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Report of a Preliminary Investigation
of Cancer Mortality Among Employees and Retirees
of General Electric Company's
Bridgeport, Connecticut Production Facilities

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For The Department of Public Health
Cornell University Medical College

On July 9, 1975 an agreement was signed between the General Electric Company and Cornell University Medical College, Department of Public Health. The purpose of this agreement was to assess mortality experience in the Bridgeport plant of the General Electric Company (G.E.).

The Medical Director of the Bridgeport plant, Dr. Jack Simpson, had become concerned at what appeared to be a large number of deaths from cancer among plant employees and retirees. The Department of Public Health of Cornell University Medical College was asked to determine whether the number or type of cancers reported among persons working in this plant differed from that which would be expected. To examine this question a preliminary investigation was undertaken by the Department of Public Health in cooperation with Dr. Casey (Medical Director of G.E.) and Dr. Simpson (Medical Director of the Bridgeport facilities). This report summarizes the results of that investigation.

From the outset three major concerns were defined: Is there an excess risk of cancer among active and retired employees who had worked at the Bridgeport plant? Is there an excess of mesothelioma (a rapidly fatal malignancy of the tissue lining the pleural and peritoneal cavities) among these persons? If excess cancer cases were confirmed, could any contributory occupational factors be identified?

Methods

The choice of methods to be used under such circumstances is influenced by the nature of available data. Three major types of information are useful in answering the questions outlined above. The first is information about the

deaths themselves. The second is data describing the population of employees who work or have worked in the Bridgeport plant, regardless of their current vital, health or employement status. In addition one needs to know the cancer mortality of other groups, for example, Connecticut residents or other G.E. employees for purposes of comparison.

The Bridgeport plant encompasses four "pay points": Associated Company Products Division (ACPD); Wire and Cable Products Division (WCPD); Housewares and Bridgeport Facility Operations (HSWRS); General Electric Supply Company (GESCO). GESCO was excluded from all parts of this analysis since its operations were conducted in a separate area and since it was not a manufacturing unit. When reference is made to "Bridgeport" plant, facilities, etc. it will be understood that such statements exclude GESCO. Deaths among GESCO employees were not counted. Employee population estimates for the Bridgeport facilities were adjusted to exclude GESCO.

An attempt was made to learn of all cancer deaths which had taken place during the period 1967-1974 among employees who were actively working at the Bridgeport plant during this period, as well as among retirees who had previously worked in those facilities. Information about deaths came from Dr. Simpson, and from Metropolitan Life Insurance Company, G.E.'s life insurance carrier.

Metropolitan Life Insurance Company has from 1967 onward prepared periodic analyses of the mortality of G.E. employees. They were able to provide computer printouts of deaths which had occurred among active G.E. employees from 1967 to 1975. Such lists were based on death claims submitted to the company. Printouts provided by Metropolitan Life Insurance Company included the following data: name of individual; year of payment of death benefit; month and year of birth; month and year of death; service at death (years); marital status; pay class; pension unit; sex; cause of death. Cause of death was coded from death

certificate information by a trained nosologist according to the guidelines of the National Center for Health Statistics. This information was available for deaths among active G.E. employees whose death claims were paid from 1967 thru mid 1975.

Retired employees present a more difficult problem. Pensioners from all General Electric units throughout the country are dealt with administratively by Metropolitan through one "pay point". It was not possible therefcre to use Metropolitan's records to identify deaths among retirees whose service at G.E. had been at the Bridgeport facilities under study. This problem was circumvented with the help of the Medical Departments at General Electric. Company death files were reviewed to identify deaths among G.E. employees and pensioners which had occurred during 1967-1974. Death certificates were on hand for 90% of these deaths and copies were made available to the investigators. These death certificates were the only source of data on deaths among pensioners. They also provided a source of information on deaths in active employees which was expected to parallel that provided by Metropolitan.

These two sources identified deaths among active and retired G.E. employees which were known to G.E. and Metropolitan Life Insurance Company. It is not necessarily a complete list. Many retired employees had ceased to work at G.E. years before and perhaps had moved out of state. There is a substantial likelihood of incompleteness in recording deaths in this group. The degree of incompleteness cannot be estimated without further information. There were discrepancies in active employee death records as illustrated in Table I. Of 41 cancer deaths among male employees under 65 years of age only 17 were picked up by both Metropolitan listings and G.E. death files. While discrepancies due to early retirement may account for some of these differences, it does cast doubt on the completeness of death data which were available.

Information was sought regarding the number of employees working in the Bridgeport plant from1967-1974 by age, sex, salary class and company unit. Metropolitan Life Insurance Company provided a pooled breakdown of the total Bridgeport plant work force including GESCO for 1971 by age, sex and pay class. Estimates of the number of GESCO employees along with the age and sex distribution of that unit were also available for 1971. It was therefore possible to calculate the 1971 population of Bridgeport facilities excluding GESCO. The columns called "Number" in Tables II and IV show this distribution by age and sex. The populations could not be broken down by plant ~~division~~ however. Data were only available for 1971, happily a mid-year in the time period of interest. The 1971 figures were taken as an estimate of the average for the entire period.

The question "Is there an excess of deaths?" implies the parallel query "Compared to what group?" The mortality experiences of two comparison groups were potentially of interest: G.E. employees throughout the country and Connecticut residents. Metropolitan Life Insurance Company had analyzed the mortality rates by cause for all G.E. employees. This provides some comparison data for active employees but is not useful for retirees. The diagnostic groupings used, particularly for cancers, were often broader than desirable for this study.

Connecticut has an excellent ongoing ~~cancer~~ tumor registry from which tissue and site-specific cancer rates are available by age and sex. Connecticut population differs in age, sex and socio-economic composition from the employed and retired population of the Bridgeport plant. Nonetheless, meaningful comparisons can be drawn if adjustments are made to accommodate age and sex differences.

To summarize, data for this analysis were derived from death certificate data on Bridgeport plant employees and pensioners and from Metropolitan's list

of deaths among active employees. An estimate of employee population was made based on 1971 figures. Sources of cancer experience for comparison were the Metropolitan Life Report of company-wide mortality and the reports of the Connecticut State ~~Cancer~~ Tumor Registry. Expected occurrence of cancer was estimated from Connecticut rates. Metropolitan data summarizing G.E.'s national experience permitted some comparisons of proportionate mortality by cause of death.

Discussion

Several precautionary notes are most important when dealing with chronic diseases. The development of cancers may occur decades after a relevant exposure. A latency period of fifteen to thirty years from exposure to the development of the malignancy is well known. The individual developing occupation-related cancer in 1975 may have had the pertinent carcinogenic exposure some time between 1940-1960.

Examination of cancer rates of currently employed persons or pensioners may be quite misleading since these persons are only a part of the group which were originally exposed. No data whatsoever are available on an undetermined but probably large number of individuals of great interest, namely those employees who left G.E.'s service before death or retirement. These persons have varying period of service at the Bridgeport plant, ranging from days to many years. For those persons with vested pension funds it is likely that the death would come to the investigator's attention, otherwise this is not the case. These individuals fill out the cohort of persons who have worked at the facility during any defined time period. They may be subject to increased disease risk. To assess the nature of increased risk fully, one ought to be able to identify this group properly and determine their experience with the diseases in question. Under the best of circumstances, this is

a laborious, albeit revealing, task. In practice, it is often impossible to identify all persons who were employed in the plant two decades ago or more. When the question of true overall risk for workers in the plant is considered, some account must be taken of this group. Failure to do so may result in minimizing important risks. With the current study design no account could be taken of this group.

Another fundamental area of concern is the quality of available data. Basic demographic data from death certificates and from Metropolitan Life Insurance Company are reasonably accurate but there are occasional errors in identifying data. Birth and death dates in the Metropolitan listing are given by month and year only. Errors in identifying data can create confusion when additional records on the case are sought from other sources.

"Cause of death" poses more of a problem. The validity of the cause of-death statement on the death certificate may vary considerably. Many factors influence that statement, among them: the person responsible for completion of the death certificate, the medical practices in the area where the terminal illness occurs, length of pre-terminal illness, age of the individual at death. Metropolitan Life lists "cause of death" as derived from death certificates and coded according to a nationally accepted system. (Eighth Revision of the International Classification of Diseases.) These lists give only the underlying cause of death. Significant coexistent disease including malignancy may not be recorded in some circumstances. As a result, such conditions as "status post ovarian carcinoma" or "carcinoma of the right tonsil" which are noted as significant associated conditions on the death certificate would not appear in a Metropolitan Life listing of cause of death. Such a death would be classified there as "non-cancer" since malignant neoplasm would not be the underlying cause of death. From the point of view of this study, however its occurrence is important.

Even if the death certificate accurately reflected the diagnostic conclusions of the physicians caring for the patient, there remains room for uncertainty. The diagnostic conclusions of physicians involved in the patient's care may be based on evidence from clinical, laboratory and pathological findings of varying certainty. In the case of malignant disease only tissue examination whether from biopsy, surgical or autopsy material provides hard evidence on which to base that diagnosis. Even so, the diagnosis may not always be clear. Certain cases may be disputed among pathologists as to site of origin or even the presence or absence of malignancy. Rare tumor types may escape recognition. In other circumstances, certain histologic diagnoses may be over-read. Consequently, in critical situations investigators may choose to reassess the original clinical material to confirm diagnostic conclusions. In the present study with stringent limitations of time, personnel and data sources, no attempt was made to confirm death certificate diagnoses nor to check Metropolitan's lists against death certificates. In a more comprehensive study, such steps might be taken on at least a sample of deaths. The records maintained by the Connecticut ~~Cancer~~ TUMOR Registry allow cancer cases occurring in that state to be confirmed rather readily. Hospital records, family physicians and relatives of patients can provide needed supplementary information on cause of death or its antecedents.

Ascertaining patients' pertinent work experience poses greater problems. While the death certificate frequently contains information concerning "usual occupation", this statement is subject to numerous sources of error. There is an upward drift of occupation on death certificates so that an electrician's helper may become, in death, an electrician and a bank clerk may die with his occupation listed as a banker. Even where this does not occur the recorded

occupation may not be the one relevant to the patient's disease. Alternative sources of occupation may be found in company records, from patient's family and co-workers, through union and social security records. Even where accurate and sequential job titles are available, the activities and exposures entailed are not necessarily evident. Job content and exposures are difficult to reconstruct for living individuals much less the deceased.

With such caveats in mind, the remainder of this discussion will be devoted to the findings and conclusions of this preliminary investigation.

Findings

1) A dramatic excess of mesothelioma deaths was observed during the period 1967-1974.

2) Among males under 65 years of age, no overall excess cancer mortality could be documented. Estimates of excess mortality could not be made on persons over 65 years since no data were available for the size or age and sex distribution of the retired Bridgeport population. Without further information on this group, meaningful conclusions cannot be drawn about the overall cancer risk. A significantly higher percentage of males over 65 die from cancer compared to all causes of death than is the case for General Electric's employees over 65 as a whole.

3) For females under 65, an increase in the Standard Mortality Ratio (SMR) to 133 (28 deaths observed; 21 expected) was noted. The excess was not statistically significant. A higher proportion of deaths among Bridgeport female retirees over 65 are due to cancer than is expected based on G.E.'s national experience. The difference is not statistically significant.

Mesothelioma

Six cases of mesothelioma of the pleura or mesothelium were encountered among the 104 male deaths with cancer (Appendix I). This is without doubt an important excess. The tumor is exceedingly rare in the absence of predisposing exposure. Not more than one such death would be expected to occur in every 10,000 deaths, or about one case per million persons per year. Mesothelioma occurrence has most importantly been associated with asbestos exposure. The latency period after exposure may be as long as four decades.

The six deaths from mesothelioma occurred between March 1971 and March 1975. All were among males. All were rapidly fatal. The average age at death was 66, with deaths occurring at ages 61, 61, 62, 66, 70, 78. One mesothelioma was of the abdominal peritoneum. The others are believed to have been of the pleura. For four men there is data concerning the duration of employment at G.E.: 20, 39, 41, 45 years. The average period of service was 36 years. For one death, a history of exposure to asbestos was recorded on the death certificate.

The conclusion must be drawn that the number of deaths from this exceedingly rare tumor occurring in one area in a few years is unexpectedly high. It is quite possible that some exposure in the work environment played a role in some or all of the cases. For those individuals for whom it is known, the ages of beginning work at G.E. were 17, 20, 22, and 46. For the first three virtually the entire employed life was with G.E. On reviewing work histories, Dr. Simpson noted that for the five individuals for whom information was available, evidence associated them at some point in their employed lives with Housewares or with Facilities. In most cases they could be traced to FAN assembly for some part of the G.E. career. In the course of this investigation it was noted that clouds of what may be asbestos fiber were released by manipulating insulated pipes in that work area.

Body statement. On a brief tour of new vacant Howes pr in July 1975, I showed Miss B. Ridolecis insulated pipes. There were no "clouds" + I am not sure it is asbestos

On the basis of the limited information available, a common community exposure cannot be absolutely ruled out. Similarly pertinent work exposures

prior to employment at G.E. cannot be eliminated from consideration. Such exposures are unlikely to explain all cases. These alternate explanations are not as likely as on-the-job exposure to a carcinogen, most likely asbestos, since this is the agent most clearly implicated in mesotheliomas.

It is worth noting that for one individual who died from mesothelioma, no work history was available. Archie Knott retired from work prior to 1965. Work records for that time period had been destroyed. This illustrates the value of maintaining employment records for extended periods of time since the diseases in question may have latency periods of decades.

The occurrence of mesotheliomas under these circumstances is in itself a major problem. Other deaths may occur from the same disease in the future. Since on-the-job exposure to a carcinogen is quite possible, it is important to pursue this problem in greater depth. Among the questions to be asked are: What is the nature and extend of the hazard in question? How many individuals were exposed? How many mesotheliomas might be expected? Is there other associated risk of disease? How many cases of mesothelioma occurred elsewhere in Connecticut and in Bridgeport during this time period?

Cancer Mortality in Males

Among male employees under 65 years of age no excess cancer mortality was observed (Table II). Forty-one cancer deaths were observed during 1967-1974 among active and retired employees under 65 years of age. In one of the deaths, cancer was an associated, as opposed to underlying, cause of death. The number of deaths expected based on Connecticut rates was 38.8. Similarly the numbers of observed versus expected cases respectively of cancer of the lung were 12 and 12.8 and for all gastrointestinal tract cancer, 12 and 11.9. Thus, for all malignancies and also for those of the respiratory, gastrointestinal, hematopoietic and genitourinary systems no excess of mortality from malignant neo-

plasms could be identified in males under 65.

Since population data were available only for active employees under 65 years of age, no conclusions could be drawn regarding cancer excess for the group 65 and older. To calculate cancer rates or to determine expected cases of cancer, the number and age-sex distribution of Bridgeport plant pensioners would have to be known. It is in the older age groups that cancer excesses would be most likely be expressed. Thus it is particularly unfortunate that these data were not available.

In the absence of population information for the older age group, an analysis of proportionate mortality by cause of death was conducted. The question asked was "What percentage of all deaths in persons over 65 had cancer as the underlying cause of death?" For the Bridgeport male population over 65 (Table III), 27.3% of deaths were associated with cancer. Among G.E. employees over 65 as a whole, based on the Metropolitan report ("General Electric Company, Mortality Among Active and Retired Employees, 1967-1974", Statistical Bureau Actuarial Corporate, Metropolitan Life Insurance Company, mimeo), the percentage of deaths among over age 65 retirees from cancer compared to all causes of death was 18.6%. The difference between these two proportions is significant (Table III) and thus is not likely to represent chance variation. Nothing can be said about the absolute level of cancer mortality among employees over 65. The unaccountably increased proportion of cancer deaths in this group points up the need to determine the true cancer mortality in this age group. This is particularly true in view of the excess of mesotheliomas previously discussed. Given the possibility of asbestos exposure raised by the mesothelioma deaths one would be most eager to ascertain whether other asbestos related cancers were presented. Excess cancers of the respiratory and possibly gastrointestinal tract are known to occur in employed populations exposed to asbestos. The

failure to demonstrate such excesses in the younger population does not rule out their presence among retirees. Certainly it is essential that this possibility be explored.

Overall Cancer Mortality in Females

For female employees under age 65 the SMR from all malignant neoplasms was 133. This figure does not statistically differ from the expected of 100 (Table IV). The related tables show that this risk is explained by modest increases in cancer mortality from respiratory, gastrointestinal and female genital systems. In Bridgeport women employees under 65 years, 50% of deaths were due to cancer. This is significantly higher than the nationwide G.E. figure for deaths among active female employees, of whom only 37% had malignant neoplasms as the underlying cause of death. The proportion of cancer deaths among women over 65 who were Bridgeport retirees was modestly increased compared G.E. nationally. The difference was not significant. No cancer rates for female retirees over 65 could be derived in the absence of population figures for female pensioners over 65 years of age.

Conclusions

1) Confirmation of cause of death should be performed in any definitive investigation. A prime collateral source of material for the Bridgeport facility cancer cases would be the Connecticut ~~Cancer~~ Tumor Registry.

The presence of six cases of mesothelioma is extremely worrisome. Independent confirmation of each mesothelioma is warranted. Malignancies with questionable site of origin and cell type should also be reviewed, since some may have in fact been mesothelioma. Exploration of work history of mesothelioma patients is essential. Once a working hypothesis as to exposure source is delineated, epidemiologic investigation of the exposed cohort is warranted.

2) This is a preliminary study which offers tentative conclusions. It does not indicate that no excess cancer risk exists, but only that no increase was demonstrated among employees less than 65. Clarification of the population at risk in the under 65 group would put any negative findings in that group on a firmer footing. The assumption that the 1971 population was representative of the over age population employed at the Bridgeport facility from 1967-1974 may not be valid. Population figures for the various divisions for each year would be useful. This would also permit intervisional comparisons of cancer mortality.

3) Population estimates for retired Bridgeport employees are essential if the cancer risk of the over 65 employees is to be evaluated. Given the long latency period of neoplastic disease the experience of this group must be delineated if meaningful conclusions are to be drawn.

4) Complete ascertainment of deaths and cause of death must be achieved. As shown in Table I, the search of plant death folders did not identify a significant number of active employee deaths identified by Metropolitan and vice versa. A definitive review of mortality experience must include a mechanism for complete collection of death data.

5) Mechanisms for reconstructing populations employed at G.E. facilities in the past must be established. Numbers of employees along with age and sex breakdowns should be available for various time periods for both active and retired groups. Once these figures are developed, subsequent epidemiologic investigations are more meaningful and may be performed much more readily.

6) Establishment of a prospective company cancer registry is merited to promptly and efficiently uncover outbreaks of disease. Such a registry is a means of maximizing the use of currently generated data. (Just such a registry is being established for the American Petroleum Institute for the nation's petrochemical workers through Memorial Hospital and the Department of Public

Health of Cornell University Medical College.)

Summary

An excess occurrence of mesothelioma was demonstrated to have occurred among Bridgeport employees 1967-1974. The overall mortality from cancer of males under age 65 was not elevated. For females the elevation of the SMR was not statistically significant. For employees over 65 no mortality rates could be ascertained in the absence of population data. However, the proportion of male deaths over 65 which were due to cancer was significantly higher than that of the General Electric Company as a whole. Further research is recommended to determine cancer risk in the retired group. It is proposed that a cancer registry be developed as one technique for facilitating future investigations.

Recommendations

1) All cases of mesothelioma should be indepencently reviewed and confirmed.

2) Cases of thoracic and abdominal malignancies of undetermined origin, particularly abdominal sarcomas, should be reviewed to insure that they are not consistent with mesothelioma.

3) Work history of mesothlioma cases should be explored in greater depth.

4) "FAN" assembly area should be reevaluated with respect to possible asbestos sources past and present.

5) Should an asbestos exposure source be delineated, the exposed employees must be identified and followed. This is particularly crucial since recent evidence suggests that dramatically elevated cancer risk is associated only with the combination of smoking and asbestos exposure.

6) An epidemiologically oriented data system should be developed.

7) Employee person-year estimates should be calculated by age, sex and company divisions for an appropriate time period.

8) Population estimates for retired employees should be developed in a fashion analogous to the above.

9) Completeness and accuracy of death reporting within the company should be reviewed.

10) The methods used in this preliminary investigation should be expanded to determine whether excess occurrence of cancer exists in the retirees group.

11) A company-wide cancer registry should be established.

Table I

Source of Information on Cancer Deaths

Females under 65 years of age at death

Information Source	Number
Death certificate only	8
Death certificate and Metropolitan listing	16
Metropolitan listing only	4
TOTAL	28

Males under 65 years of age at death

Information Source	Number
Death certificate only	13
Death certificate and Metropolitan listing	17
Metropolitan listing only	11
TOTAL	41

Table II

Observed Cancer Deaths Among Male Bridgeport Employees
Compared to Expected Numbers Based on Connecticut State Rates
(1967 - 1974)

(1) Age	(2) Number***	(3) Observed Deaths**	(4) Age-Specific Cancer Mortality Rates Conn., 1972	(5) Expected Deaths in 8 Years [Column 2 x Column 4] x8
20-24	39	1	13.6	0.042
25-29	373	0	11.0	0.328
30-34	330.5	0	18.0	0.476
35-39	242.5	0	38.9	0.560
40-44	203	4	59.5	0.966
45-49	246	6	115.4	2.27
50-54	284.5	5	223.5	5.09
55-59	362.5	14	406.4	11.79
60-64	348.	11	620.2	17.27
Total	2422	41*		38.75

SMR - 41/38.8 x 100 = 105

* Cancer was the underlying cause of death for all but one employee who died with cancer noted on the death certificate.
** Cancer deaths are drawn from active employees and retirees under 65.
*** Bridgeport G.E. population is estimated based on 1971 figures for active employees.

Table IIa

Observed Cancer Deaths Among Male Bridgeport Employees
Compared to Expected Numbers Based on Connecticut State Rates
(Lung, Bronchus, Trachea)

(1) Age	(2) Number in 1971	(3) Observed Deaths	(4) Age-Specific Cancer Mortality Rates Conn., 1972	(5) Expected Deaths in 8 Years
20-24	39	0	-	-
25-29	373	0	-	-
30-34	330.5	0	3.4	0.089
35-39	242.5	0	9.2	0.18
40-44	203	2	14.3	0.23
45-49	246	1	43.1	0.85
50-54	284.5	1	72.6	1.65
55-59	362.5	6	147.8	4.3
60-64	348	2	198.7	5.5
		12		12.8

$$SMR = \frac{12}{12.8} \times 100 = 94$$

Table IIB

Observed Deaths Among Male Bridgeport G.E. Employees
Compared to Expected Numbers Based on Connecticut State Rates
(Gastrointestinal Tract Cancer)

(1) Age	(2) Number	(3) Observed Deaths: Gastro-Intestinal	(4) Observed Deaths: Pancreatic	(5) Age-Specific Cancer Mortality Rates Conn., 1972: Gastro-Intestinal	(6) Age-Specific Cancer Mortality Rates Conn., 1972: Pancreatic	(7) Expected Deaths in 8 Years: Gastro-Intestinal	(8) Expected Deaths in 8 Years: Pancrea
20-24	39	-	-	-	-	-	-
25-29	373	-	-	-	-	-	-
30-34	330.5	-	-	2.2	1.1	0.06	0.0
35-39	242.5	-	-	5.8	1.2	0.11	0.0
40-44	203	-	-	17.6	2.2	0.29	0.0
45-49	246	3	(1)	38.8	5.4	0.76	0.1
50-54	284.5	3	(2)	59.2	11.2	1.34	0.2
55-59	362.5	2		131.2	21.7	3.80	0.1
60-64	348	4		200.3	40.1	5.57	0.1
TOTAL		12	(3)			11.9	0.6

Gastrointestinal: $SMR = \frac{12}{11.9} \times _ = 101$

Pancreatic: $SMR = 100 \times \frac{3}{0.67} = 448$ (not significant)

Table III

Cancer Deaths as a Proportion of All Deaths in Males and Females Over 65

Males over 65

Cause	Number	
	Bridgeport	G.E. Nationwide
Cancer	74	2114
Non-Cancer	192	9239
TOTAL	266	11,353
Percent deaths due to cancer	27.8%	18.6%

$\chi^2_{1\ d.f.} = 14.4 \quad (P < .001)$

Females over 65

Cause	Number	
	Bridgeport	G.E. Nationwide
Cancer	15	508
Non-Cancer	53	1475
TOTAL	68	1983
Percent deaths due to cancer	22.1%	25.6%

Table IV

Observed Cancer Deaths Among Female Bridgeport Employees
Compared to Expected Numbers Based on Connecticut State Rates
(1967 - 1974)*

(1) Age	(2) Number***	(3) Observed Deaths**	(4) Age-Specific Cancer Mortality Rates Conn., 1972	(5) Expected Annual Deaths (Column 2 x Column 4)	(6) Expected Deaths in 8 Years (Column 5)
20-24	35.5	0	4.7	.00167	0.0133
25-29	251.5	1	8.1	.0204	0.163
30-34	183.5	0	12.7	.0233	0.186
35-39	93.5	1	37.7	.0352	0.282
40-44	131	4	67.4	.0883	0.706
45-49	172	2	154.6	0.2659	2.13
50-54	255.5	9	208.2	0.532	4.26
55-59	263.5	9	331.0	0.872	6.98
60-64	174	2	453.0	0.788	6.31
	510	28*			21.0

$SMR = 28/21.0 \times 100 = 133$

$Var(SMR) = \frac{10^4(28)}{(21)^2} = 634$; $\sqrt{Var(SMR)} = SE(SMR) = 25$

$\therefore$ 95% confidence interval = $SMR \pm 1.96 \times SE(SMR) = 133 \pm 49 = 84$ to 182

$\therefore$ The SMR is not significantly elevated compared to the expected SMR of 100.

* Cancer was the underlying cause of death for all but one employee who died with cancer noted on the death certificate

** Cancer deaths are drawn from active employees and retirees under 65.

*** Bridgeport G.E. population is estimated based on 1971 figures for active employees.

Table IVa

Observed Cancer Deaths Among Female Bridgeport Employees
Compared to Expected Numbers Based on Connecticut State Rates
(Lung Cancer)

(1) Age	(2) Number	(3) Age-Specific Cancer Mortality Rates Conn., 1972	(4) Expected Deaths in 8 Years [Column 2 x Column 3] x 8	(5) Observed Deaths
20-24	35.5	-	-	0
25-29	251.5	0.9	0.02	0
30-34	183.5	1.1	0.02	0
35-39	93.5	4.4	6.03	0
40-44	131	8.4	0.09	1
45-49	172	15.3	0.21	0
50-54	255.5	40.8	0.84	2
55-59	263.5	49.8	1.05	1
60-64	174	70.1	0.98	8
TOTAL			3.2	4

SMR = 4/3.2 x 100 = 125

Table IVb

Observed Cancer Deaths Among Female Bridgeport Employees
Compared to Expected Numbers Based on Connecticut State Rates
(Gastrointestinal Tract Cancer)

(1) Age	(2) Number	(3) Age-Specific Cancer Mortality Rates Conn., 1972	(4) Expected Deaths in 8 Years [Column 2 x Column 3] x 8	(5) Observed Deaths
20-24	35.5	-	-	-
25-29	251.5	-	-	-
30-34	183.5	1.1	0.02	-
35-39	93.5	1.1	0.01	-
40-44	131	12.6	0.13	-
45-49	172	26.4	.36	-
50-54	255.5	42.9	0.88	3
55-59	263.5	89.0	1.9	3
60-64	174	116.4	1.6	1
TOTAL			4.9	7

SMR = 7/4.9 x 100 = 142