EPIDEMIOLOGICAL STUDY OF WORKERS EMPLOYED IN THE VISCOSE RAYON INDUSTRY

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SUMMARY

An epidemiological study of the mortality pattern of workers in the viscose rayon industry was carried out.

A total of 5879 white males, 3120 white females, hired in 1938-48, characterized by duration of employment and department exposure, were followed through 1976 to identify those who died and the specific causes of death. There were 1314 male deaths, 296 female deaths.

Among the males, there was an increased risk of death noted due to cardiovascular disease (400-468) and to coronary heart disease (420) for all ages, for those employed for 10 years or more, for the total plant population and for certain departments. Indications of an elevated standard mortality ratio for stroke (330-334) was noted in selected departments and duration of employment.

Observations on external causes of death, accidents, motor vehicle accidents and suicides, identified elevated standard mortality ratios following the 15 year period of followup, for the employees of the total plant and selected departments.

The females had consistently lower standard mortality ratios than the males for deaths due to cardiovascular system and coronary heart disease.

The standard mortality ratios for selected deaths due to all external causes, accidents, motor vehicle and suicides were occasionally elevated in certain departments.

RAYON STUDY - Dr. Mancuso
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INTRODUCTION

It is recognized in any industrial epidemiological study directed at the determination of the presence or absence of a particular occupational risk that the use of the total plant population will submerge such a risk because of the dilution factor, the combining of all employees regardless of the presence or absence of risk to the particular occupational chemical exposures during the course of their employment in the plant. It is known, for example from other studies, that an occupational hazard could exist in a particular company yet this may not be reflected in the total plant employee death rate for cancer.

The use therefore of death rates for the total plant employees must be considered as conservative estimates of any true occupational risk at any particular plant.

It is also recognized from actuarial experience that basically the industrial employee population, consisting of the healthy, and those able to work, have a much higher life expectancy and a much lower death rate for causes of death, for cancer and heart disease, than the general population, who consist of the sick, the disabled, and the institutionalized.

If the death rates for the total plant approximate the death rates of the general population for a specific cause of death, then it would indicate that the internal occupational risk factor in the plant was sufficiently strong to influence the total employee death rate and this would have added significance in any interpretation.

Purpose of the Study

The objective of the present study is a fundamental one applied to cardiovascular disease: - To encourage the studies of the biochemical causation of cardiovascular disease in which carbon disulphide constitutes the model from which various experimental studies can be conducted.

There have been several epidemiological studies on the viscose rayon workers identifying a high risk for coronary heart disease and reports of excess risk due to cerebrovascular accidents.

The primary epidemiological purpose of the study was directed to the following questions.

1. Is there an increase mortality risk for cardiovascular disease among workers employed in the viscose rayon industry?

2. Is there an increase mortality risk for coronary heart disease among workers employed in the viscose rayon industry?

3. Is there an increase mortality risk for cerebrovascular disease among workers employed in the viscose rayon industry?

Earlier studies have established that carbon disulphide exposures in the rayon industry had induced mental illness,

including psychoses among the workers resulting in admission to mental institutions. The present study attempts to identify clues to the effects of such abnormal behavior by including observations on accidents, motor vehicle accidents and suicides.

Method of Study

The total plant employees, the total cohort of all those who entered employment in the viscose rayon company as new employees between 1938-48 are considered as a total cohort in which all employees are included regardless of their multiple changes from one department to another.

It was quite evident that the hiring practices and needs of the plant, varied from 1938 when the plant just started operations to 1948, representing the cutoff period of the cohort. It is known that some operational and process changes occurred around 1945, although the details are not available. Consequently, the use of the 1938-48 combined cohort death rates may not reflect the risk for certain occupational groups hired in specific time periods.

In the Department analyses, the assignment of duration of employment in that Department begins when the worker enters that department even though the worker may have been previously employed in another Department. It is important to remember this where evaluating observations in the duration of employment less than 1 year in a specific department. In essence a worker could have been employed previously for 1 or more years in another department.

It must be recognized that certain occupational groups of workers could have been hired in one time period and not in another, and further that more of a certain occupational type may have been in one category of duration of employment, with relatively few in the longer periods of employment and for certain other occupational groups, the converse could be true, with corresponding effects on the ratios in the respective departments, classified by duration of employment.

The cohort of employees hired in 1938-1948 was reprocessed through Social Security Administration to determine the death claims and subsequently the death certificates were obtained.

All death certificates were recoded by an experienced Nosologist according to the Seventh Revision of the International Statistical Classification of causes of death to overcome the differences in the coding of the primary cause of death which have occurred since 1940, as well as the differences which may have occurred in the coding of deaths in different states.

The Monson U.S. death rates over several decades were used to derive the expected rates for each specific cause of death during successive time periods by the Department of Biostatistics of Graduate School of the University of Pittsburgh.

The cause of death selected for analyses and the corresponding international code (7th revision) causes of death were as follows:

All Malignant Neoplasms (140-205)
Large intestine (153)
Pancreas (157)
Bronchus, trachea, and lung (162-163)

Prostate (177)
Kidney (180)
Bladder and other Urinary Organs (181)
Central Nervous System (193)
Lymphatic & Hematopoietic Tissue (200-205)
Diabetes Mellitus (260)
Stroke (330-334)
All Diseases of Circulatory System (400-468)
Coronary Heart Disease (420)
Nonmalignant Respiratory Disease (470-527)
Ulcer of Stomach and Duodenum (540-541)
All Diseases of Genito-Urinary System (590-639)
All External Causes of Death (800-835)
Accidents (800-962)
Motor Vehicle Accidents (810-835)
Suicides (963, 970-979)

The gradients of employment exposure used were less than one year; 12-47 months; 48-119 months; ten years or more.

FINDINGS

Table I represents for white males, the findings for the 28 year followup, for cardiovascular diseases (400-468), coronary heart disease (420) and stroke (330-334) for all employees, hired during 1938-48, by category of duration of employment. The number of employees at risk and the total number of deaths for all causes, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	5879	759
1-3	2275	206
4-9	1394	147
10+	790	202

Cardiovascular Disease (400-468)

The observed, expected, and standard mortality ratios of deaths due to cardiovascular disease, by duration of employment, showed a rise in the SMRs for the last three categories, of duration of employment; from 1-3 years SMR, 95.1; 108.9 to 129.2 for those employed 10 years or more which was statistically significant at the 5% level.

Coronary Heart Disease (420)

For death due to coronary heart disease, the SMRs by duration of employment from 1-3 years, followed a more marked progressive rise 98.2, 108.9 and 138.8. The SMR 138.8 for coronary heart disease for those employed 10 years or more was statistically significant at the 1% level.

Stroke (330-334)

For deaths due to stroke (cerebrovascular accident) for those employed 1938-48, an elevated SMR above 100, occurred for each duration of employment from 1-3 years. A progressive rise in SMR was noted for those employed less than 1 year (95.4), 1-3 yrs. (107.7) and 4-9 years (138). This elevated SMR was higher than the SMR for coronary heart disease for the 4-9 year duration of employment 138 vs. 108.9 and the SMR for 1-3 years duration for stroke was higher han that of coronary heart disease, 107.7 vs. 98.2.

Dept. A
(Viscose, Aging)

The number of employees at risk and the number of deaths from all causes, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	1395	305
1-3	444	77
4-9	203	37
10+	84	32

Cardiovascular Disease (400-468)

For those employed during 1938-48, the SMR for deaths due to this cause was elevated above 100, for those employed less than 1 year and those employed 4-9 years SMR 110.4 and 116.2.

Coronary Heart Disease (420)

The highest SMR 126.4 occurred for those employed 4-9 years. The SMR for the employment duration of less than 1 year was 115.7.

Stroke (330-334)

There were two markedly elevated SMRs. For those employed 1-3 years, and for those employed 10 years or more, the SMRs were 164.8 and 216.6. respectively. These SMRs are markedly higher than the SMRs for coronary heart disease for the same periods of employment 164.8 vs. 87.4 and 216.6 vs. 74.8.

Dept. B
(Spinning & Twisting)

The number of employees at risk and the number of deaths from all causes by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	3016	300
1-3	1012	83
4-9	526	47
10+	239	48

Cardiovascular Disease (400-468)

For those employed 1938-48 there was a gradual rise in SMRs above 100 with duration of employment. A marked rise, SMR 187.0, occurred for those employed 10 years or more which was statistically significant at the 1% level.

Coronary Heart Disease (420)

There was a gradual rise in SMRs, by duration of employment, then a marked increase, SMR 216.., for those employed 10 years or more, which was statistically significant at the 1% level.

Stroke (330-334)

There were elevated SMRs in the first 3 categories of duration of employment SMR 111.2, 153., 136.9.

Dept. X
(Maintenance, Mechanics)

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	1677	203
1-3	792	70
4-9	488	64
10+	258	76

Cardiovascular Disease (400-468)

There is a markedly elevated SMR, 155.5, among those employed 10 years or more, which is statistically significant at the 1% level.

Coronary Heart Disease (420)

A markedly elevated SMR 169.3 occurred among those employed 10 years or more which was statistically significant at the 1% level.

Stroke (330-334)

The total SMR for all categories of employment was elevated 120.2. The higher SMRs occurred among those employed less than 1 year SMR 123 and those employed 4-9 years SMR 189.2.

External Causes/White Males

Table II represents the findings for the 28 year followup, for all external causes of death (800-998); all accidents (800-962); motor vehicle accidents (810-835) and suicides (963, 970-979) for all those hired 1938-48. (For those hired in 1938-48 the number at risk and total deaths of all causes by duration of

employment is cited on page 6.

All External Causes of Death (800-998)

There is an elevated SMR, for those employed <1 year, 1-3 and 4-9 years, 110.1, 135.5, 124.9.

Accidents (800-962)

There was a slight elevation of SMR above 100 for duration of employment 4-9 years and 10 years or more, 108 and 109.8, respectively.

Motor Vehicle Accidents (810-835)

An elevated SMR 128.2 occurred for those employed 4-9 years.

Suicides (963, 970-979)

The SMR for the combined categories of employment was elevated 121.8. The highest SMRs occurred for those employed 1-3 and 4-9 years, 146.8 and 142.5, respectively.

Dept. A
(Viscose, Aging)

The number of employees at risk and the number of deaths of all causes are cited on page 7.

All External Causes of Death (800-998)

For the combined duration of employment for those employed during 1938-1948, the SMR 149.2 was (statistically significant at the 1% level) All succeeding categories of duration of employment were elevated from less than 1 year SMR 151 statistically significant at the 5% level, SMRs 134.1; 174; and 132.9 for those employed 10 years or more.

Accidents (800-962)

For the total combined employment category, the SMR for this cause of death was 141.1; the SMR for those employed less than 1 year was 153.9. Both were statistically significant at the 5% level. The highest SMR 163.5 occurred among those employed 4-9 years.

Motor Vehicles (810-835)

For the total combined employment period the SMR was 163.3 and for those employed for less than one year was 188.5. Both SMR's were statistically significant at the 5% level. The SMR 188.3 occurred among those employed 4-9 years.

Suicides (963,970-979)

There is an elevated SMR 144.4 for the combined employment category and SMR 146.4 for those employed less than 1 year. The SMRs for the remaining categories of employment were 121.1, 122.4, 256.5.

Dept. B
(Spinning & Twisting)

The number of workers at risk and the total number of deaths by duration of employment are cited on page 8.

All External Causes (800-998)

For the combined duration of employment during 1938-48 there is an elevated SMR 122.3. The highest SMR 168.4 occurred among those employed 1-3 years, which was statistically significant at the 5% level.

Accidents (800-962)

The SMR for the combined employment categories was 100.2.

Motor Vehicle Accident (810-835)

The SMR for the combined employment category was 108.9 and the highest SMR 160.6 occurred for those employed 10 years or more.

Suicide (963, 970-979)

There is an elevated SMR 130.4 for the combined categories of employment. The highest SMRs occurred among those employed 1-3 years 204.7 and among those employed 4-9 years 175.4.

Dept. X
(Maintenance, Mechanics)

The total number at risk, and the total number of deaths due to all causes according to duration of employment is shown on page 9.

All External Causes (800-998)

The highest SMR 123.4 occurred among those employed 1-3 years.

Accidents (800-962)

The SMR for the combined employment categories was 77.8. The only elevated rate of SMR 131 occurred among those employed 10 years or more.

Suicides (963, 970-979)

The SMR for the combined employment categories was 133.5. The elevated SMRs occurred among those employed less than 1 year 142.8 and those employed 1-3 years 229.8.

Females

Tables III,IV, represent for white females the findings for the employees hired among 1938-48 by category of duration of employment. The number of employees at risk and the number of deaths for all causes, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	3120	179
1-3	1081	56
4-9	503	31
10+	236	30

Cardiovascular Disease (440-468)

The SMRs for deaths due to cardiovascular disease for the combined employment categories was under 100 at 85.6. The SMRs from 1-3 years and longer, showed a progressive rise 67.8, 77.7, and 112.9 for those employed 10 years or more.

Coronary Heart Disease (420)

The SMRs followed the same pattern as noted for cardiovascular disease. However, the SMRs were higher. The SMRs for 1-3 years and longer were 72.2, 94.2 and 120.8 for those employed 10 years or more. For the females, the higher SMR for those employed 10 years or more follows the same pattern observed among the males.

Stroke (330-334)

For the combined employment category, the SMR was 87.5 and for those employed 10 years or more the SMR was 103.5.

Dept. B
(Spinning & Twisting)

The total number at risk and the total number of deaths due to all causes, by each category of employment, were as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
41	397	22
1-3	95	12
4-9	2	1
10+	1	0

Cardiovascular Disease (400-468)

Table III, the SMR for the combined duration of employment category was 73.9 and for period 1-3 years 73.7.

Coronary Heart Disease (420)

The SMR for combined duration of employment category was 52.6 and 67.3 for those employed less than one year.

Stroke (330-334)

The SMR for the combined duration of employment category was higher than the SMR for coronary heart disease 89 vs. 52.6.

Dept. C
(Yarn Opr., Twisting)

The total number employees at risk and number of total deaths, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	818	35
1-3	282	17
4-9	128	8
10+	86	11

Cardiovascular Diseases (400-468)

Table III shows SMR 79.1 for combined duration of employment was less than the SMR for the total plant 85.6. In Dept. C, the SMRs elevated above 100 were for those employed 4-9 years 112.4 and 10 years or more 112.7.

Coronary Heart Disease (420)

The SMR for the combined category of duration of employment 78.3 was less than the total plant 86.3. The SMR for Dept. C for those employed less than 1 year was less compared to the total plant (57.3 vs. 82.4). In Dept. C, the higher SMRs occurred for those employed 4-9,176.7 and 10 years or more 94.8.

Stroke (330-334)

The SMR for all durations of employment combined 103.2 was much higher than the SMRs for coronary heart disease 78.3. This was also true for those employed 1 year or less 86.3 vs. 57.3. For stroke, although the number of deaths were small, the SMRs were high for those employed 1-3 177.7 and 4-9 years 128.8.

Dept. M
(Storeroom & Shipping)

The number of employees at risk and the total number of deaths due to all causes according to period of duration of employment was as follows:

Duration of Employment	Number of Risk	Total Deaths All Causes
<1	128	27
1-3	34	8
4-9	6	2
10+	1	0

Table III, show that for the combined duration of employment, the SMRs for all cardiovascular disease 77.6 and coronary heart disease 75.9 which were below the SMRs for the entire plant. However, for stroke the SMR 109.2 is higher than the SMR 87.5 for stroke for the total plant. Within Dept. M., for the duration of employment less than 1 year, the SMR for stroke 140.7 was much higher than for coronary heart disease 65.3, in which the same number of deaths (6) were observed.

Dept. T
(Textile Coning)

The total number at risk, and the total number of all causes of death, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	1844	99
1-3	599	26
4-9	253	13
10+	103	12

Cardiovascular Disease (400-468)

For the combined duration of employment the SMRs are higher in Dept. T, (83.1), than in Dept. M, (77.6), Dept. C, (79.1) and Dept. B, (73.9). For coronary heart disease there was a higher SMR 90.4 in Dept. T compared to Dept. M, (75.9), Dept. C, (78.3), Dept. B (52.6.). For stroke the SMR 71.9 in Dept. T was less than the other departments. The highest SMR 137.7 occurred for coronary heart disease among those employed 10 years or more.

Dept.V/W
(Warping/Weaving)

The number of employees at risk, the total number of deaths due to all causes, by duration of employment was as follows:

Duration of Employment	Number at Risk	Total Deaths All Causes
<1	386	41
1-3	157	8
4-9	72	9
10+	33	7

Cardiovascular Disease (400-468)

Table IV, shows the highest SMR 131 for the combined duration of employment, compared to Dept. B (73.9), Dept. C. (79.1), Dept. M (77.6), and Dept. T (83.1) and for the total plant (85.6). Within Dept. V/W the highest SMRs occurred for those employed less than 1 year 136.4 and 4-9 years 142.5 and 10 years or more 193.5.

Coronary Heart Disease (420)

Table IV, the SMR for the combined duration of employment 146 was markedly higher than the corresponding SMRs in Dept. B (52.6), Dept. C (78.3), Dept. M (75.9), Dept. T (90.4), and for the total plant (86.3).

Within Dept. V/W, there is a progressive rise for deaths due to coronary heart disease in SMRs for those employed less than 1 year 99.9 to succeeding periods of time SMR 165 and SMR 201.6 for those employed 10 years or more.

Stroke (330-334)

The SMR for the combined duration of employment was 170, which is approximately 100% higher than the SMR 87.5 for the total plant, and considerably higher than the SMR for each of the other Depts. (B), (C), (M), (T). Within the Dept. V/W, the excess was concentrated among those employed less than 1 year 246.2 (Workers could have been employed in other departments before they entered V/W Dept. for the respective period of employment).

All External Causes - Total Plant

For distribution of employees at risk and total number of deaths due to all causes, see page 13.

Table V, VI, for the combined employment category, the SMR was 102.9 with a definite rise according to the specific periods of employment 93.3, 99.1, 125.4 and 193.6 for those employed 10 years or more.

Accidents (800-962)

Tables V,VI, the highest SMRs occurred for those employed 4-9 years and 10 years or more 192.2 and 191.2.

Motor Vehicle Accidents (810-835)

There is a consistent rise in SMR with increasing category of duration of employment 47.9, 114.3, 244, 386.9.

Suicides (963, 970-979)

The SMR was elevated for the combined employment category 120.8, and for those employed less than 1 year 120.3 and for the period 1-3 years 142.1.

Dept. B
(Spinning & Twisting)

The distribution of number of employees at risk and number of total deaths by duration of employment is cited on page 14.

Table V, shows SMRs for all external causes, accidents, motor vehicle accidents and suicides.

The SMR for accidents for the combined duration of employment was 181.5 which was higher than the SMR of any other department for that cause of death. For accidents the elevated SMR occurred for those employed 1-3 years, 422.5. Motor vehicle accidents was the principal cause for the elevated rates. For the combined duration of employment the SMR was 251 and for those employed 1-3 years SMR was 782. There were no deaths due to suicides within the 22 total deaths from all causes.

Dept. C
(Yarn Opr., Twisting)

For population at risk and total number of deaths due to all causes, by duration of employment see page 15.

For accidents the SMR for all combined durations of employment was 144.8 which was much higher than the SMR 96.1

for the total plant. Within Dept. C the concentration of deaths occurred with those employed less than 1 year, SMR 155.5. These accidents in addition to motor vehicle accidents contributed to the excess.

Dept. M
(Storeroom & Shipping)

There were no observed deaths from external causes.

Dept. T
(Textile Coning)

For the population at risk, and the total number of deaths due to all causes, by duration of employment see page .

For accidents the elevated SMRs occurred for those employed 10 years or more, SMR 456.6 and for motor vehicle accidents the SMR was 910.8 which was statistically significant at the 5% level. Suicides showed an elevated rate for those employed 1-3 years SMR 245.4 and for those employed 10 years or more SMR 579.5 (1 death).

Dept. V/W
(Warping/Weaving)

There were markedly higher SMRs for each category, compared to the total plant SMRs for all external causes, accidents, motor vehicles, and suicides, for the combined duration of employment and for employment less than 1 year.

The SMR for all external causes of death for those employed less than 1 year -- 325.4 was statistically significant at the 5% level. The corresponding SMRs for this period of employment

of less than 1 year was for accidents (288), motor vehicle accidents (269.3) and for suicides (501.9) which was statistically significant at the 5% level.

Followup for 22 and 15 Year Time Periods for White Males (Tables VII, IX)

The excess for cardiovascular disease (400-468) and for coronary heart disease (420) as demonstrated in the observations following the 28 year followup were also noted in the 22 year followup, for those employed 10 years or more for the total plant employees and for employees of Dept. B. Elevated SMRs were also noted for Dept. X in the 22 year followup.

In the 15 year period followup, elevated SMRs occurred for the total plant employees and for employees of Dept. B.

Period of Followup and SMRs
Employed 10 years or more

Total Plant	28 yr.	22 yr.	15 yr.
Cardiovascular	129.2*	121.3	131.3
Coronary	138.8*	134.7*	155.4
Dept. B			
Cardiovascular	187**	200.8*	186.5
Coronary	216.2**	227.7**	252.5
Dept. X			
Cardiovascular	155.5**	135.3	92.1
Coronary	169.3**	140.1	102.0

Stroke
SMRs Combined Duration of Employment

Total Plant	106	105.6	86.5
Dept. A	106.6	99.3	78.5
Dept. B	118.7	162.9*	106.5
Dept. X	120.2	93	88.2

*significant 5% level.
**significant 1% level.

In the comparisons in time periods for external causes of death, there was an apparent shift, an increase in SMRs when the period of followup was shortened from 28 years to 15 years as follows.

Period of Followup -
SMRs for Combined Duration of Employment
(Tables VII, X)

In the 15 year period of observations, the SMRs for suicides were the same for Dept. A. (149.9), Dept. B (148.1) and Dept. X (148.9).

Total Plant	28 year	22 year	15 year
External causes	115	120.3*	133.8*
Accidents	98.9	102.9	110.5
Motor Vehicle Accidents	103.7	104.1	121
Suicides	121.8	124.7	138.2
Dept. A			
External causes	149.22**	150.7**	164.2**
Accidents	141.1	138.3	149.5
Motor Vehicle Accidents	163.3*	150	179.5
Suicides	144.4	141.6	149.9
Dept. B			
External causes	122.3	126.3*	146.8**
Accidents	100.2	105	115.8
Motor Vehicle Accidents	108.9	115.3	133.4
Suicides	130.4	122.4	148.1
Dept. X			
External causes	92.1	88.6	94.5
Accidents	77.8	75.9	72.4
Motor Vehicle Accidents	57.7	47.6	44.8
Suicides	133.5	117.6	148.9

*significant 5% level.
**significant 1% level.

Total Cohort 1938-48 Males - Causes of Death
Followup - 28 years

Tables XI-XVI, provide a broad overview for the white males, the person years at risk by age group, the deaths observed and expected for all ages and the standard mortality ratios for each of the causes of death studied, by duration of exposure.

The discussion of the findings of the standard mortality ratios for cardiovascular disease and for external causes of death, for the total plant and by respective departments has already been presented.

These tables provide an overview description of other specific causes of death and the direction of the standard mortality ratios.

Malignancies

For all malignancies for the total combined employment the SMR was 91.5. Within this category of all malignancies, cancer of CNS (193) was elevated SMR 154.2; cancer of the prostate 134.6. Cancer of the respiratory system (162-63) SMR 101.4.

When considered by duration of employment an excess for the cancer of CNS (193) occurred among those employed less than 1 year 149.6 and for those employed 1-3 years 238.9 and 4-9 years 226.7.

The excess for cancer of the prostate occurred among those employed less than 1 year, SMR 157.6, and for those employed 10 years or more, SMR 175.4.

The SMR for cancer of the lung, was elevated for those employed less than 1 year SMR 124, however in succeeding periods of duration of employment, the SMRs dropped, 1-3 years (57.1), 4-6 years (100), 10 years or more (63.8).

Cancer of the pancreas was elevated only for those employed 10 years or more SMR 205.3, whereas the SMR for cancer of the lung for this duration category was 63.8.

Specific Causes of Death

For the total combined employment category, the SMR for death due to ulcer of stomach and duodenum was elevated SMR 145.7. The excess occurred among those employed less than 1 year, SMR (176.5), 1-3 years (131.6), for 10 years or more (112.4).

Total Cohort 1938-48 Females - Causes of Death
Followup - 28 years

Tables XVII-XXII provide for the females the characterization of the cohort and the broad overview for specific causes of death for all ages by duration of employment.

Malignancies

For all malignancies, for the combined employment, the SMR was 64.4. Within this category of all malignancies, cancer of the respiratory system had an elevated SMR 129.2 (In contrast, the males had an SMR of 101.4); cancer of the bladder and other urinary organs had an SMR 194.1; lymphatic and hematopoietic system SMR 151.5.

The SMR for cancer of the respiratory system was elevated among those employed 1-3 years SMR 174.4; among those employed 4-9 years SMR 335.8.

The SMR for cancer of the bladder occurred among those employed less than 1 year SMR 295.6. The excess for the combined lymphatic and hematopoietic system (200-205) occurred among those employed less than 1 year - SMR 159.1; among those employed 4-9 years SMR 258.9 and among those employed 10 years or more SMR 142.8. For cancer of the breast for the combined employment the SMR showed a deficit, SMR 47.5. However there was an elevated SMR 115.2 for those employed 1-3 years and SMR 86.1 for those employed 4-9 years.

Specific Causes of Death

The SMR for nonmalignant respiratory disease was elevated 131.2 for the combined employment category. The contribution of the excess occurred, among those employed 1-3 years SMR 244.5; 4-9 years of employment SMR 185.4.

The SMR for deaths due to diabetes for the combined employment period was elevated, SMR 129.6. The contribution of the excess occurred among those employed 1-3 years SMR 280; among those employed 4-9 years SMR 231.3 and for those employed 10 years or more SMR 236.2.

TABLE I

RAYON PLANT: Cohort 1938-48 employees (white males) with 28 year follow-up period

TABLE I

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
All CVD (400-468)	572	540.6	105.8	316	304.2	103.9	82	86.2	95.1	50	45.9	108.9	112	86.7	129.2
Coronary (420)	453	407.4	111.2	246	229.9	107	62	63.1	98.2	50	45.9	108.9	95	68.4	138.9
Stroke (330-334)	87	82.1	106	43	45	95.4	14	13	107.7	14	10.1	138	16	13.9	114.9
Dept A															
All CVD (400-468)	196	186.3	105.2	135	122.3	110.4	29	32.5	89	21	18	116.2	11	13.3	82.7
Coronary (420)	153	140.6	108.8	107	92.5	115.7	21	24	87.4	17	13.4	126.4	8	10.6	74.6
Stroke (330-334)	33	30.9	106.6	16	20	79.8	9	5.4	164.8	3	3.1	95.8	5	2.3	216.1
Dept B															
All CVD (400-468)	184	165.3	111.3	103	104.7	98.3	30	26.8	111.8	20	17.1	116.4	31	16.5	187**
Coronary (420)	151	127.5	118.4	84	80.7	104.1	23	20.3	112.8	15	13	115.3	29	13.4	216.1
Stroke (330-334)	25	21	118.7	15	13.4	111.2	5	3.2	153	3	2.1	136.9	2	2.1	94.4
Dept X															
All CVD (400-468)	197	188.4	104.6	97	92.7	104.6	25	33	75.6	27	31.7	85.1	48	30.8	155.9
Coronary (420)	157	140.6	111.6	77	68.8	111.9	21	24.4	86	18	23.2	77.6	41	24.2	169.3
Stroke (330-334)	35	29.1	120.2	17	13.8	123	4	4.8	82.3	10	5.2	189.2	4	5.1	77.6

*significant at 5% level
**significant at 1% level

TABLE II

RAYON PLANT: Cohort 1938-48 employees (white males) with 28 year follow-up period

TABLE II

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
Ext. Causes (800-998)	196	170.4	115	118	107.1	110.1	40	29.5	135.5	24	19.2	124.9	14	14.5	96.3
Accidents (800-962)	124	124.5	99.5	78	78.9	98.9	20	21.7	91.9	15	13.8	108	11	10	109.8
M. Veh. Acc. (810-835)	59	56.9	103.7	41	36.6	111.8	6	9.6	62.2	8	6.2	128.2	4	4.3	91.5
Suicides (963,970-979)	44	36.1	121.8	26	22	117.8	9	6.1	146.8	6	4.2	142.5	3	3.7	80.7
Dept A															
Ext. Causes (800-998)	60	40.2	149.2**	42	27.8	151*	10	7.4	134.1	6	3.4	174	2	1.5	132.9
Accidents (800-962)	41	29	141.1*	31	20.1	153.9*	5	5.4	92.4	4	2.4	163.5	1	1	95.9
M. Veh. Acc. (810-835)	21	12.8	163.3*	17	9	188.5*	2	2.3	85.4	2	1	188.3	0	.4	-----
Suicides (963,970-979)	13	9	144.4	9	6.1	146.4	2	1.6	121.1	1	.8	122.4	1	.3	256.5
Dept B															
Ext. Causes (800-998)	104	85.0	122.3	67	58	115.4	25	14.8	168.4*	8	7.1	100.1	4	4	97.7
Accidents (800-962)	63	62.8	100.2	44	43.3	101.6	12	11	108.8	4	5.7	69.4	3	2.7	108
M. Veh. Acc. (810-835)	33	30.3	108.9	23	21.2	108.5	5	5.1	97.2	3	2.7	110.4	2	1.2	160.6
Suicides (963,970-979)	22	16.8	130.4	12	11.1	107.3	6	2.9	204.7	3	1.7	175.4	1	1	95
Dept X															
Ext. Causes (800-998)	46	49.9	92.1	25	28.9	86.4	12	9.7	123.4	5	6.8	72.9	4	4.4	90.3
Accidents (800-962)	28	35.9	77.8	14	21	66.6	6	7	85.6	4	4.8	82.1	4	3	131
M. Veh. Acc. (810-835)	9	15.6	57.7	4	9.1	43.6	2	3	66.1	1	2.1	47.7	2	1.3	153.1
Suicides (963,970-979)	15	11.2	133.5	9	6.3	142.8	5	2.1	229.8	1	1.6	62.2	0	1.1	-----

*significant at 5% level
**significant at 1% level

RAYON PLANT: Cohort 1938-48 employees (white females) with 28 year follow-up period

TABLE III

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant All CVD (400-468)	93	108.6	85.6	62	71.4	86.7	11	16.2	67.8	8	10.3	77.7	12	10.6	112.[illegible]
Coronary (420)	59	68.4	86.3	37	44.8	82.4	7	9.7	72.2	6	6.3	94.2	9	7.4	120.[illegible]
Stroke (330-334)	27	30.8	87.5	20	20.3	98.2	2	4.5	43.7	2	3	66.1	3	2.9	103.[illegible]
Dept B All CVD (400-468)	9	12.1	73.9	7	9.5	73.7	2	2.6	75.8	0	0	-----	0	0	-----
Coronary (420)	4	7.6	52.6	4	5.9	67.3	0	1.6	-----	0	0	-----	0	0	-----
Stroke (330-334)	3	3.3	89	2	2.6	76.3	1	.7	135.4	0	0	-----	0	0	-----
Dept C All CVD (400-468)	22	27.8	79.1	10	16.5	60.4	4	4.1	96.2	3	2.6	112.4	5	4.4	112.[illegible]
Coronary (420)	14	17.8	78.3	6	10.4	57.3	2.0	2.5	78.4	3	1.7	176.7	3	3.1	94.[illegible]
Stroke (330-334)	8	7.7	103.2	4	4.6	86.3	2	1.1	177.7	1	.7	128.8	1	1.2	82.[illegible]
Dept H All CVD (400-468)	14	18	77.6	10	13.9	71.7	3	3.5	85.6	1	.4	216.1	0	.1	-----
Coronary (420)	9	11.8	75.9	6	9.1	65.3	2	2.2	87.8	1	.3	334.4	0	0	-----
Stroke All CVD (400-468)	6	5.4	109.2	6	4.2	140.7	0	1	-----	0	.1	-----	0	0	-----

*significant at 5% level
**significant at 1% level

TABLE V

RAYON PLANT: Cohort 1938-48 employees (white females) with 28 year follow-up period

TABLE V

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
Ext. Causes (800-998)	28	27.2	102.9	17	18.2	93.3	5	5	99.1	3	2.3	125.4	3	1.5	193.
Accidents (800-962)	17	17.6	96.1	9	11.8	76	3	3.2	92.5	3	1.5	192.2	2	1	191.
M. Veh. Acc. (810-835)	9	9.3	96.3	3	6.2	47.9	2	1.7	114.3	2	.8	244	2	.5	386.
Suicides (963,970-979)	9	7.4	120.8	6	4.9	120.3	2	1.4	142.1	0	.6	-----	1	.4	248.
Dept B															
Ext. Causes (800-998)	4	3.4	116.8	2	2.6	74.8	2	.7	272.3	0	0	-----	0	0	-----
Accidents (800-962)	4	2.2	181.5	2	1.7	116.2	2	.4	422.5	0	0	-----	0	0	-----
M. Veh. Acc. (810-835)	3	1.2	251	1	.9	107	2	.2	782	0	0	-----	0	0	-----
Suicides (963,970-979)	0	.9	-----	0	0	-----	0	0	-----	0	0	-----	0	0	-----
Dept C															
Ext. Causes (800-998)	10	7.5	132.5	8	5	158.5	1	1.3	73.3	1	.5	183.4	0	.5	-----
Accidents (800-962)		4.8	144.8	5	3.2	155.5	1	.8	116	1	.3	279.8	0	.4	-----
M. Veh. Acc. (810-835)	2	2.6	76.6	2	1.7	115	0	.4	-----	0	.1	-----	0	.1	-----
Suicides (963,970-979)	1	2.1	47	1	1.4	70.3	0	.3	-----	0	.1	-----	0	.1	-----
Dept M															
Ext. Causes (800-998)	0	0	-----	0	0	-----	0	0	-----	0	0	-----	0	0	-----
Accidents (800-962)	0	0	-----	0	0	-----	0	0	-----	0	0	-----	0	0	-----
M. Veh. Acc. (810-835)	0	0	-----	0	0	-----	0	0	-----	0	0	-----	0	0	-----
Suicides (963,970-979)	0	0	-----	0	0	-----	0	0	-----	0	0	-----	0	0	-----

*significant at 5% level
**significant at 1% level

TABLE VI

RAYON PLANT: Cohort 1938-48 employees (white females) with 28 year follow-up period

TABLE VI

	TOTAL obs	TOTAL exp	TOTAL SMR	<1 obs	<1 exp	<1 SMR	1-3 obs	1-3 exp	1-3 SMR	4-9 obs	4-9 exp	4-9 SMR	10+ obs	10+ exp	10+ SMR
Dept T															
Ext. Causes (800-998)	12	15.6	76.8	4	10.8	36.8	4	2.8	138.5	1	1.2	82.8	3	.6	458.9
Accidents (800-962)	7	10	69.5	2	7	28.5	2	1.8	108.6	1	.7	129.4	2	.4	456.6
M. Veh. Acc. (810-835)	5	5.4	92.5	0	3.7	-----	2	1	199.6	1	.4	241.6	2	.2	910.8
Suicides (963,970-979)	5	4.3	115.2	2	3	66.4	2	.8	245.4	0	.3	-----	1	.1	579.5
Dept V/W															
Ext. Causes (800-998)	7	3.5	196.4	7	2.1	325.4*	0	0	-----	0	0	-----	0	0	-----
Accidents (800-962)	4	2.3	171.7	4	1.3	288	0	0	-----	0	0	-----	0	0	-----
M. Veh. Acc. (810-835)	2	1.2	164.1	2	.7	269.3	0	0	-----	0	0	-----	0	0	-----
Suicides (963,970-979)	3	.9	308.9	3	.6	501.9*	0	0	-----	0	0	-----	0	0	-----

*significant at 5% level
**significant at 1% level

TABLE VII

RAYON PLANT: Cohort 1938-48 employees (white males) with 22 year follow-up period

TABLE VII

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
All CVD (400-468)	355	342.6	103.5	198	190.9	103.7	49	56.6	86.5	47	45	104.4	61	50.2	121.3
Coronary (420)	277	244.3	113.3*	149	136.2	109.4	38	38.8	97.9	38	30.7	123.5	52	38.6	134.7*
Stroke (330-334)	56	53	105.6	30	28.8	104	8	8.7	91.9	8	7.4	107.7	10	8	124.4
Dept A															
All CVD (400-468)	130	127.8	101.7	90	83.5	107.7	18	22.9	78.5	13	13.3	97.4	9	8	111.6
Coronary (420)	102	92.5	110.3	71	60.4	117.4	13	16.1	80.7	11	9.5	114.8	7	6.3	110.6
Stroke (330-334)	21	21.1	99.3	12	13.6	87.9	3	3.8	77.6	3	2.3	129.6	3	1.3	228.9
Dept B															
All CVD (400-468)	97	94.8	102.3	55	59.9	91.7	14	15.5	90.3	10	10.4	96	18	8.9	200.8*
Coronary (420)	76	68.3	111.2	42	43	97.5	11	10.9	100.8	7	7.3	95.2	16	7	227.7**
Stroke (330-334)	21	12.8	162.9*	13	8.2	157.4	4	2	199.6	2	1.4	139.3	2	1.1	167.8
Dept X															
All CVD (400-468)	120	117.7	101.9	59	57.3	102.8	18	20.9	85.9	19	21.8	87.4	24	17.7	135.3
Coronary (420)	96	83	115.7	46	39.9	115.2	15	14.4	103.6	16	15	106.4	19	13.5	140.1
Stroke (330-334)	17	18.2	93	8	8.6	92.4	4	3	130.2	3	3.6	82.9	2	2.9	68.3

*significant at 5% level
**significant at 1% level

TABLE VIII

RAYON PLANT: Cohort 1938-48 employees (white males) with 22 year follow-up period

TABLE VIII

	TOTAL obs	TOTAL exp	TOTAL SMR	<1 obs	<1 exp	<1 SMR	1-3 obs	1-3 exp	1-3 SMR	4-9 obs	4-9 exp	4-9 SMR	10+ obs	10+ exp	10+ SMR
Total Plant															
Ext. Causes (800-998)	164	136.3	120.3*	98	86.2	113.6	35	24.4	143	21	15.8	132.4	10	9.7	102.7
Accidents (800-962)	105	102	102.9	66	65.1	101.3	17	18.4	92.3	14	11.6	120	8	6.7	118
M. Veh. Acc. (810-835)	49	47	104.1	33	30.6	107.8	6	8.1	73.3	8	5.2	151.8	2	3	66.5
Suicides (963,970-979)	34	27.2	124.7	20	16.6	120	8	4.8	166.5	4	3.3	120.1	2	2.4	81.2
Dept A															
Ext. Causes (800-998)	49	32.5	150.7**	32	22.5	141.9	10	6.1	163	6	2.8	213.7	1	1	97.9
Accidents (800-962)	33	23.8	138.3	23	16.6	138.4	5	4.5	110.6	4	2	198.6	1	.7	141.7
M. Veh. Acc. (810-835)	16	10.6	150	12	7.5	159.6	2	1.9	101.9	2	.8	227	0	.3	-----
Suicides (963,970-979)	10	7	141.6	7	4.8	145.2	2	1.3	152.3	1	.6	153.1	0	.2	-----
Dept B															
Ext. Causes (800-998)	85	67.3	126.3*	56	46.2	121	18	12	149.6	8	6.3	126.4	3	2.6	111.8
Accidents (800-962)	54	51.4	105	39	35.7	109.2	9	9.2	97.9	4	4.6	85.4	2	1.8	107.8
M. Veh. Acc. (810-835)	29	25.1	115.3	21	17.7	118.4	4	4.3	92.5	3	2.2	134.4	1	.8	118.2
Suicides (963,970-979)	15	12.2	122.4	8	8.1	98.4	3	2.1	137.3	3	1.2	236.7	1	.6	148.7
Dept X															
Ext. Causes (800-998)	35	39.5	88.6	18	23.2	77.5	11	7.8	139.4	4	5.5	72.7	2	2.8	69.6
Accidents (800-962)	22	28.9	75.9	11	17.2	63.8	6	5.7	103.7	3	3.9	75.8	2	1.9	100.3
M. Veh. Acc. (810-835)	6	12.6	47.6	2	7.5	26.5	2	2.5	80.1	1	1.7	58.5	1	.8	115.6
Suicides (963,970-979)	10	8.4	117.9	5	4.7	104.4	4	1.6	236.6	1	1.2	79.6	0	.7	-----

*significant at 5% level
**significant at 1% level

TABLE IX

RAYON PLANT: Cohort 1938-48 employees (white males) with 15 year follow-up period

TABLE IX

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
All CVD (400-468)	171	175.3	97.5	104	97.9	106.2	19	31.2	60.9	26	29.3	88.5	22	16.7	131.[illegible]
Coronary (420)	128	112	114.3	71	62.4	113.7	16	18.7	85.4	22	18.5	118.5	19	12.2	155.[illegible]
Stroke (330-334)	24	27.7	86.5	13	15.2	85.5	4	4.9	81.7	6	4.9	121.5	1	2.6	37.[illegible]
Dept A															
All CVD (400-468)	70	70.1	100	48	45.8	104.6	8	12.7	62.9	8	8.4	95.1	6	2.9	201.[illegible]
Coronary (420)	52	46.7	111.1	36	30.6	117.3	6	8.1	74	6	5.7	105	4	2.2	175.[illegible]
Stroke (330-334)	9	11.4	78.5	8	7.4	107.7	0	2.1	-----	1	1.4	68.5	0	.4	-----
Dept B															
All CVD (400-468)	40	43.8	91.2	24	28.1	85.3	5	7.2	69.2	6	5.8	103.2	5	2.6	186.[illegible]
Coronary (420)	28	27.5	101.6	14	17.5	79.6	5	4.3	116.1	4	3.6	108.5	5	1.9	252.[illegible]
Stroke (330-334)	7	6.5	106.5	3	4.2	70.1	3	1	294.6	1	.8	112.3	0	.3	-----
Dept X															
All CVD (400-468)	50	58	86.1	30	29.1	102.8	5	11.3	44.3	10	12.1	82.2	5	5.4	92.[illegible]
Coronary (420)	40	36.2	110.4	21	17.7	118.2	5	6.8	72.9	10	7.7	129.9	4	3.9	102
Stroke (330-334)	8	9.0	88.2	2	4.5	44.1	5	11.3	44.3	3	1.9	152.3	0	.8	-----

*significant at 5% level
**significant at 1% level

TABLE X

RAYON PLANT: Cohort 1938-48 employees (white males) with 15 year follow-up period

TABLE X

	TOTAL			<1			1-3			4-9			10+		
	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR	obs	exp	SMR
Total Plant															
Ext. Causes (800-998)	130	97.1	133.8**	76	62.5	121.6	29	18.6	155.7*	19	12	157.9	6	3.9	150.8
Accidents (800-962)	83	75.1	110.5	52	48.9	106.3	15	14.4	104.2	12	9	133.1	4	2.8	141.8
M. Veh. Acc. (810-835)	42	34.7	121	27	23	117.1	6	6.3	94.5	8	4	197.1	1	1.2	79
Suicides (963,970-979)	24	17.3	138.2	14	10.7	130.6	4	3.3	120.6	4	2.3	168.6	2	.9	208.7
Dept A															
Ext. Causes (800-998)	38	23.1	164.2**	26	16.2	160.4*	8	4.4	178.2	4	2	198.9	0	.0	-----
Accidents (800-962)	26	17.3	149.5	20	12.2	163.2	4	3.3	118.4	2	1.4	136.8	0	.0	-----
M. Veh. Acc. (810-835)	14	7.8	179.5	11	5.5	197.5	2	1.4	137	1	.6	156.8	0	.0	-----
Suicides (963,970-979)	7	4.6	149.9	5	3.2	155.9	1	.9	111.7	1	.4	221.9	0	.0	-----
Dept B															
Ext. Causes (800-998)	70	47.6	146.8**	46	33.2	138.2*	14	8.8	157.9	8	4.5	177.5	2	1	192.3
Accidents (800-962)	44	38	115.8	32	26.8	119.4	7	7	99.6	4	3.4	116.6	1	.7	135.3
M. Veh. Acc. (810-835)	25	18.7	133.4	17	13.4	126.4	4	3.3	121.2	3	1.6	182.9	1	.3	292.4
Suicides (963,970-979)	11	7.4	148.1	6	4.9	120.6	1	1.4	71.5	3	.8	368	1	.2	414
Dept X															
Ext. Causes (800-998)	26	27.5	94.5	11	16.7	65.5	10	5.7	172.6	4	3.8	102.9	1	1	96.2
Accidents (800-962)	15	20.7	72.4	5	12.8	39	6	4.3	137.9	3	2.8	105.7	1	.7	137
M. Veh. Acc. (810-835)	4	8.9	44.8	1	5.5	18.1	2	1.8	108	1	1.2	82.3	0	.0	-----
Suicides (963,970-979)	8	5.3	148.9	4	3.1	128	3	1.1	262.5	1	.8	118.5	0	.0	-----

*significant at 5% level
**significant at 1% level

AGE DISTRIBUTIONS ...

AGE GROUP	FREQUENCY		
	AGE AT HIRE	AGE AT ENTRY INTO STUDY	AGE AT DEATH
<25	2770	2770	33
25-29	888	888	34
30-34	674	674	42
35-39	482	482	71
40-44	384	384	114
45-49	298	298	143
50-54	194	194	147
55-59	121	121	163
60-64	35	35	155
65-69	28	28	179
70-74	4	4	134
75+	1	1	99
TOTAL	5879	5879	1314
AVERAGE AGE	29.1	29.1	56.3

PROJECT TITLE: WHITE MALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1936-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 5879
PERSON YEARS: 95298.4

Duration of Exposure: <1
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO	95% C.I. LL	95% C.I. UL	SIG
ALL CAUSES OF DEATH	759	734.71	103.3	96.1	110.9	
ALL MALIGNANT NEOPLASMS (140-205)	121	123.75	97.8	81.1	116.9	
LARGE INTESTINE (153)	10	10.80	92.1	44.3	169.2	
PANCREAS (157)	5	6.69	74.7	24.2	174.5	
BRONCHUS, TRACHEA, AND LUNG (162-163)	41	33.07	124.0	88.9	168.3	
PROSTATE (177)	10	6.35	157.6	75.8	289.7	
KIDNEY (180)	3	3.16	94.9	19.6	277.4	
BLADDER AND OTHER URINARY ORGANS (181)	2	3.58	55.9	6.8	201.6	
CENTRAL NERVOUS SYSTEM (193)	7	4.69	149.6	60.1	308.4	
ALL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	8	13.66	58.6	25.2	115.3	
DIABETES MELLITUS (260)	8	10.21	78.4	33.8	154.3	
STROKE (330-334)	43	45.06	95.4	69.1	128.7	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	310	304.22	103.2	92.7	116.0	
CORONARY HEART DISEASE (420)	246	229.93	107.0	94.0	121.3	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	32	32.66	98.1	66.9	134.3	
ULCER OF STOMACH AND DUODENUM (540-541)	13	7.36	176.5	93.9	301.7	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	16	15.35	104.2	59.6	169.2	
ALL EXTERNAL CAUSES OF DEATH (800-998)	118	107.14	110.1	91.1	132.0	
ACCIDENTS (800-962)	78	78.90	98.9	78.2	123.5	
MOTOR VEHICLE ACCIDENTS (810-835)	41	36.66	111.8	80.2	151.8	
SUICIDES (963,970-979)	26	22.07	117.8	77.0	172.7	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	30					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE MALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 2275
PERSON YEARS: 25656.4

Duration of Exposure: 1-3
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	206	209.62	98.3	85.3	112.6	
ALL MALIGNANT NEOPLASMS (140-205)	26	34.35	75.7	49.5	111.0	
LARGE INTESTINE (153)	3	3.07	97.6	20.1	285.4	
PANCREAS (157)	0	1.85	---	---	---	
BRONCHUS, TRACHEA, AND LUNG (162-163)	5	8.76	57.1	18.5	133.3	
PROSTATE (177)	1	1.82	55.1	1.4	305.9	
KIDNEY (180)	1	0.87	114.5	2.9	638.2	
BLADDER AND OTHER URINARY ORGANS (181)	0	1.04	---	---	---	
CENTRAL NERVOUS SYSTEM (193)	3	1.26	238.9	49.3	698.5	
ILL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	4	3.62	110.5	30.1	282.6	
DIABETES MELLITUS (260)	3	2.92	102.8	21.2	300.7	
STROKE (330-334)	14	13.00	107.7	58.8	180.6	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	82	86.21	95.1	75.7	118.1	
CORONARY HEART DISEASE (420)	62	63.11	98.2	75.3	126.0	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	10	9.69	103.2	49.6	189.7	
ULCER OF STOMACH AND DUODENUM (540-541)	3	2.28	131.6	27.1	384.9	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	3	5.02	59.7	12.3	174.7	
ALL EXTERNAL CAUSES OF DEATH (800-998)	40	29.52	135.5	96.8	184.6	
ACCIDENTS (800-962)	20	21.77	91.9	56.0	142.0	
MOTOR VEHICLE ACCIDENTS (810-835)	6	9.64	62.2	22.8	135.6	
SUICIDES (963,970-979)	9	6.13	146.8	67.3	278.6	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	8					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE MALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 1394
PERSON YEARS: 17174.7

Duration of Exposure: 4-9
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	147	149.24	98.5	83.2	115.8	
ALL MALIGNANT NEOPLASMS (140-205)	22	24.66	89.2	55.7	135.1	
LARGE INTESTINE (153)	1	2.25	44.5	1.1	247.2	
PANCREAS (157)	1	1.33	75.3	1.9	418.3	
BRONCHUS, TRACHEA, AND LUNG (162-163)	6	5.96	100.6	36.9	219.2	
PROSTATE (177)	1	1.45	69.1	1.7	383.6	
KIDNEY (180)	0	0.62	---	---	---	
BLADDER AND OTHER URINARY ORGANS (181)	1	0.77	129.4	3.3	719.0	
CENTRAL NERVOUS SYSTEM (190)	2	0.98	226.7	27.4	818.5	
ILL-LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	4	2.57	155.7	42.4	398.2	
DIABETES MELLITUS (260)	4	2.12	188.4	51.3	482.0	
STRUMA (330-334)	14	10.13	138.2	75.5	231.9	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	62	63.47	97.7	74.9	125.3	
CORONARY HEART DISEASE (420)	50	45.93	108.9	80.6	143.6	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	3	6.50	46.2	9.5	135.0	
ULCER OF STOMACH AND DUODENUM (540-541)	1	1.62	61.8	1.6	343.5	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	3	3.61	83.0	17.1	242.7	
ALL EXTERNAL CAUSES OF DEATH (800-998)	24	19.22	124.9	80.0	185.8	
ACCIDENTS (800-962)	15	13.96	106.0	60.4	178.3	
MOTOR VEHICLE ACCIDENTS (810-835)	8	6.24	128.2	55.3	252.4	
SUICIDES (963,970-979)	6	4.21	142.5	52.2	310.5	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	6					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE MALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 790
PERSON YEARS: 12330.7

Duration of Exposure: 10+
Latency: Total
Time Period: All
Age Group: All

STANDARDIZED MORTALITY RATIO

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	SMR	95% C.I. LL	95% C.I. UL	SIG
ALL CAUSES OF DEATH	202	182.47	110.7	96.0	127.0	
ALL MALIGNANT NEOPLASMS (140-205)	29	33.69	86.1	57.8	123.7	
LARGE INTESTINE (153)	3	3.11	96.5	19.9	282.2	
PANCREAS (157)	4	1.95	205.3	55.9	525.1	
BRONCHUS, TRACHEA, AND LUNG (162-163)	6	5.41	83.8	23.4	138.9	
PROSTATE (177)	4	2.28	175.4	47.8	448.6	
KIDNEY (180)	0	0.84	---	---	---	
BLADDER AND OTHER URINARY ORGANS (181)	1	1.13	88.4	2.2	490.9	
CENTRAL NERVOUS SYSTEM (193)	0	0.96	---	---	---	
ILL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	2	3.27	61.1	7.4	220.5	
DIABETES MELLITUS (260)	3	2.60	115.5	23.8	337.8	
STROKE (330-334)	16	13.92	114.9	65.7	186.6	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	112	86.70	129.2	106.3	155.6	*
CORONARY HEART DISEASE (420)	95	68.44	138.8	112.4	169.7	**
NONMALIGNANT RESPIRATORY DISEASE (470-527)	10	9.21	108.5	52.2	199.5	
ULCER OF STOMACH AND DUODENUM (540-541)	2	1.78	112.4	13.6	405.8	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	1	2.96	33.8	0.9	187.7	
ALL EXTERNAL CAUSES OF DEATH (800-998)	14	14.54	96.3	52.6	161.6	
ACCIDENTS (800-962)	11	10.01	109.8	54.9	196.5	
MOTOR VEHICLE ACCIDENTS (810-835)	4	4.37	91.5	24.9	234.1	
SUICIDES (963,970-979)	3	3.72	80.7	16.6	236.1	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	4					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE MALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 5879
PERSON YEARS: 150460.1

Duration of Exposure: Total
Latency: Total
Time Period: All
Age Group: All

STANDARDIZED MORTALITY RATIO

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	1314	1276.04	103.0	97.4	108.7	
ALL MALIGNANT NEOPLASMS (140-205)	198	216.46	91.5	79.2	105.1	
LARGE INTESTINE (153)	17	19.29	88.1	51.2	141.0	
PANCREAS (157)	10	11.82	84.6	40.7	155.5	
BRONCHUS, TRACHEA, AND LUNG (162-163)	58	57.20	101.4	76.9	131.1	
PROSTATE (177)	16	11.99	134.6	76.9	218.4	
KIDNEY (180)	4	5.50	72.8	19.8	186.1	
BLADDER AND OTHER URINARY ORGANS (181)	4	6.52	61.3	16.7	156.9	
CENTRAL NERVOUS SYSTEM (193)	12	7.78	154.2	79.5	269.1	
ILL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	18	23.13	77.8	46.1	123.0	
DIABETES MELLITUS (260)	18	17.84	100.9	59.7	159.4	
STROKE (330-334)	87	82.11	106.0	85.0	130.7	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	572	540.60	105.8	97.3	114.9	
CORONARY HEART DISEASE (420)	453	407.42	111.2	101.2	121.9	*
NONMALIGNANT RESPIRATORY DISEASE (470-527)	55	59.07	93.1	70.0	121.3	
ULCER OF STOMACH AND DUODENUM (540-541)	19	13.04	145.7	87.6	227.7	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	23	26.95	85.4	54.0	128.2	
ALL EXTERNAL CAUSES OF DEATH (800-998)	196	170.40	115.0	99.5	132.3	
ACCIDENTS (800-962)	124	124.57	99.5	82.8	118.8	
MOTOR VEHICLE ACCIDENTS (810-835)	59	56.92	103.7	78.9	133.7	
SUICIDES (963,970-979)	44	36.13	121.8	88.5	163.6	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	48					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1930-1948 Table XVII 44

AGE DISTRIBUTIONS ...

AGE GROUP	FREQUENCY		
	AGE AT HIRE	AGE AT ENTRY INTO STUDY	AGE AT DEATH
<25	1529	1529	3
25-29	501	501	2
30-34	408	408	8
35-39	301	301	14
40-44	178	178	21
45-49	114	114	39
50-54	58	58	52
55-59	21	21	28
60-64	9	9	34
65-69	1	1	51
70-74	0	0	20
75+	0	0	24
TOTAL	3120	3120	290
AVERAGE AGE	28.1	28.1	57.3

TABLE XVIII

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 3120
PERSON YEARS: 57044.2

Duration of Exposure: <1
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	179	235.85	75.9	65.2	87.9	**
ALL MALIGNANT NEOPLASMS (140-205)	33	68.44	48.2	33.1	67.8	**
LARGE INTESTINE (153)	3	6.71	44.7	9.2	130.7	
PANCREAS (157)	1	2.36	42.1	1.1	233.8	
BRONCHUS, TRACHEA, AND LUNG (162-163)	5	4.59	108.9	35.2	254.3	
CANCER OF THE BREAST (170)	4	16.53	24.1	6.6	61.5	**
KIDNEY (180)	0	0.30	---	---	---	
BLADDER AND OTHER URINARY ORGANS (181)	2	0.66	295.6	35.6	1067.2	
LEUKEMIA AND ALEUKEMIA (204)	2	2.36	83.9	10.2	302.8	
ILL LYMPHATIC & HEMATOPOIETIC TISSUE (200-205)	9	5.65	159.1	73.0	301.8	
DIABETES MELLITUS (260)	4	6.14	65.3	17.8	167.1	
STROKE (330-334)	20	20.36	98.2	59.9	151.8	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	62	71.46	86.7	66.5	111.2	
CORONARY HEART DISEASE (420)	37	44.36	82.4	57.9	113.7	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	8	8.96	99.0	42.7	194.8	
EMPHYSEMA (527)	1	0.89	112.0	2.8	622.1	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-659)	4	5.91	67.7	18.5	173.2	
ALL EXTERNAL CAUSES OF DEATH (800-998)	17	18.21	93.3	54.3	149.4	
ACCIDENTS (800-962)	9	11.34	79.0	34.9	144.3	
MOTOR VEHICLE ACCIDENTS (810-835)	3	6.26	47.9	9.9	140.1	
SUICIDES (963,970-979)	6	4.99	120.3	44.1	262.1	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	17					

* SIGNIFICANT AT 5% LEVEL, ** SIGNIFICANT AT 1% LEVEL

TABLE XIX

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1930-1948
EXPECTED NUMBERS BASED ON: 25 YEAR FOLLOW-UP
NUMBER AT RISK: 1081
PERSON YEARS: 16000.8

Duration of Exposure: 1-3
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	56	58.94	95.0	71.7	123.5	
ALL MALIGNANT NEOPLASMS (140-205)	17	17.45	97.4	56.6	155.9	
LARGE INTESTINE (153)	1	1.62	61.6	1.6	342.0	
PANCREAS (157)	1	0.56	178.9	4.5	993.7	
BRONCHUS, TRACHEA, AND LUNG (162-163)	2	1.15	174.4	21.1	629.7	
CANCER OF THE BREAST (170)	5	4.34	115.2	37.3	269.1	
KIDNEY (180)	0	0.22	---	---	---	
BLADDER AND OTHER URINARY ORGANS (181)	0	0.15	---	---	---	
LEUKEMIA AND ALEUKEMIA (204)	0	0.62	---	---	---	
ALL LYMPHATIC & HEMATOPOIETIC TISSUE (200-205)	1	1.45	69.0	1.7	383.1	
DIABETES MELLITUS (260)	4	1.45	280.2	76.3	716.5	
STROKE (330-334)	2	4.58	43.7	5.3	157.6	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	11	16.25	67.8	33.9	121.2	
CORONARY HEART DISEASE (420)	7	9.70	72.2	29.0	148.8	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	5	2.04	244.5	79.1	571.4	
EMPHYSEMA (527)	0	0.21	---	---	---	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	1	1.63	61.5	1.6	341.8	
ALL EXTERNAL CAUSES OF DEATH (800-999)	5	5.05	99.1	32.1	231.5	
ACCIDENTS (960-962)	3	3.24	92.5	19.1	270.4	
MOTOR VEHICLE ACCIDENTS (810-835)	2	1.75	114.3	13.8	412.8	
SUICIDES (963,970-979)	2	1.41	142.1	17.2	513.0	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	1					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 593
PERSON YEARS: 7443.5

Duration of Exposure: 4-9
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	31	32.93	94.4	64.2	134.2	
ALL MALIGNANT NEOPLASMS (140-205)	11	9.53	115.4	57.7	206.4	
LARGE INTESTINE (153)	1	0.94	105.9	2.7	588.1	
PANCREAS (157)	1	0.33	305.3	7.7	1696.2	
BRONCHUS, TRACHEA, AND LUNG (162-163)	2	0.60	335.8	40.7	1212.2	
CANCER OF THE BREAST (170)	2	2.31	86.7	10.5	312.9	
KIDNEY (190)	0	0.12	---	---	---	
BLADDER AND OTHER URINARY ORGANS (181)	0	0.10	---	---	---	
LEUKEMIA AND ALEUKEMIA (204)	2	0.33	606.8	73.5	2190.5	
ALL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	2	0.77	258.9	31.3	934.7	
DIABETES MELLITUS (260)	2	0.86	231.3	28.0	835.2	
STROKE (330-334)	2	3.03	66.1	8.0	238.7	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	8	10.30	77.7	33.5	152.9	
CORONARY HEART DISEASE (420)	6	6.37	94.2	34.5	205.1	
NON-MALIGNANT RESPIRATORY DISEASE (470-527)	2	1.08	185.4	22.4	669.2	
EMPHYSEMA (527)	0	0.11	---	---	---	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	0	0.80	---	---	---	
ALL EXTERNAL CAUSES OF DEATH (800-998)	3	2.39	125.4	25.9	366.6	
ACCIDENTS (800-962)	3	1.56	192.2	39.6	562.1	
MOTOR VEHICLE ACCIDENTS (810-835)	2	0.82	244.0	29.5	880.8	
SUICIDES (950,970-979)	0	0.65	---	---	---	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	1					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER IN RISK: 230
PERSON YEARS: 3872.3

Duration of Exposure: 10+
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	33	29.31	102.3	69.2	146.2	
ALL MALIGNANT NEOPLASMS (140-205)	6	8.60	69.7	25.5	151.9	
LARGE INTESTINE (153)	0	0.95	---	---	---	
PANCREAS (157)	0	0.37	---	---	---	
BRONCHUS, TRACHEA, AND LUNG (162-163)	0	0.63	---	---	---	
CANCER OF THE BREAST (170)	1	2.00	49.9	1.3	277.5	
KIDNEY (186)	1	0.13	790.3	20.0	4399.5	
BLADDER AND OTHER URINARY ORGANS (181)	0	0.10	---	---	---	
LEUKEMIA AND ALEUKEMIA (204)	0	0.27	---	---	---	
ALL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	1	0.70	142.8	3.6	793.6	
DIABETES MELLITUS (260)	2	0.35	236.2	28.6	852.9	
STROKE (330-334)	3	2.90	103.5	21.3	302.6	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	12	10.63	112.9	58.2	197.1	
CORONARY HEART DISEASE (420)	9	7.45	120.8	55.4	229.2	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	1	0.99	100.9	2.6	562.7	
EMPHYSEMA (527)	1	0.13	775.1	17.1	3750.6	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	0	0.51	---	---	---	
ALL EXTERNAL CAUSES OF DEATH (800-998)	3	1.55	193.6	39.9	566.2	
ACCIDENTS (800-962)	2	1.05	191.2	23.1	690.3	
MOTOR VEHICLE ACCIDENTS (810-835)	2	0.52	386.9	46.8	1396.6	
SUICIDES (963,970-979)	1	0.40	248.7	6.3	1381.4	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	2					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL

PROJECT TITLE: WHITE FEMALES (TOTAL PLANT)
POPULATION SELECTED: DATE OF HIRE 1938-1948
EXPECTED NUMBERS BASED ON: 28 YEAR FOLLOW-UP
NUMBER AT RISK: 3120
PERSON YEARS: 84960.9

Duration of Exposure: Total
Latency: Total
Time Period: All
Age Group: All

CAUSE OF DEATH (ICDA 7TH REVISION CODE)	OBS	EXP	STANDARDIZED MORTALITY RATIO SMR	95% C.I. LL	UL	SIG
ALL CAUSES OF DEATH	296	356.95	82.9	73.7	93.0	**
ALL MALIGNANT NEOPLASMS (140-205)	87	104.92	84.4	68.0	61.9	**
LARGE INTESTINE (153)	5	10.23	48.9	15.8	114.2	
PANCREAS (157)	3	3.63	82.6	17.0	241.6	
BRONCHUS, TRACHEA, AND LUNG (162-163)	9	6.96	129.2	59.3	245.3	
CANCER OF THE BREAST (170)	12	25.28	47.5	24.5	82.8	**
KIDNEY (190)	1	1.37	73.0	1.8	405.3	
BLADDER AND OTHER URINARY ORGANS (181)	2	1.03	194.1	23.5	700.8	
LEUKEMIA AND ALEUKEMIA (204)	4	3.61	110.9	30.2	283.7	
ALL LYMPHATIC & HAEMATOPOIETIC TISSUE (200-205)	13	8.58	151.5	80.6	259.0	
DIABETES MELLITUS (260)	12	9.20	129.6	66.8	226.1	
STROKE (330-334)	27	39.87	67.5	57.6	127.3	
ALL DISEASES OF CIRCULATORY SYSTEM (400-468)	93	108.63	85.6	69.2	104.9	
CORONARY HEART DISEASE (420)	59	68.41	86.3	65.8	111.3	
NONMALIGNANT RESPIRATORY DISEASE (470-527)	16	12.20	131.2	74.9	212.9	
EMPHYSEMA (527)	2	1.30	148.7	17.8	529.5	
ALL DISEASES OF GENITO-URINARY SYSTEM (590-639)	5	8.85	56.5	18.3	132.1	
ALL EXTERNAL CAUSES OF DEATH (800-998)	28	27.20	102.9	68.8	148.8	
ACCIDENTS (800-962)	17	17.69	96.1	55.9	153.8	
MOTOR VEHICLE ACCIDENTS (810-835)	9	9.35	96.3	44.2	182.7	
SUICIDES (963,970-979)	9	7.45	120.8	55.4	229.3	
UNKNOWN CAUSES (IN ALL CAUSES CATEGORY ONLY)	21					

* SIGNIFICANT AT 5% LEVEL; ** SIGNIFICANT AT 1% LEVEL