	47	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	LEUKEMIA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10411	753	4256	323	15743	22	1	9	32	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	863	140	1157	194	2354	2	.	1	3	865	140	1158	194	2357
HIGH EXPOSURE >2000	1339	205	764	61	2369	5	1	1	7	1344	206	765	61	2376
ALL	12613	1098	6177	578	20466	29	2	11	42	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF LYMCOMA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10427	754	4263	323	15767	6	.	2	8	10433	754	4265	323	15775
EXPOSED	2208	344	1923	255	4730	1	2	.	3	2209	346	1923	255	4733
ALL	12635	1098	6186	578	20497	7	2	2	11	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF PROSTATE								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			MALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE													
NOEXPOSURE	10381	751	4265	323	15720	52	3	55	10433	754	4265	323	15775
EXPOSED	2195	339	1923	255	4712	14	7	21	2209	346	1923	255	4733
ALL	12576	1090	6188	578	20432	66	10	76	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF LIVER									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10423	753	4262	323	15761	10	1	3	14	10433	754	4265	323	15775
EXPOSED	2205	345	1922	255	4727	4	1	1	6	2209	346	1923	255	4733
ALL	12628	1098	6184	578	20488	14	2	4	20	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	LEUKEMIA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10411	753	4256	323	15743	22	1	9	32	10433	754	4265	323	15775
EXPOSED	2202	345	1921	255	4723	7	1	2	10	2209	346	1923	255	4733
ALL	12613	1098	6177	578	20466	29	2	11	42	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF BREAST								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE													
NOEXPOSURE	10433	754	4238	319	15744	27	4	31	10433	754	4265	323	15775
EXPOSED	2209	346	1908	254	4717	15	1	16	2209	346	1923	255	4733
ALL	12642	1100	6146	573	20461	42	5	47	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF KIDNEY									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10416	753	4259	323	15751	17	1	6	24	10433	754	4265	323	15775
EXPOSED	2204	344	1922	255	4725	5	2	1	8	2209	346	1923	255	4733
ALL	12620	1097	6181	578	20476	22	3	7	32	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	ALL CANCER										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE															
NOEXPOSURE	9819	695	4114	317	14945	614	59	151	6	830	10433	754	4265	323	15775
EXPOSED	2058	315	1842	248	4463	151	31	81	7	270	2209	346	1923	255	4733
ALL	11877	1010	5956	565	19408	765	90	232	13	1100	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE.

	LIVE OR DEATH										ALL				
	LIVE					DEAD									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE															
NOEXPOSURE	7955	548	3842	295	12640	2478	206	423	28	3135	10433	754	4265	323	15775
EXPOSED	1669	212	1711	224	3816	540	134	212	31	917	2209	346	1923	255	4733
ALL	9624	760	5553	519	16456	3018	340	635	59	4052	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF CERVIX							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL												
NO OR LOW EXPOSURE	10943	809	5715	513	17980	1	1	10943	809	5716	513	17981
MEDIUM OR HIGH	1699	291	472	65	2527	.	.	1699	291	472	65	2527
ALL	12642	1100	6187	578	20507	1	1	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF UTERINE							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL												
NO OR LOW EXPOSURE	10943	809	5710	513	17975	6	6	10943	809	5716	513	17981
MEDIUM OR HIGH	1699	291	472	65	2527	.	.	1699	291	472	65	2527
ALL	12642	1100	6182	578	20502	6	6	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF OTHER FEMALE GENITAL								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWHITE	WHITE	NONWHITE	ALL	WHITE	NONWHITE	ALL	WHITE	NONWHITE	WHITE	NONWHITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL													
NO OR LOW EXPOSURE	10943	809	5708	512	17972	8	1	9	10943	809	5716	513	17981
MEDIUM OR HIGH	1699	291	470	63	2523	2	2	4	1699	291	472	65	2527
ALL	12642	1100	6178	575	20495	10	3	13	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF RECTUM									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10932	809	5713	513	17967	11	.	3	14	10943	809	5716	513	17981
MEDIUM OR HIGH	1697	290	471	65	2523	2	1	1	4	1699	291	472	65	2527
ALL	12629	1099	6184	578	20490	13	1	4	18	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF BLADDER								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			MALE	FEMALE		MALE		FEMALE		
	RACE		RACE			RACE	RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL													
NO OR LOW EXPOSURE	10926	809	5715	513	17963	17	1	18	10943	809	5716	513	17981
MEDIUM OR HIGH	1694	291	472	65	2522	5	.	5	1699	291	472	65	2527
ALL	12620	1100	6187	578	20485	22	1	23	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	NON MALIGNANT RESPERITORAY										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL															
NO OR LOW EXPOSURE	10695	785	5663	508	17651	248	24	53	5	330	10943	809	5716	513	17981
MEDIUM OR HIGH	1665	276	463	64	2468	34	15	9	1	59	1699	291	472	65	2527
ALL	12360	1061	6126	572	20119	282	39	62	6	389	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF LYMPHA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10880	804	5694	513	17891	63	5	22	90	10943	809	5716	513	17981
MEDIUM OR HIGH	1688	288	469	65	2510	11	3	3	17	1699	291	472	65	2527
ALL	12568	1092	6163	578	20401	74	8	25	107	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF DIGEST										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL															
NO OR LOW EXPOSURE	10773	797	5680	512	17762	170	12	36	1	219	10943	809	5716	513	17981
MEDIUM OR HIGH	1672	285	469	65	2491	27	6	3	.	36	1699	291	472	65	2527
ALL	12445	1082	6149	577	20253	197	18	39	1	255	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF BRONCHUS										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL															
NO OR LOW EXPOSURE	10712	781	5653	511	17657	231	28	63	2	324	10943	809	5716	513	17981
MEDIUM OR HIGH	1651	283	465	64	2463	48	8	7	1	64	1699	291	472	65	2527
ALL	12363	1064	6118	575	20120	279	36	70	3	388	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF LYMCOMA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10936	809	5714	513	17972	7	.	2	9	10943	809	5716	513	17981
MEDIUM OR HIGH	1699	289	472	65	2525	.	2	.	2	1699	291	472	65	2527
ALL	12635	1098	6186	578	20497	7	2	2	11	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF PROSTATE								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			MALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL													
NO OR LOW EXPOSURE	10887	805	5716	513	17921	56	4	60	10943	809	5716	513	17981
MEDIUM OR HIGH	1689	285	472	65	2511	10	6	16	1699	291	472	65	2527
ALL	12576	1090	6188	578	20432	66	10	76	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF LIVER									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWHITE	WHITE	NONWHITE	ALL	WHITE	NONWHITE	WHITE	ALL	WHITE	NONWHITE	WHITE	NONWHITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10931	808	5712	513	17964	12	1	4	17	10943	809	5716	513	17981
MEDIUM OR HIGH	1697	290	472	65	2524	2	1	.	3	1699	291	472	65	2527
ALL	12628	1098	6184	578	20488	14	2	4	20	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	LEUKEMIA									ALL				
	NOT SUCH CANCER-					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10920	808	5705	513	17946	23	1	11	35	10943	809	5716	513	17981
MEDIUM OR HIGH	1693	290	472	65	2520	6	1	.	7	1699	291	472	65	2527
ALL	12613	1098	6177	578	20466	29	2	11	42	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF BREAST								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL													
NO OR LOW EXPOSURE	10943	809	5680	508	17940	36	5	41	10943	809	5716	513	17981
MEDIUM OR HIGH	1699	291	466	65	2521	6	.	6	1699	291	472	65	2527
ALL	12642	1100	6146	573	20461	42	5	47	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	CANCER OF KIDNEY									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL														
NO OR LOW EXPOSURE	10926	808	5710	513	17957	17	1	6	24	10943	809	5716	513	17981
MEDIUM OR HIGH	1694	289	471	65	2519	5	2	1	8	1699	291	472	65	2527
ALL	12620	1097	6181	578	20476	22	3	7	32	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	ALL CANCER										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL															
NO OR LOW EXPOSURE	10293	749	5512	504	17058	650	60	204	9	923	10943	809	5716	513	17981
MEDIUM OR HIGH	1584	261	444	61	2350	115	30	28	4	177	1699	291	472	65	2527
ALL	11877	1010	5956	565	19408	765	90	232	13	1100	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND PEAK EXPOSURE IN THREE GROUPS

	LIVE OR DEATH										ALL				
	LIVE					DEAD									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
PEAK LEVEL															
NO OR LOW EXPOSURE	8349	589	5160	466	14564	2594	220	556	47	3417	10943	809	5716	513	17981
MEDIUM OR HIGH	1275	171	393	53	1892	424	120	79	12	635	1699	291	472	65	2527
ALL	9624	760	5553	519	16456	3018	340	635	59	4052	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF CERVIX							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP												
NO EXPOSURE	10433	754	4264	323	15774	1	1	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	865	140	1158	194	2357	.	.	865	140	1158	194	2357
HIGH EXPOSURE >2000	1344	206	765	61	2376	.	.	1344	206	765	61	2376
ALL	12642	1100	6187	578	20507	1	1	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF UTERINE							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP												
NO EXPOSURE	10433	754	4260	323	15770	5	5	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	865	140	1157	194	2356	1	1	865	140	1158	194	2357
HIGH EXPOSURE >2000	1344	206	765	61	2376	.	.	1344	206	765	61	2376
ALL	12642	1100	6182	578	20502	6	6	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF OTHER FEMALE GENITAL								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP													
NO EXPOSURE	10433	754	4260	323	15770	5	.	5	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	865	140	1157	193	2355	1	1	2	865	140	1158	194	2357
HIGH EXPOSURE >2000	1344	206	761	59	2370	4	2	6	1344	206	765	61	2376
ALL	12642	1100	6178	575	20495	10	3	13	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF RECTUM									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10423	754	4263	323	15763	10	.	2	12	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	864	140	1158	194	2356	1	.	.	1	865	140	1158	194	2357
HIGH EXPOSURE >2000	1342	205	763	61	2371	2	1	2	5	1344	206	765	61	2376
ALL	12629	1099	6184	578	20490	13	1	4	18	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	NON MALIGNANT RESPERITORAY										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP															
NO EXPOSURE	10196	730	4228	319	15473	237	24	37	4	302	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	851	137	1144	193	2325	14	3	14	1	32	865	140	1158	194	2357
HIGH EXPOSURE >2000	1313	194	754	60	2321	31	12	11	1	55	1344	206	765	61	2376
ALL	12360	1061	6126	572	20119	282	39	62	6	389	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF LYMPHA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10373	749	4248	323	15693	60	5	17	82	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	861	139	1153	194	2347	4	1	5	10	865	140	1158	194	2357
HIGH EXPOSURE >2000	1334	204	762	61	2361	10	2	3	15	1344	206	765	61	2376
ALL	12568	1092	6163	578	20401	74	8	25	107	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF DIGEST										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP															
NO EXPOSURE	10271	742	4240	322	15575	162	12	25	1	200	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	855	138	1149	194	2336	10	2	9	.	21	865	140	1158	194	2357
HIGH EXPOSURE >2000	1319	202	760	61	2342	25	4	5	.	34	1344	206	765	61	2376
ALL	12445	1082	6149	577	20253	197	18	39	1	255	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF BRONCHUS										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWHITE	WHITE	NONWHITE	ALL	WHITE	NONWHITE	WHITE	NONWHITE	ALL	WHITE	NONWHITE	WHITE	NONWHITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP															
NO EXPOSURE	10217	726	4219	322	15484	216	28	46	1	291	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	837	137	1145	193	2312	28	3	13	1	45	865	140	1158	194	2357
HIGH EXPOSURE >2000	1309	201	754	60	2324	35	5	11	1	52	1344	206	765	61	2376
ALL	12363	1064	6118	575	20120	279	36	70	3	388	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF LYMCOMA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10427	754	4263	323	15767	6	.	2	8	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	864	139	1158	194	2355	1	1	.	2	865	140	1158	194	2357
HIGH EXPOSURE >2000	1344	205	765	61	2375	.	1	.	1	1344	206	765	61	2376
ALL	12635	1098	6186	578	20497	7	2	2	11	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF PROSTATE								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			MALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWHITE	WHITE	NONWHITE	ALL	WHITE	NONWHITE	ALL	WHITE	NONWHITE	WHITE	NONWHITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP													
NO EXPOSURE	10381	751	4265	323	15720	52	3	55	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	861	137	1158	194	2350	4	3	7	865	140	1158	194	2357
HIGH EXPOSURE >2000	1334	202	765	61	2362	10	4	14	1344	206	765	61	2376
ALL	12576	1090	6188	578	20432	66	10	76	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND CUMULATIVE EXPOSURE IN THREE GROUPS

	CANCER OF LIVER									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CUMEXP														
NO EXPOSURE	10423	753	4262	323	15761	10	1	3	14	10433	754	4265	323	15775
LOW EXPOSURE 1-2000	863	139	1158	194	2354	2	1	.	3	865	140	1158	194	2357
HIGH EXPOSURE >2000	1342	206	764	61	2373	2	.	1	3	1344	206	765	61	2376
ALL	12628	1098	6184	578	20488	14	2	4	20	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF DIGEST										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE															
NOEXPOSURE	10271	742	4240	322	15575	162	12	25	1	200	10433	754	4265	323	15775
EXPOSED	2174	340	1909	255	4678	35	6	14	.	55	2209	346	1923	255	4733
ALL	12445	1082	6149	577	20253	197	18	39	1	255	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF BRONCHUS										ALL				
	NOT SUCH CANCER					CANCER									
	SEX					SEX					SEX				
	MALE		FEMALE			MALE		FEMALE			MALE		FEMALE		
	RACE		RACE			RACE		RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE															
NOEXPOSURE	10217	726	4219	322	15484	216	28	46	1	291	10433	754	4265	323	15775
EXPOSED	2146	338	1899	253	4636	63	8	24	2	97	2209	346	1923	255	4733
ALL	12363	1064	6118	575	20120	279	36	70	3	388	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF BLADDER								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			MALE	FEMALE		MALE		FEMALE		
	RACE		RACE			RACE	RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE													
NOEXPOSURE	10418	754	4265	323	15760	15	.	15	10433	754	4265	323	15775
EXPOSED	2202	346	1922	255	4725	7	1	8	2209	346	1923	255	4733
ALL	12620	1100	6187	578	20485	22	1	23	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF LYMPHA									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10373	749	4248	323	15693	60	5	17	82	10433	754	4265	323	15775
EXPOSED	2195	343	1915	255	4708	14	3	8	25	2209	346	1923	255	4733
ALL	12568	1092	6163	578	20401	74	8	25	107	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF OTHER FEMALE GENITAL								ALL				
	NOT SUCH CANCER					CANCER							
	SEX					SEX			SEX				
	MALE		FEMALE			FEMALE			MALE		FEMALE		
	RACE		RACE			RACE			RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE													
NOEXPOSURE	10433	754	4260	323	15770	5	.	5	10433	754	4265	323	15775
EXPOSED	2209	346	1918	252	4725	5	3	8	2209	346	1923	255	4733
ALL	12642	1100	6178	575	20495	10	3	13	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF RECTUM									ALL				
	NOT SUCH CANCER					CANCER								
	SEX					SEX				SEX				
	MALE		FEMALE			MALE		FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	NONWH-ITE	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE														
NOEXPOSURE	10423	754	4263	323	15763	10	.	2	12	10433	754	4265	323	15775
EXPOSED	2206	345	1921	255	4727	3	1	2	6	2209	346	1923	255	4733
ALL	12629	1099	6184	578	20490	13	1	4	18	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF CERVIX							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE												
NOEXPOSURE	10433	754	4264	323	15774	1	1	10433	754	4265	323	15775
EXPOSED	2209	346	1923	255	4733	.	.	2209	346	1923	255	4733
ALL	12642	1100	6187	578	20507	1	1	12642	1100	6188	578	20508

HUGHES COHORT STUDY, SEPTEMBER 1997
DISTRIBUTION BY RACE, SEX, VITAL STATUS, AND TCE EXPOSURE

	CANCER OF UTERINE							ALL				
	NOT SUCH CANCER					CANCER						
	SEX					SEX		SEX				
	MALE		FEMALE			FEMALE		MALE		FEMALE		
	RACE		RACE			RACE		RACE		RACE		
	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL	WHITE	ALL	WHITE	NONWH-ITE	WHITE	NONWH-ITE	ALL
	N	N	N	N	N	N	N	N	N	N	N	N
TCE OR NO TCE												
NOEXPOSURE	10433	754	4260	323	15770	5	5	10433	754	4265	323	15775
EXPOSED	2209	346	1922	255	4732	1	1	2209	346	1923	255	4733
ALL	12642	1100	6182	578	20502	6	6	12642	1100	6188	578	20508

Mantel-Haenszel
Analysis

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
All Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.084	0.949	1.239	1.119	0.979	1.278	1.074	0.941	1.226	1.077	0.944	1.229
Exposure peak med and high vs. low and no exposure	1.365	1.168	1.595	1.173	1.006	1.369	1.203	1.031	1.404	1.082	0.929	1.260
Cumulative less than 2000 vs. no exposure, no high low	0.919	0.760	1.112	1.094	0.902	1.326	1.044	0.865	1.261	1.148	0.949	1.389
Cumulative greater than 2000 vs. no exposure, no high low	1.248	1.057	1.473	1.133	0.961	1.335	1.098	0.932	1.294	1.024	0.870	1.204

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Prostate Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.273	0.771	2.099	1.631	0.994	2.677	1.269	0.771	2.088	1.578	0.962	2.590
Exposure peak med and high vs. low and no exposure	1.897	1.104	3.260	1.445	0.837	2.495	1.681	0.975	2.898	1.387	0.803	2.395
Cumulative less than 2000 vs. no exposure, no high low	0.852	0.389	1.866	1.620	0.746	3.517	0.971	0.446	2.115	1.656	0.765	3.584
Cumulative greater than 2000 vs. no exposure, no high low	1.690	0.947	3.015	1.637	0.918	2.919	1.490	0.833	2.666	1.539	0.862	2.748

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Digestive Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.917	0.681	1.233	1.004	0.744	1.354	0.889	0.660	1.198	0.957	0.708	1.293
Exposure peak med and high vs. low and no exposure	1.170	0.824	1.660	0.980	0.691	1.389	1.015	0.716	1.441	0.895	0.632	1.268
Cumulative less than 2000 vs. no exposure, no high low	0.703	0.451	1.096	0.916	0.579	1.448	0.790	0.505	1.235	0.966	0.610	1.529
Cumulative greater than 2000 vs. no exposure, no high low	1.129	0.787	1.619	1.061	0.739	1.522	0.971	0.676	1.396	0.953	0.663	1.369

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Kidney Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.111	0.500	2.471	1.167	0.544	2.504	1.087	0.496	2.385	1.131	0.533	2.399
Exposure peak med and high vs. low and no exposure	2.372	1.092	5.149	2.058	0.947	4.472	2.078	0.955	4.525	1.876	0.867	4.057
Cumulative less than 2000 vs. no exposure, no high low	0.279	0.043	1.801	0.286	0.040	2.042	0.307	0.047	1.990	0.310	0.045	2.152
Cumulative greater than 2000 vs. no exposure, no high low	1.936	0.848	4.242	1.746	0.779	3.913	1.672	0.736	3.798	1.569	0.706	3.484

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Lympho & Reticulo	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.250	0.333	4.697	1.370	0.388	4.843	1.172	0.325	4.232	1.297	0.371	4.532
Exposure peak med and high vs. low and no exposure	1.581	0.346	7.219	1.421	0.298	6.770	1.395	0.306	6.359	1.257	0.271	5.819
Cumulative less than 2000 vs. no exposure, no high low	1.673	0.362	7.744	1.930	0.475	7.841	1.686	0.382	7.453	1.970	0.488	7.954
Cumulative greater than 2000 vs. no exposure, no high low	0.830	0.104	6.612	0.826	0.104	6.555	0.702	0.093	5.316	0.741	0.098	5.610

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Leukemia	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.042	0.512	2.117	1.034	0.522	2.049	1.026	0.492	2.139	0.976	0.486	1.961
Exposure peak med and high vs. low and no exposure	1.423	0.635	3.188	1.254	0.550	2.863	1.236	0.549	2.783	1.139	0.499	2.602
Cumulative less than 2000 vs. no exposure, no high low	0.627	0.194	2.025	0.664	0.210	2.097	0.735	0.221	2.446	0.689	0.212	2.236
Cumulative greater than 2000 vs. no exposure, no high low	1.452	0.645	3.272	1.285	0.583	2.830	1.277	0.553	2.951	1.140	0.512	2.540

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
All Lymphoma & Hematopoetic	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.016	0.650	1.588	1.048	0.670	1.639	1.014	0.646	1.592	1.009	0.642	1.587
Exposure peak med and high vs. low and no exposure	1.344	0.803	2.250	1.189	0.705	2.003	1.191	0.711	1.995	1.091	0.647	1.840
Cumulative less than 2000 vs. no exposure, no high low	0.816	0.425	1.569	0.918	0.471	1.791	0.944	0.489	1.822	0.980	0.498	1.925
Cumulative greater than 2000 vs. no exposure, no high low	1.215	0.702	2.101	1.137	0.661	1.956	1.072	0.614	1.870	1.023	0.591	1.769

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Bladder	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.778	0.763	4.142	2.253	0.967	5.248	1.806	0.780	4.178	2.238	0.964	5.197
Exposure peak med and high vs. low and no exposure	1.977	0.748	5.221	1.573	0.586	4.224	1.785	0.672	4.742	1.534	0.571	4.117
Cumulative less than 2000 vs. no exposure, no high low	0.446	0.062	3.198	0.710	0.073	6.941	0.507	0.071	3.643	0.770	0.084	7.079
Cumulative greater than 2000 vs. no exposure, no high low	3.098	1.324	7.253	3.033	1.291	7.125	2.825	1.201	6.643	2.924	1.241	6.888

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Non Malign Resp Dis	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.960	0.758	1.216	1.026	0.807	1.305	0.951	0.751	1.205	0.975	0.767	1.239
Exposure peak med and high vs. low and no exposure	1.272	0.968	1.673	1.052	0.802	1.382	1.111	0.845	1.461	0.972	0.741	1.275
Cumulative less than 2000 vs. no exposure, no high low	0.709	0.495	1.016	0.926	0.638	1.344	0.816	0.569	1.171	0.961	0.663	1.395
Cumulative greater than 2000 vs. no exposure, no high low	1.209	0.910	1.606	1.102	0.829	1.465	1.058	0.796	1.405	0.992	0.747	1.317

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Other Fem Gen Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	5.333	1.969	14.446	2.840	0.988	8.159	4.972	1.893	13.058	2.553	0.913	7.140
Exposure peak med and high vs. low and no exposure	3.162	1.037	9.643	3.927	1.332	11.578	2.721	0.887	8.343	3.061	1.013	9.247
Cumulative less than 2000 vs. no exposure, no high low	2.677	0.554	12.934	1.268	0.252	6.374	2.842	0.618	13.076	1.286	0.268	6.160
Cumulative greater than 2000 vs. no exposure, no high low	7.967	2.938	21.605	4.780	1.637	13.960	6.397	2.374	17.235	3.589	1.234	10.442

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Respiratory Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.111	0.885	1.395	1.177	0.937	1.478	1.101	0.877	1.382	1.130	0.900	1.419
Exposure peak med and high vs. low and no exposure	1.406	1.079	1.831	1.178	0.904	1.534	1.235	0.948	1.609	1.090	0.837	1.420
Cumulative less than 2000 vs. no exposure, no high low	1.035	0.758	1.413	1.325	0.972	1.806	1.180	0.865	1.609	1.382	1.015	1.884
Cumulative greater than 2000 vs. no exposure, no high low	1.186	0.886	1.589	1.071	0.800	1.435	1.044	0.780	1.397	0.972	0.727	1.301

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Liver Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.428	0.552	3.697	1.552	0.603	3.994	1.384	0.530	3.617	1.478	0.571	3.828
Exposure peak med and high vs. low and no exposure	1.256	0.369	4.271	1.093	0.314	3.799	1.078	0.319	3.647	1.010	0.293	3.478
Cumulative less than 2000 vs. no exposure, no high low	1.434	0.415	4.954	1.836	0.581	5.801	1.602	0.454	5.654	1.915	0.603	6.082
Cumulative greater than 2000 vs. no exposure, no high low	1.423	0.412	4.916	1.353	0.375	4.877	1.234	0.360	4.232	1.186	0.333	4.228

Mantel-Haenszel Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Breast Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.720	0.949	3.120	0.951	0.521	1.736	1.682	0.919	3.078	0.886	0.484	1.624
Exposure peak med and high vs. low and no exposure	1.041	0.443	2.450	1.366	0.582	3.210	0.922	0.393	2.162	1.118	0.473	2.640
Cumulative less than 2000 vs. no exposure, no high low	2.375	1.220	4.623	1.129	0.568	2.244	2.628	1.324	5.213	1.150	0.568	2.328
Cumulative greater than 2000 vs. no exposure, no high low	1.071	0.417	2.751	0.721	0.288	1.805	0.954	0.374	2.437	0.605	0.246	1.488

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Rectal Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.666	0.632	4.392	1.703	0.634	4.573	1.678	0.624	4.516	1.634	0.599	4.461
Exposure peak med and high vs. low and no exposure	2.033	0.685	6.033	1.749	0.585	5.223	1.771	0.595	5.271	1.606	0.534	4.828
Cumulative less than 2000 vs. no exposure, no high low	0.558	0.075	4.165	0.709	0.103	4.862	0.672	0.089	5.091	0.772	0.112	5.343
Cumulative greater than 2000 vs. no exposure, no high low	2.766	1.019	7.513	2.480	0.880	6.990	2.457	0.874	6.905	2.181	0.746	6.374

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Uterine Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.667	0.079	5.621	0.425	0.060	3.011	0.690	0.082	5.828	0.437	0.065	2.920
Exposure peak med and high vs. low and no exposure	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.
Cumulative less than 2000 vs. no exposure, no high low	1.339	0.158	11.367	0.670	0.083	5.404	1.612	0.192	13.516	0.757	0.097	5.896
Cumulative greater than 2000 vs. no exposure, no high low	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.

Mantel-Haenszel Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Cervical Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.
Exposure peak med and high vs. low and no exposure	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.
Cumulative less than 2000 vs. no exposure, no high low	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.
Cumulative greater than 2000 vs. no exposure, no high low	0.000	.	.	0.000	.	.	0.000	.	.	0.000	.	.

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Kidney Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.171	0.524	2.614	1.143	0.507	2.576	1.179	0.528	2.634	1.144	0.508	2.577
Exposure peak med and high vs. low and no exposure	2.206	0.990	4.914	1.893	0.847	4.232	2.191	0.984	4.881	1.844	0.843	4.211
Cumulative less than 2000 vs. no exposure, no high low	0.324	0.044	2.397	0.312	0.041	2.356	0.330	0.045	2.448	0.314	0.042	2.370
Cumulative greater than 2000 vs. no exposure, no high low	1.758	0.756	4.087	1.589	0.681	3.705	1.754	0.755	4.076	1.585	0.680	3.696

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
All Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.171	1.020	1.344	1.084	0.942	1.246	1.173	1.022	1.347	1.083	0.942	1.246
Exposure peak med and high vs. low and no exposure	1.285	1.094	1.509	1.057	0.900	1.242	1.284	1.093	1.509	1.057	0.900	1.242
Cumulative less than 2000 vs. no exposure, no high low	1.190	0.978	1.449	1.215	0.993	1.486	1.196	0.982	1.456	1.215	0.993	1.486
Cumulative greater than 2000 vs. no exposure, no high low	1.152	0.970	1.367	1.006	0.847	1.194	1.153	0.971	1.368	1.006	0.847	1.194

COX Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Leukemia	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.120	0.549	2.283	0.983	0.478	2.024	1.135	0.557	2.314	0.986	0.479	2.030
Exposure peak med and high vs. low and no exposure	1.336	0.593	3.010	1.102	0.489	2.486	1.335	0.593	3.006	1.098	0.487	2.476
Cumulative less than 2000 vs. no exposure, no high low	0.798	0.244	2.613	0.691	0.206	2.316	0.835	0.255	2.732	0.693	0.207	2.321
Cumulative greater than 2000 vs. no exposure, no high low	1.348	0.594	3.059	1.141	0.502	2.597	1.361	0.600	3.088	1.150	0.505	2.615

COX Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Liver	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.549	0.593	4.045	1.481	0.561	3.909	1.561	0.598	4.076	1.481	0.561	3.910
Exposure peak med and high vs. low and no exposure	1.189	0.348	4.059	0.977	0.285	3.345	1.183	0.346	4.040	0.973	0.284	3.331
Cumulative less than 2000 vs. no exposure, no high low	1.935	0.552	6.776	2.123	0.589	7.659	1.950	0.556	6.834	2.124	0.589	7.661
Cumulative greater than 2000 vs. no exposure, no high low	1.351	0.388	4.707	1.189	0.339	4.163	1.345	0.386	4.685	1.183	0.338	4.143

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Rectal Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.590	0.595	4.249	1.532	0.562	4.175	1.684	0.630	4.504	1.569	0.577	4.268
Exposure peak med and high vs. low and no exposure	1.785	0.587	5.426	1.480	0.486	4.507	1.806	0.594	5.491	1.481	0.486	4.507
Cumulative less than 2000 vs. no exposure, no high low	0.633	0.082	4.889	0.741	0.093	5.934	0.711	0.092	5.486	0.760	0.095	6.070
Cumulative greater than 2000 vs. no exposure, no high low	2.295	0.807	6.527	1.987	0.692	5.705	2.401	0.844	6.833	2.059	0.718	5.904

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Prostate Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.420	0.857	2.354	1.582	0.955	2.618	1.407	0.848	2.333	1.582	0.955	2.619
Exposure peak med and high vs. low and no exposure	1.821	1.048	3.163	1.386	0.798	2.408	1.821	1.048	3.163	1.389	0.799	2.414
Cumulative less than 2000 vs. no exposure, no high low	1.151	0.522	2.537	1.724	0.783	3.798	1.133	0.513	2.501	1.734	0.787	3.821
Cumulative greater than 2000 vs. no exposure, no high low	1.609	0.894	2.898	1.530	0.850	2.754	1.603	0.890	2.888	1.529	0.850	2.753

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Lympho & Reticulo	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.282	0.339	4.845	1.358	0.354	5.208	1.281	0.339	4.844	1.361	0.355	5.220
Exposure peak med and high vs. low and no exposure	1.500	0.324	6.952	1.305	0.280	6.079	1.498	0.323	6.954	1.310	0.281	6.114
Cumulative less than 2000 vs. no exposure, no high low	1.847	0.390	8.738	2.248	0.455	11.091	1.859	0.392	8.813	2.248	0.455	11.096
Cumulative greater than 2000 vs. no exposure, no high low	0.822	0.103	6.573	0.806	0.100	6.491	0.835	0.104	6.723	0.821	0.101	6.647

COX Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Lympho & Hemato	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.124	0.717	1.762	1.047	0.665	1.650	1.129	0.721	1.770	1.047	0.665	1.649
Exposure peak med and high vs. low and no exposure	1.288	0.767	2.164	1.081	0.642	1.818	1.283	0.764	2.155	1.077	0.640	1.812
Cumulative less than 2000 vs. no exposure, no high low	1.077	0.577	2.083	1.094	0.558	2.143	1.102	0.570	2.131	1.098	0.561	2.151
Cumulative greater than 2000 vs. no exposure, no high low	1.155	0.665	2.004	1.031	0.593	1.792	1.152	0.664	1.998	1.029	0.592	1.788

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Bladder	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.865	0.787	4.419	2.046	0.863	4.851	1.855	0.781	4.405	2.040	0.860	4.837
Exposure peak med and high vs. low and no exposure	1.820	0.675	4.907	1.413	0.524	3.810	1.815	0.673	4.896	1.412	0.524	3.807
Cumulative less than 2000 vs. no exposure, no high low	0.516	0.068	3.917	0.693	0.090	5.359	0.499	0.065	3.803	0.694	0.090	5.371
Cumulative greater than 2000 vs. no exposure, no high low	2.742	1.115	6.746	2.707	1.102	6.649	2.724	1.105	6.714	2.692	1.096	6.615

COX Analysis

	Model 1 No Stratification			Model 2 Strat by age and sex			Model 3 Strat by decade			Model 4 Strat by age, sex, decade		
Digestive Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.966	0.716	1.304	0.953	0.704	1.289	0.970	0.719	1.309	0.953	0.704	1.289
Exposure peak med and high vs. low and no exposure	1.086	0.763	1.545	0.877	0.616	1.249	1.086	0.763	1.545	0.877	0.616	1.249
Cumulative less than 2000 vs. no exposure, no high low	0.892	0.568	1.401	1.005	0.635	1.591	0.902	0.574	1.416	1.006	0.636	1.592
Cumulative greater than 2000 vs. no exposure, no high low	1.022	0.710	1.471	0.926	0.643	1.333	1.024	0.711	1.473	0.926	0.643	1.334

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Respiratory Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	1.219	0.968	1.535	1.142	0.904	1.441	1.220	0.968	1.536	1.141	0.904	1.441
Exposure peak med and high vs. low and no exposure	1.331	1.017	1.740	1.071	0.818	1.401	1.331	1.017	1.740	1.071	0.819	1.401
Cumulative less than 2000 vs. no exposure, no high low	1.382	1.008	1.895	1.473	1.067	2.034	1.385	1.010	1.899	1.473	1.067	2.034
Cumulative greater than 2000 vs. no exposure, no high low	1.103	0.821	1.483	0.963	0.716	1.294	1.103	0.821	1.483	0.962	0.715	1.294

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Uterine Cancer	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	0.701	0.081	6.039	0.399	0.045	3.553	0.763	0.089	6.545	0.432	0.049	3.834
Exposure peak med and high vs. low and no exposure	0.000	0.000	.	0.000	0.000	.	0.000	0.000	.	0.000	0.000	.
Cumulative less than 2000 vs. no exposure, no high low	1.672	0.193	14.481	0.775	0.088	6.859	1.882	0.219	16.185	0.844	0.095	7.482
Cumulative greater than 2000 vs. no exposure, no high low	0.000	0.000	.	0.000	0.000	.	0.000	0.000	.	0.000	0.000	.

COX Analysis

	Model 1			Model 2			Model 3			Model 4		
	No Stratification			Strat by age and sex			Strat by decade			Strat by age, sex, decade		
Other Fem Gen Cancers	R.R.	Lower C.I.	Upper C.I.	R.R	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.	R.R.	Lower C.I.	Upper C.I.
Ever exposed vs. never exposed	6.276	2.045	19.259	3.637	1.145	11.555	6.173	2.006	18.997	3.686	1.152	11.794
Exposure peak med and high vs. low and no exposure	3.062	0.942	9.954	3.487	1.050	11.585	3.009	0.924	9.798	3.547	1.066	11.799
Cumulative less than 2000 vs. no exposure, no high low	3.712	0.713	19.317	1.536	0.287	8.218	3.479	0.657	18.416	1.506	0.278	8.157
Cumulative greater than 2000 vs. no exposure, no high low	7.639	2.326	25.092	5.483	1.599	18.802	7.455	2.260	24.585	5.515	1.595	19.067